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HAEDEN ELI STEWART

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"They'll be digging through the landfills/ To find evidence of our great demise"

Jay Ferrar, *Barstow*

TABLE OF CONTENTS

LIST OF IMAGES

LIST OF TABLES

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Introduction

Mill Creek runs roughly north to south, emptying into the North Saskatchewan River through a steep ravine. The ravine, still forming today, began to form following the end of the Ice Age (roughly 10,000 years ago), when a deep post-glacial lake began to drain eastward towards Hudson Bay. As the North Saskatchewan River began to cut its way across the vast flat prairies, Mill Creek cut a smaller path to the North Saskatchewan, draining an area south of the river. As Mill Creek drained, it dug into the flattened landscape left behind by the glaciers, and revealed ancient geological strata. First the creek cut through soft river sands from twenty-one thousand years ago, then through hard packed soils from when the area was a dry grassland, then—finally—through thick layers of coal, the remains of wet and warm peat bogs that had once flourished in the area, 140 million years ago.

Today this ravine is a large urban park nestled at the heart of Edmonton, a city of over a million people, the capital of Alberta, and a hub for the oil-sands industry. The main users of the park are joggers, dog-walkers, and dozens of homeless people who camp in the woods lining the ravine. Overgrown with thick brush the ravine is littered with degraded concrete slabs, old domestic waste, and cow bones eroding out of the creek bank, half-submerged in the soil. These strewn objects and rubble tell a particular industrial history of the ravine: the colonial dispossession of Indigenous land in the late nineteenth century, the rise of meat-packing and coal industries in the early twentieth century, but also of the collapse of industry, which left piles of rubble and mounds of slaughtered cow bones when it abandoned the ravine in the 1920s. This history is at once particular and general, offering a situated perspective of multiple histories from a peripheral place—a palimpsestic node that gestures outward to the layered histories of colonial settlement, capitalist exploitation, and environmental degradation.

Fueled by concerns over the threats of climate change, recent social scientific research has highlighted the ubiquity of landscapes devastated by resource extraction and industrial waste, as well the inequality of toxic exposures across different communities (Bird Rose 2018; Haraway 2016; Murphy 2013a; Tsing 2005). For the most part, these studies have emphasized the acute effects of recent industrial waste and the unique ways through which this waste transforms communities, ecologies and landscapes. This focus on more recent waste ignores the ways that early industrial waste, produced during periods now considered long past, continues to persist in contemporary landscapes. Furthermore, this focus on recent industry also elides the intertwined histories of early industrial devastation with settler colonial dispossession and violence. In order to interrogate this elision my dissertation is focused on the question: How does early industrial waste define the landscapes of the Capitalocene? And further, as a corollary to this question: Given the historical links between early industry and settler colonialism, how does the persistence of early industrial waste articulate with ongoing colonial violences and silences? Identifying Mill Creek Ravine as a paradigmatic site of settler colonial industry, my research answers these questions by focusing on how the persistent waste of early industrial production in Mill Creek Ravine has decayed, disrupted, and harmed the landscape over the past 120 years.

This dissertation is a historical archaeology of the early industrial waste of Mill Creek Ravine. Instead of merely studying the history of occupation and production behind this waste, I am interested in the history of this waste *particularly*. How did it persist in the landscape? How did it harm humans and non-humans alike? How did it become meaningful and valuable to different community and governmental projects as they attempted to make and remake Mill Creek Ravine? But also, how has the persistence of this waste served as a disturbing force, disrupting these projects and serving as a critical archive of the ideals and histories that have congealed around them? By tracking this waste archaeologically, I trace the history of Mill Creek Ravine as it was transformed from an Indigenous reserve, to an industrial epicenter, to a shantytown, to an abandoned wasteland, and finally to a beloved city park.

Drawing on three years of archaeological excavation, archival research, ethnographic interviews and environmental science testing, I demonstrate that, even as the area was made and remade according to external economic forces and government logics, the persistence of industrial waste in the ravine continued to harm and remake the human and non-human communities of the ravine long after the cessation of industry. As the landscape was purposed and repurposed in different ways by municipal governments and local communities, this early industrial waste has continued to actively haunt, define, and disrupt the human and non-human communities that made up the ravine. Through this research, I argue that the decay of early industrial waste actively mediated the production and reproduction of Mill Creek Ravine as a landscape over the past century, a process I call lively decay. Initiated by the appropriation and dispossession of Indigenous rights, the lively decay of early industrial waste acted as a medium for the logic of late nineteenth century settler colonial capitalism to continue to haunt Mill Creek Ravine: the human and non-human bodies and roots that constituted it, and their ways of knowing it. At the same time, this lively decay serves as a medium for the emergence of new ecologies, new communities, and critical perspectives on the fantasies that shaped and continue to shape how Mill Creek Ravine is imagined and used.

Beyond making a historical point about the haunting material legacies of nineteenth century colonialism, a central goal of this research in Mill Creek Ravine is to show that industrial waste is an important object for archaeological research, not simply as an artifact of production, but as a source of lively decay that continues to effect social and ecological relations long after industry has ceased. The archaeological study of industrial landscapes and industrial debris provides an optic not merely onto what happened in the past, but onto how the historical processes that appear as past are still happening. Industrial archaeology, as a sub-discipline of historical archaeology which investigates the history of industrialization through the waste it leaves behind, is a vital method to explore the devastated landscapes of the contemporary world.

Mill Creek Ravine

Between 1869 and 1877, under threat of starvation, Indigenous communities signed what are known as the Numbered treaties, ostensibly trading the rights to their land in exchange for government support, food, and land reserves. In 1877, Papaschase, the chief of a Cree band, signed an adhesion to Treaty Six. The Papaschase band—which traditionally lived, foraged, trapped, and hunted in the area between Fort Edmonton and Lesser Slave Lake—had an historical relationship to the land around Edmonton and a longstanding trading relationship with the Hudson's Bay Company. Due to this relationship, Papaschase secured a 48 square mile reserve directly south of Edmonton. The main geographic feature of the Papaschase Reserve was Mill Creek Ravine. On an otherwise treeless plain, the ravine was a unique and prized resource: densely wooded, filled with game, and a valuable source of water. It was also, incidentally, home to rich and easily accessible coal deposits, something of especial interest to future industry.

However, in Edmonton political pressure from Euro-Canadian settlers rallied to limit the Papaschase reserve. Frank Oliver, the first media mogul in Edmonton, began using his newly minted newspaper to galvanize Euro-Canadian support against the Papaschase. Claiming that the Papaschase did not use their land properly, and that rich deposits of coal and timber in Mill Creek should be used for the progressive development of industry, local Edmontonian businessmen and journalists successfully petitioned the Canadian government to renege on the Papaschase reserve agreement and to open the land to industrial development in 1886 (Edmonton Bulletin 18 June 1890; Edmonton Bulletin 2 Aug 1884, L. Vankoughnet to Sir J.A. Macdonald 3 April 1886 PPP). The government pressured the majority of the Papaschase band to leave their reserve, stripped them of their band status, and then sold the reserve land ("Surrender and Sale of Passpasschase Reserve and its Amalgamation with Enoch's Band" 19 Nov. 1886). After the appropriation of the reserve was complete, the Edmonton, Yukon, and Pacific Company began building the first railroad connecting Edmonton to the rest of Canada—and it ran right through Mill Creek Ravine. By the time the railroad was finished in 1902, industries had already begun clustering in the ravine, eager to exploit the wood, water, and coal resources, and to take advantage of the transportation opportunities of the railroad. Up until the 1920s, Mill Creek Ravine was one of the main industrial centers in Edmonton, and Western Canada as a whole. As Edmonton's economy experienced a downturn in the 1920s, industry abandoned Mill Creek, leaving behind piles of industrial waste in its path (ruined buildings, mining overburden, waste Pits filled with bones and coal debris).

When industry left, a marginalized community of industrial labourers settled in a community known as Ross Acreage continued to occupy the northern end of the ravine. In the

1950s, the city kicked the residents of Ross Acreage out of their homes, and for the next twenty years Mill Creek Ravine was left abandoned, with trees and shrubbery descendant from Ross Acreage plot boundaries growing over the decaying industrial waste. In something of a sea change in the 1970s, this overgrown ravine was deemed to be an important natural resource for the city and the local communities on either side, and the ravine was officially protected as a municipal park. Since the 1970s it has been one of the most popular park destinations in Edmonton. Despite this, it remains one of the most polluted parks in Edmonton, containing the most polluted urban creek in the province, a fact that has raised numerous conservation efforts towards protecting it.

Today, the ecology of this park grows on top of the bones, clinker, and bricks from this early industrial period. Old concrete foundations peak out behind thick understories of caragana, wild rose, and other wildflowers. On top of this decaying waste, a lush array of shrubs and trees extend across the entire ravine. Bike paths are built on top of the tracks of the old railroad that serviced the packing plants and train track trestles still hold up bridges across the creek. While the old train tracks are publicly memorialized, the rest of the history of Mill Creek Ravine has been forgotten. The history of the Papaschase reserve has also been largely forgotten. The material legacies of this past, the direct result of colonial fantasies of progress and capitalist fantasies of profit, continue to decompose slowly, underground and out of sight.

Anthropocene or Capitalocene

As a space that has sedimented decades of industrial waste in its soil, creek bed, and across its tangled ecology of roots and bodies, Mill Creek Ravine represents a landscape that is definitive of the contemporary era. By landscape I am not referring to the term as a visual godseye trick (Hawkins 2013), or as a space that is "socially and culturally constructed" (Richard 2018: 35). Rather, I use the term landscape to refer to the "overlaid arrangements of human and non-human living spaces" (Gan, Tsing, Swanson, and Bubandt 2018: G1), an arrangement that is defined through forms of human construction (both material and ideational), but also through abandonment, destruction, and growth. Landscapes haunted by the presence of industrial waste are neither outliers nor aberrations; they are ground-zero for a globe that is increasingly becoming one big industrial landscape.

In order to better historically situate this global florescence of devastated landscapes, scholars across the humanities and social sciences have turned to the concept of the Anthropocene (Chakrabarty 2009; Clark 2015; Eckersley 2017; Ellis 2017; Lidskog and Waterton 2016; Tsing, Swanson, Gan, and Bubandt 2017). Identifying the human impacts on the environment following the Industrial Revolution as so substantial that they warrant their own geological period, the concept of the Anthropocene was introduced in 2000 by atmospheric chemist Paul Crutzen and ecologist Eugene Stoermer (Crutzen and Stoermer 2000). The term has achieved broad interdisciplinary use across the sciences and social sciences, and has been extensively drawn on as a useful frame to better understand the uniquely transformative and destructive nature of recent human activity and human waste on the globe.

Many archaeologists have reacted ambivalently towards the Anthropocene concept (Erlandson and Braje 2013; Gonzalez-Ruibal 2018; Graves-Brown 2014). While some have criticized the founding assumptions the analytic is founded upon, most archaeologists have pushed back against the modernist periodization inherent in the Anthropocene, arguing that the geophysical transformations of the Anthropocene have a much deeper history, and human environmental relations are far more complicated with far deeper histories than the Anthropocene as concept allows (Balter 2013; Bauer 2015; Bauer and Ellis 2018; Erlandseon 2013). While this critique is well-taken, it elides the useful content of the Anthropocene, that is: the acknowledgement that contemporary human effects on the globe are destructive and unsustainable at a scale that cannot be explained away by a reflection on the Neolithic revolution. It is undoubtedly true that pre-modern humans were active in drastic transformations of their local environments. At the same time, it is also undoubtedly true that identifying those transformations as similar in kind to modern industrial devastation evacuates the useful analytical and political purchase of the Anthropocene concept.

As other archaeologists, like Alfredo Gonzalez Ruibal, have pointed out, the central problem of the Anthropocene as a concept is not its attempt to distinguish between modern and pre-modern human-environment relations (2018). By reinserting an essentialized and universal Anthropos at the heart of the problem, the concept of the Anthropocene reifies the nature/culture divide it ostensibly attempts to critique. It purports to provide a historical critique, while in fact providing a cookie cutter explanation dependent upon unreflexive transhistorical categories eliding questions of politics, exploitation and inequality. The basic Anthropocenic contention, that human activity plus nature results in a planetary catastrophe, fails to differentiate between different forms of human activity and different experiences of environmental victimhood, and merely reinscribes a Malthusian terror of carrying capacity to the global scale (Moore 2016).

What the concept of the Anthropocene fundamentally misses is that the defining characteristic of the modern period is not some monolithic Anthropos imposing itself upon a helpless 'Nature'. The defining characteristic is an abstract and global dynamic that is founded upon the expansion of self-valorizing value, in a word: capital. This period, termed the Capitalocene by Jason W. Moore (2016), is marked by socio-natural relations that reproduce themselves through structures of social interdependence produced by globally abstract human labor. The dynamic of capital has remade the globe on a social, biological, and geological level, and has subsumed the ecologies and geologies of the world into its value-making project. At the same time, the Capitalocene does not represent humans "overwhelming the great forces of Nature" (Steffen et. al. 2007), the subsumption of the non-human world under an exclusively human system. Instead, the periodization of the Capitalocene argues the opposite, that capitalism is not a closed system distinct from the ecology of the world, but a totalizing world-ecology defined by the double internality of capital-in-nature and nature-in-capital: "the mosaic of relations that we call capitalism works through nature" while "nature works through that more limited zone: capitalism" (Moore 2015: 1). The Capitalocene is not the result of capitalism doing something to nature, it is a history of how capital made nature work for it.

Cheap Nature

Rather than being organized around a monolithic vision of humanity (like the Anthropocene), the historical periodization of the modern era as the Capitalocene highlights how relations of inequality, exploitation, and racism intersect with the global environmental degradation and transformation that is driven by the hunt for surplus value. The concept of the Capitalocene highlights how the capitalist mode of production represents a unique and destructive set of socio-natural relations that is indexed by a unique geophysical imprint. As it circles the world, capital remakes social relations, communities, built environments, ecologies, and biologies. The environmental devastation and transformation that marks the Capitalocene is facilitated by a unique and destructive understanding of humanity's relation to nature. The global expansion of capital, and the rise of industrial capitalism, is also necessarily tied to the analytical alienation of nature as external to humanity. The separation of humanity from nature performs a "special kind of work" for capitalism, identifying Nature as endless, "Cheap" and free for the taking (Moore 2015). Under this binary, nature appears as the source of endless potential resources and resource frontiers, an arena that can be endlessly appropriated for new materials that can be transformed into commodities, and a storehouse for endless progressive growth. Historically, the appearance of nature as external facilitates the endless expansion of capital into new regions and the violent colonial appropriation of land, resources and labor. While fundamentally organized by the commodity form and the logic of capitalism, the Capitalocene is always already "colonial and imperial" (Haraway 2015), and the binary of nature/culture "is directly implicated in the modern world's colossal violence, inequality, and oppression" (Moore 2016). The exploitation of labor that functions at the core of commodity production is itself dependent upon the unpaid appropriation of work and resources from "women, nature, and colonies" (Mies 1986: 77) as natural. Just as Nature appeared free for the taking so did the land, labor, and resources of those who were not fully legible as humans.

By the beginning of the Industrial Revolution in the late eighteenth century, accelerated by the globalization of industrial capitalism in the mid-nineteenth century, the appropriation of Cheap-Nature necessarily expanded to not just include exploitation, but also degradation. Just as industrial production drastically accelerated the appropriation of new environments, and the production of new commodities, it also drastically accelerated the production of new waste. The identification of natural spaces as inert containers of valuable resources also identified the surrounding landscapes, ecologies, and communities as not just exploitable, but degradable. The ecological and economic devastation of stripping ‘frontier’ landscapes of resources and exploiting labor was combined with the devastation of landscapes through the deposition of waste. This new industrial waste was pumped into rivers, accumulated in ravines, and sedimented in lake beds, remaking landscapes and their ecologies.

How Waste Makes Space in the Capitalocene

The Capitalocene does not describe a geological era, it describes a theory of how capitalism makes space that takes into account waste. Industrial production does not just devastate landscapes by appropriation, production, and abandonment it also continues to define landscapes over the long term through the persistence of industrial waste. According to classical Marxist geography, production defines space; the drive to produce and circulate capital leads to an increasing abstraction of space, the remaking of particular places according to the principles of efficiency, scalability, and profit (Harvey 1996; Lefebrve 1991; Smith 1984). Despite its claims to universality, this proliferation of abstraction does not result in an equal world, but in a radically uneven one, defined by inequality, ecological devastation, and economic abandonment tied to the contradictions and crises inherent to capitalism (Blunt and Wills 2013; Mels 2014; Smith 1984) This geography of production, circulation, and abandonment is tied to the ever-accelerating temporality of capital, the unequal concentration of wealth, exploitation, and economic abandonment. From the perspective of production, the purpose of a space is defined by its relation to capital. As the speed of capital accelerates globally, this speed is felt locally by the transformation in the local landscape. A single space over time may be produced as many different kinds of landscapes, a factory may turn into an abandoned space, which may be turned into a park, which may be turned into an apartment complex.

Shadowing this geography of production is a geography of the waste, a result of the increasing acceleration of capital, but one that is also tied to the long temporality of material decay. The two geographies are fundamentally linked, but also in tension, since any project that wishes to remake one landscape must deal with the residue of the old; as Lefebrve pointed out, "no space ever vanishes utterly, leaving no trace" (Lefebvre 1991: 164). At the same time, describing the geography of industrial waste as merely a question of traces drastically underestimates the persistence, size, and vitality of industrial waste to not just resist vanishing, but to actively form, haunt, and subvert future landscapes.

One way in which scholars have understood the connection between capitalism and its waste has been through a focus on its abandonment. Channeling the thought of Walter Benjamin, such scholars argue that waste, as the rejected and fragmentary result of abandoned commodities, provides a vital archive of the history of capitalist production, and the fantastic images the commodity fetish has dreamed up (Dawdy 2009; Gordillo 2011). In "Convolutes N," Benjamin gives a "modest methodological proposal for the cultural-historical dialectic," that for any given moment or period, one could distinguish the positive (the functioning, the forward looking, the productive) as defined against the negative (the detritus, the rubble, and the ruins) (1999). And that methodologically one should investigate the negative. Critical attention to the abandoned detritus of capital points out the falsity of the capitalist dreams of progress, presencing through absence the "fabulous levels of destruction" that capitalism produces (Gordillo 2011: 79).

Orienting waste towards the past (production), and to the future (as an archive for political inspiration), this approach usefully identifies the critical potential of waste.

While powerful, this approach elides the ongoing material relations that define post-depositional decay except as an allegorical index of abandonment. In order to avoid overdetermining waste as singularly defined by its abandonment, Moore highlights the connection between the geography of production and that of waste through the concept of negative value (2015b). The accumulation of industrial waste in the environment produces landscapes that "are increasingly hostile to capital accumulation and can be temporarily fixed only through increasingly costly and toxic strategies" (Moore 2015b: 1). Instead of aiding the production of new value, waste settles into the reproductive capacity of the landscape, and disrupts future attempts to appropriate new resources from them. The normative processes of industrial production are constantly shadowed by the pathological presence of waste. On a macro-scale, Moore's concept usefully articulates the question of waste to both the process of production as well as the oncoming crisis of ecology that emerges out of the infinite drive for capitalist expansion in a finite world. On the micro-scale, however, even while noting how the feedback loop of waste becomes entangled into the reproduction of life under capital, Moore's concept of negative value largely ignores the particularities of how waste makes space, communities, and ecologies over the long term and the politics of this production.

In contrast to Moore, Michelle Murphy highlights the specific manner in which the persistence of industrial waste does not just negate it also "brings new things to life" (2013: 104). For Murphy, the sedimented waste deposited by capitalist production is an extension of the industrial infrastructures that produce it. Instead of distinguishing between intended and unintended consequences of production, Murphy notes that both waste and commodities directly mediate how human and non-human lives reproduce themselves. Instead of a rejected residue, this sedimented waste is part of what Murphy calls "chemical infrastructure": the distribution of industrial waste as "they become mobile in the atmosphere, settle into landscapes, travel in water ways, leach from commodities, are regulated (or not) by states, monitored by experts, engineered by industries, absorbed by bodies, metabolized physiologically, and as they bioaccumulate in food changes, break down over time, or persist." (105)

Just as the factories and roads serve as the physical infrastructure to produce and circulate the commodities that reproduce the capitalist world, this reproduction is also mediated by the persistence of industrial waste that capitalism leaves behind. In other words, industrial waste mediates the reproduction of life in the landscapes of the Capitalocene. Just as the production of commodities via the traditional infrastructure of roads and pipes and factories unevenly enriches certain classes and reproduces certain ways of life over others, so to does the waste sedimented in the ground unevenly promote the reproduction of certain forms of life over others. Certain communities, both humans and non-humans, suffer in the face of toxic exposure from this waste—yet, others thrive. The uneven distribution of the harms and benefits of industrial waste is neither arbitrary nor completely deterministic. On one hand, industrially harmed landscapes, and the vulnerable communities that occupy them, do not develop by accident. The geography of industrial devastation is closely linked to the geography of poverty, and the latent harms that industrial waste produces disproportionately exposes marginalized and impoverished communities to its toxicities (Lerner 2010; Hedges and Sacco 2012; Chari 2012). As the negative value of industrial waste build-ups in peripheral spaces, marginalized communities become front-line victims of its exposure, pulled by the lure of jobs and unable to afford to move to a better, cleaner, and healthier location. These chemical infrastructures are defined not by their immediacy, but by their persistence, by the uneven way in which they may lie hidden or emerge suddenly. As Rob Nixon argues, it is precisely in the "slow violence" of this long-term exposure that the harms of industrial waste are most insidious, causing widespread injuries and engendering fear and paranoia, while at the same time resisting the legibility of straightforward cause and effect (2011).

Chemical infrastructures define their landscapes and their ecologies by their latency, by an indeterminate lag between deposition and effect. While industrial waste lies dormant, "Latency names how the past becomes reactivated" (Murphy 2013: 106), waste deposited decades ago may still have effects on local communities and ecologies. The latency of industrial waste serves as a medium through which the inequalities and harms of the past are ongoing and indefinite, "[t]hrough latency, the future is already altered" (Murphy 2013: 106). At the same time, the latency and harms of industrial waste do not just harm, they also disrupt and reconfigure the emergence of new forms of life, new ecologies, and new communities. The latency of waste at once becomes an avenue for unequal exposures, harm, and the accumulation of new waste, as well as an object that mobilizes the production of new kinds of space, knowledge, and ecologies.

The Great Acceleration

At the same time, not all eras of the Capitalocene are equal, and not all industrial waste mediates the reproduction of life in the landscapes of the Capitalocene in the same way. In other words, not all industrial waste can be understood as latent chemical infrastructures. There is a vital third term in Murphy's analysis of industrial waste as infrastructure: chemical. Drawing on the example of petrochemical production that has lined the banks of the St. Clair River along the Ontario/Michigan border since the 1940s, Murphy highlights the diffusion of synthetic chemicals like BPA (Bisphenol A, a chemical commonly used in the production of plastics) throughout the riverine soils. These chemicals, the direct result of a booming post-war florescence of petrochemical production, disrupt the absorption of hormones by a body, drastically transforming its growth, its ability to reproduce, and its ability to survive and thrive. While on one hand Murphy is talking broadly about industrial waste, she is in practice speaking particularly about a specific kind of chemical industrial waste tied to a specific historic era.

The rise of the petrochemical industry along the St. Clair river was part of the massive growth of new industries following the Second World War that produced massive amounts of new synthetic chemicals, pesticides, and plastics. This industrial growth, termed the Great Acceleration, drastically increased the amount of industrial waste, and introduced new forms of virulently toxic chemical waste into the world (Stoner and Melathopoulos 2015; Tsing, Swanson, Gan, and Bubandt 2017). Like Murphy, most scholars studying industrially devastated landscapes focus on the chronic effects of industry from the period following the Great Acceleration as problems of the present. These studies focus particularly on the insidious chemistry of post-Great Acceleration industrial waste and its effects: the long-term histories of an organic compound like methyl isocyanate in a disastrous landscape like Bhopal (Fortun 2001, 2012), radioactive isotopes in Chernobyl or New Mexico (Brown 2018; Masco 2006; Mycio 2005), and petrochemicals like BPA along the banks of the Mississippi (Davies 2018). These scholars correctly identify the pressing need to understand the ongoing traumas, political communities, inequalities, and ways of knowing associated with the spread of this particularly insidious form of industrial waste, and its production of increasingly ubiquitous devastated landscapes across the globe.

However, the emphasis on post-war industrial waste elides the longer histories of industrialization, waste, and abandonment that define the Capitalocene. By highlighting the landscapes of petrochemistry, post-war neoliberalism and Cold-War imperialism, this research only grapples with the shadowy waste of histories of production that are linked to recent decades: industries that from the perspective of production are still functioning or have only recently closed. While the immediacy of the harms of post-war industrial activity and waste is incredibly high stakes, and the pervasiveness of its dramatic effects on both human and nonhuman communities is extensive, an overemphasis on this kind of waste threatens to situate the problem of industrial devastation with a specific kind of materiality instead of a specific kind of social relation of production. Industrial waste from long abandoned early (pre-war) industries continue to transform contemporary communities.

Emphasizing the waste of the Great Acceleration as the representative waste of the Capitalocene threatens to situate the prior history of industrial capitalism as part of a distant past, rather than a transformative world-deforming project that is still materially present in the decaying waste it has left behind. Early industrial waste is at once a historical pre-cursor for the contemporary devastation of synthetic chemistry, as well as a vital and transformative object that is present in the contemporary in its own right. The distribution of early industrial waste constitutes an archive of entangled histories of a much longer duration than that of the Great Acceleration, representing histories of occupation that do not hinge simply upon questions of production and abandonment, but upon longer recursive histories of re-occupation, salvage, growth, restoration, remembering, and forgetting. These landscapes of early industrial waste embody longer histories of use and re-use, as well as histories of how the material effects and looping pasts of this waste have been mobilized. Necessitating a longer time frame, early industrial waste articulates with questions not only of toxic injuries and ecological harm, but also those of historical memorialization.

The Early Industrial Waste of Mill Creek Ravine

The histories of early industrial production waste are intertwined with historical processes that are often consigned to the distant past, namely nineteenth-century settler colonialism and the appropriation of Indigenous land. As Moore points out, the Capitalocene is itself premised upon the settler colonial project (2016). Heather Swanson doubles down on this, emphasizing that the most appropriate place to locate the beginning of the contemporary era is in the 1860s, when the expansion of railroads across North America linked industrial transportation and the colonial appropriation of land with an emergently global industrial capitalism (2015: 104). Driven by the need for new resources, and facilitated by global flows of capital and commodities, the appropriation and settlement of the North American West was driven by industrialized processing and resource extraction. In Western Canada, the building of the railroads throughout the 1880s and 1890s facilitated the establishment of industrial-powered extraction and processing in mining, meatpacking, and fish canning. The massive exploitation of natural resources that marked the appropriation of the West as a frontier, as well as the transformation of landscapes into dumping grounds for industrial waste remade local environments and the communities that lived off of them. Rich in coal and open range, Alberta became an early site for the coal mining and meatpacking: two industries that dumped high levels of waste across the province. Combined with the capitalist drive to appropriate resources, the settlement of Alberta was conditioned by a colonial fantasy to remake the Prairies into an industrial and industrious place not just by remaking its economy but by remaking its ecology.

Mill Creek Ravine serves as a paradigmatic example of an early industrial landscape of the Capitalocene, in which the drives of profit combined with the colonial fantasies of progress and Cheap Nature to transform Mill Creek Ravine into a landscape filled with industrial waste. Situated in Central Alberta, near the old trading center of Fort Edmonton, Mill Creek Ravine was industrialized during the early twentieth century as part of the appropriation and settlement of Western Canada. From 1880-1886 Mill Creek Ravine was designated as part of the official reserve of the Papaschase Cree. In 1886 the treaty associated with the reserve was reneged and the land was appropriated by the Canadian government to exploit the coal and lumber resources of the area and facilitate the industrial development of Edmonton. Following this appropriation, Mill Creek Ravine became one of the first industrialized manufacturing centers in Alberta, lined with coal mines and meatpacking plants. As the remains from the coal mines and meatpacking plants decomposed, they reformed the ecology of Mill Creek and its ravine and in doing so they polluted the lives and homes of the laborers who worked there; at the same time, those remains were actively reused and revalorized by successions of locals, activists, and municipal bureaucrats to remake the park according to a colonial fantasy of pre-industrial Nature that elided Indigenous histories, communities, and politics. Rather than an artifact or ruin of the past, this persistent waste represents what Ann Stoler would call one of the “protracted imperial processes that saturate the subsoil of people’s lives and persist, sometimes subjacently, over a long durée”

(2013: 5). This persistence, and its ability to appear ‘from the past,’ represent the extension of colonial appropriation into the present. Unassuming, it also serves as example of how the residues of colonial settlement mediate colonial logics precisely in a way that prevents it from being legible to any easy representation of colonialism or empire.

Lively Decay of Mill Creek Ravine

The decomposing remains of coal mining and meatpacking waste in Mill Creek Ravine do not just reflect a deeper history than Murphy’s build-up of petrochemicals in the St. Clair River, they represent a different way in which the persistence of industrial waste makes space. Murphy defines the petrochemical waste of the St. Clair River as a chemical infrastructure that defines the landscape through its latency. Due to the significant temporal distance between the life of actual industrial production in Mill Creek Ravine and the afterlife industrial waste, there is a useful distinction to be made between the infrastructures in the process of commodity production and waste (that which the relations of production leave behind) as an extension and a medium for the effects of this production. Identifying chemical waste as co-extensive part of the productive infrastructure elides the ways in which waste does not serve simply as an extension of the relations of production, it also reflects the relations that produced the waste. Waste does not just appear as an appendage to industrial infrastructure, but also—fractal-like—serves as an archive of that infrastructure’s production.

As an extension and reflection of the infrastructures of coal mining and meat-packing, the early industrial waste of Mill Creek Ravine can, perhaps, be better thought of as what Joshua Reno might call a sign of early industrial life. Using animal scat as his master metaphor, Reno identifies waste as "a sign of life," a material-semiotic bundle that serves as both an archive of and a material extension of the form of life that produced it (2014). "Once it has been left behind," waste continues to serve as a medium through which the form of life that produced it develops new "material and semiotic entanglements" (Reno 2014: 20). Once scat is left behind, it remains tangible, meaningful, and vitally engaged with the surrounding ecology, even as it reflects back upon the life that produced it.

In her discussion of microscopic petrochemicals Murphy notes that latency is defined in contrast to decay: some chemicals "break down" while other chemicals "persist" to emerge later and disrupt the present and future (105). This distinction hinges on the scale of Murphy's object: microscopic synthetic chemicals like BPA that persist or decay at the scale of covalent bonds. This contrasts with the materiality of the early industrial waste in Mill Creek Ravine, which, like Reno's scat, exists on a larger scale. This waste, the accumulated piles of old bones, bricks, disintegrating concrete, and clinker does not engage with the landscape latently, it does so actively and often visibly. Trees grow out of crumbling concrete, clinker disintegrates into the ground, and old bones erode out of the banks. Decay is not the cessation of these objects, instead it is precisely the way they persist—not latently, but lively.

Traditionally, decay has been seen from the prospective of production, as a form of negativity that disrupts and disintegrates an object's identity. For Mary Douglas the decay of an object threatens the order that made the object meaningful in the first place. Decay makes a thing dangerous, leaving it in a liminal state with its "half-identity" still clinging to it (2003: 161). For Benjamin, decay is the embodiment of the transience of nature (McKinney 2012; Benjamin 2003). Unlike Douglas, Benjamin sees the critical benefits of decay, drawing on the negativity embodied in decay to critique the fantasies of wholeness and progress that define capitalist society. For archaeology, decay has been seen as the silencing of the past, the erasure of meaning.

Attending to waste as a sign of life suggests a different interpretation of decay. Decay is a contact zone between waste and its environment, the emergent entanglement of waste's particular history, as well as the particular history of its context. Through its decay, waste serves as a kind of compost for new life, new communities, and new meanings. At the same time, decay does not just facilitate new growth, it also facilitates new harms, new toxins, and new disturbances. Both these benefits and harms are unevenly distributed, experienced, and made meaningful across human and non-human communities. This unevenness is not arbitrary, but rests in the history of the waste itself and the form of production under which it was produced, as well as the history of its context. Decay serves as a process by which the inequalities and harms of this past are perpetuated through the active and uneven reproduction of "new life", new relations, new communities, and new meanings (Reno 2014: 12). At the same time, decay reveals the historical relations of production congealed in the waste.

As a sign of life, the decay of early industrial waste in Mill Creek Ravine is not negative, it is lively. Since the appropriation of the Papaschase reserve and the founding of Mill Creek Ravine as a landscape of industry and waste, the landscape has been defined and redefined in a number of different ways by a number of different projects. This dissertation argues that this production and reproduction of the landscape has been mediated by the lively decay of early industrial waste. By lively decay I mean decay as an active and ongoing engagement of waste with the landscape, extending the effects of early industrial production into the present, as well as reflecting upon the history of industrial production itself. Lively decay is lively in the double sense: on one hand it is (like compost) a source for active engagement with the local ecology (new growth, new ideas, new entanglements), while on the other hand it is a reflection of the form of life that produced it. Through the lively decay of this waste, the colonial fantasies and silences that served to appropriate the Papaschase reserve and produce the landscape as an industrial space continue to haunt the present. Furthermore, as a reflection of this history, lively decay appears as a marker of its pastness, its temporal distance. Beyond serving as a medium for colonial violence and silences, lively decay also fosters new growth, new disruptions. Just as lively decay of early industrial waste extends injuries and inequalities into the present and future, as an active archive of this history it also retains the power to disturb and transform the status quo, the production of space, and the assembling of history.

The force of lively decay is not the force of production. Anthropologists Elaine Gan, Anna Tsing, Heather Swanson and Nils Bubandt might call this lively decay a kind of ghost, a way that "multiple pasts, human and non-human" continue to haunt a landscape (2018: G2). In an age of great transformation like the Capitalocene, every landscape is an archive of haunting pasts, absences and presences, that persist in both material and spectral ways to transform and trouble contemporary landscapes. The latency of petrochemical waste, for instance, represents a haunting of the landscape, a hidden and feared past that may emerge in the present. The lively decay of early industrial waste represents a different kind of haunting. Perhaps a related, but more specific spooky metaphor for the lively decay of early industrial waste in Mill Creek Ravine would be spiritual possession, a play on the way that the active persistence of industrial waste reflects and extends a settler colonial claim of ownership[1]. While hauntings are ethereal, uncanny and embodied by the figure of the wind (Gan, Tsing, Swanson and Bubandt 2018: G3), possession is denser, thicker, and more visible: sometimes it hides itself away, and sometimes it grabs the wheel to cause disruption. Lively decay does not produce the landscape, nor does it determine the lives, ecologies, and meanings that occur there, instead it possesses the landscape, compels it, harms it, germinates it, and disturbs it.

Archaeology of Early Industrial Landscapes

The central research question of this dissertation was: how has early industrial waste continued to make and remake settler colonial landscapes long after the abandonment of industry? To answer this question, I study Mill Creek Ravine as a paradigmatic example of an abandoned early industrial landscape. In order to explore how early industrialization has defined and haunted Mill Creek Ravine over the past century I rely on a number of methods to track the long-term afterlives of early industrial waste in Mill Creek Ravine. I combined the methods of archaeology, environmental science and history to not just reconstruct the history of production, but to track how the lively decay of early industrial waste articulated with other communities, both human and non-human.

The early industrial waste of Mill Creek Ravine represents a lively archive of how early industrialization has continued to define the landscape long after its abandonment. Congealing the entangled multispecies relations between this waste and its landscape, the sedimented history

[1] A metaphor which works nicely with Michel Serres contention that to produce waste is to claim ownership (2010).

of industrial waste in Mill Creek Ravine reflects the effects of colonial appropriation and early industrialization. Studying the multi-species relations that are entangled in this archive requires a method that can investigate and reveal these sedimented relations within industrial waste—in short, archaeology. Despite being a discipline which reconstructs the past through waste archaeologists who focus on the recent industrial past have largely failed to account for the lively ways that industrial waste decays. Archaeology has a long tradition of interpreting the material residue of the past through its ability to shed light on human activity in the past (Lamotta and Schiffer 2007). For the archaeologist, waste serves as a fragmented index of the processes of production, consumption, and abandonment that created it as waste, as well as the historical society in which these processes took place. From this perspective, the post-depositional afterlife of an object is largely irrelevant, except as a site of decaying processes that fragment and distort the historic artifacts' ability to recall information. Identifying waste by their pastness, this approach has relied upon a fantasy of progressive time, and failed to acknowledge how, through the medium of waste, the processes of the past continue to act upon the present. Decay, in other words, is viewed as the destruction of history, the erasure of the past.

Contrary to this view, the archaeological record is not constituted by the sum of the 'real human past' plus 'natural' taphonomic distortions. Taphonomic distortions are part of the history (Dawdy 2008), indeed, they are evidence of the active social and ecological 'afterlives' of objects once they have been abandoned. In the case of early industrial waste, such distortions are precisely the lively decay that defines how the waste mediates and disrupts space after it has been left behind. Studies of the heritage industry, the archaeology of nationalism, and the archaeology of colonialism have long acknowledged the vital ways in which the objects studied by archaeologists, far from being inert channels to the past, are lively, political, and potentially potent (Fotiadis 1993; Hodder 2000, 2002; Lucas 2001; Meskell 2002; Shanks and Tilley 1987). We as archaeologists need to extend this reflexive turn outside of the realm of heritage museology, specifically to explore the ways industrial waste forms and deforms space, communities, and ecologies—not as an artifact of the past but as a lively and vital material working in the present. As it decays, industrial waste manifests itself in the soil, in the flora and fauna, and in local residents. Working within a discipline that digs under the accumulated roots, soil, plants, and worms that live on top of archaeological material, archaeologists are well equipped to combine with other methods to identify the ecologies that decaying waste helps mediate.

To uncover the history of the development and abandonment of early industrial production in Mill Creek Ravine, I excavated the remains of Vogel's Meat Packing plant, one of the major meatpacking plants established in Mill Creek. Drawing on archival research from the City of Edmonton Archives, I located the packing plant remains through a combination of archival images and descriptions of the plant. I dug twenty-six shovel tests in this area in order to locate the extent of the industrial remains and the packing plant's waste pit. Following these shovel tests, my team and I excavated six units, uncovering the remains of the meatpacking plant's waste pile and revealing the concrete foundations of the main plant structure. In order to understand the effects of decaying industrial waste on the Ph of the soil, we took samples from every excavation level and tested its Ph. In order to understand the leaching of heavy metals from the widespread deposits of burnt coal we sent ten soil samples to the Canadian Center for Isotopic Microanalysis (CCIM) lab at the University of Alberta to test for heavy metals associated with coal mining (beryllium, nickel, arsenic, selenium, cadmium, antinomy, and lead). These samples were chosen from levels that had the densest concentration of industrial waste within each of the three major areas of the Vogel's Meats site. In order to link these results on soil chemistry to their ecological effects, my team and I mapped the flora of the area surrounding Vogel's Meats. After excavations were completed, faunal analysis was done by MA students at the University of Alberta. I completed all other materials analysis with the assistance of field school students from MacEwan University. Through a combination of the archaeological excavation of an early twentieth-century meatpacking plant and shantytown, heavy-metal testing of soils, archival and ethnographic research into the local community, and studies of the local flora, this study of Vogel's Meats traced industrial waste from the emergence of Mill Creek as a landscape of coal mining and meatpacking through to the present.

In order to track the effects of industrial waste outside of the factory, archaeology can also be used to show how industrial waste remade daily life for local communities living in landscapes suffused with industrial waste. To uncover how industrial production and industrial waste effected the lives of working-class industrial laborers living in Mill Creek Ravine during the early industrial period, I also identified, mapped, and excavated the archaeological remains of the community of Ross Acreage, a long-lived informal community of laborers that was occupied between 1905-1950. While archival evidence identified the basic location of Ross Acreage and the shanties of the people who lived there, it contains almost no record of their day-to-day lives. In order to reconstruct the lives of these workers and their families during both the boom and the recession of the early industrial period, I developed a methodology to recover the remains of domestic space and domestic waste from the Ross Acreage community. I dug fifty shovel tests pits to locate the remains of two distinct shanty-areas. Following survey, my team and I excavated eight units in these two areas, recovering *in situ* domestic contexts.

In order to identify the presence of industrial toxins in the community of Ross Acreage, we again collected soil samples from every excavation level and tested for soil Ph. One of the shanties we located showed evidence of flooding events from the Creek. In order to determine the presence of industrial toxins from the coal mine in the creek, I chose five soil samples from this sediment to be tested. Due to the use of coal by the residents and the adjacency of Ross Acreage to a large coal mine, I sent these five samples to the University of Alberta's SWAMP Laboratory to test for heavy metals associated with coal mining (beryllium, nickel, arsenic, selenium, cadmium, antinomy, and lead). In-between excavations I spent six months in the City of Edmonton Archives looking at city records concerning the history of Mill Creek Ravine, Ross Acreage, Vogel's Meats, and the appropriation of the ravine from the Papaschase Cree. Most of this research focused on the later historical attempts to protect Mill Creek Ravine as a city park. In addition, I spent two months conducting interviews with City of Edmonton officials as well as with local community members concerning the history of Mill Creek and a number of contemporary projects to restore Mill Creek as a place of nature.

The goal of studying early industrial waste through this combination of archaeology, environmental science, and history was not just to reveal the histories of decaying waste, but to disrupt the taken-for-granted histories and fantasies that this waste has articulated with. Studying this waste, and the ways it has formed and deformed Mill Creek Ravine over the past century reveals how the colonial logics of the past continue to define the present and silence the past. Situating this waste within the larger context of the Capitalocene, studying the lively decay of waste in Mill Creek Ravine shows the multispecies complexity of growth and devastation that defines the afterlives of early industrial waste. Rather than presuming decay as either beneficial or harmful, or presuming certain ecologies as good and others as bad, studies of the Capitalocene need better ways of exploring "the multiple pasts of humans and non-humans" that continue to haunt and harm a place Mill Creek Ravine. In order to "stem the tide of ruination" of the Capitalocene, we need better understanding of how the past persists in the present and continues to unevenly distribute harms, as well as better understanding of the tactics that humans and nonhumans use to thrive within them (Gan, Tsing, Swanson, and Bubandt 2018: G1). In order to get back to these pasts, and in doing so to "see the present more clearly" we need to better understand the histories, inequalities, and hope that emerge out of multispecies histories of industrial production and waste (Haraway 2015; Gan, Tsing, Swanson, and Bubandt 2018: G1).

Chapter Outline

Based on the data recovered from my fieldwork, my dissertation consists of five chapters that sequentially track how Mill Creek Ravine was fantasized, produced, and lived in by various local communities and ecologies. Each chapter tackles a period in Mill Creek Ravine's history seen through the lens of how the area was being produced as a space at the time. Each chapter shows how the different attempts to make and remake this landscape articulated with the lively decay of early industrial waste, and how these attempts to produce the space were both facilitated and disrupted by decay.

The first chapter is entitled 'The Sacrifice of Mill Creek Ravine: Industrial Space, Meat-Packing, and the Lost Reserve'. Following Susan Lawrence's argument that in settler colonial states an archaeology of industry must necessarily be an archaeology of colonization, this chapter tracks how Mill Creek Ravine developed as an industrial space as part of a larger colonial project that appropriated Indigenous land. I investigate how the fantasy of the frontier drove the appropriation of Papaschase land, the industrialization of Mill Creek Ravine, and through industrialization the broader transformation of the regional economy and ecology. I show how the frontier fantasy figured Mill Creek Ravine as not simply a landscape of industry but also a landscape of industrial waste. Using the remains of Vogel's Meats to reconstruct the effects of the meatpacking industry on the economy and ecology of the surrounding area, I interpret the same remains to point to the ultimate failure of the promises of modernity and progress that Vogel's Meats embodied.

The second chapter, 'Life on the Fence-Line: Early Twentieth-Century Life in Mill Creek Ravine,' connects the impact of industrialization in Mill Creek Ravine to the daily lives of industrial workers. This chapter explores the history of Ross Acreage, the working-class shantytown situated in Mill Creek. Drawing from archaeological excavations this chapter shows how daily life was ordered by the changing dynamics of local industrialization and global capital, as well as how the impoverished locals who lived at the mercy of these dynamics built their lives within them. First emerging in 1905, the community existed until 1950, punctuated by three distinct occupations identifiable in the archaeological record. When industrial jobs were plentiful the residents could afford some of the new commodities that industrialization had produced. When industry abandoned the area, residents were forced to rely on the subsistence and salvage from their toxic backyards. While archaeological investigation identifies three distinct occupations this chapter argues that Ross Acreage is better understood as a single fence-line community, a community defined by its relationship to pervasive and harmful industrial waste.

The third chapter is entitled 'Caragana: Ecologies of Abandonment' and outlines the history of Mill Creek's abandonment between 1933-1970, after its industries had shut down. This chapter examines the history of this abandonment through an analysis of the ecology of plants that grew on top of the decaying industrial waste during this period. Specifically, this chapter focuses on the shrub caragana, a plant which played a central role in the colonial settlement of Alberta, and which spread all throughout Mill Creek Ravine after it was abandoned. Drawing from archival documents, I illustrate how the thriving of caragana in Mill Creek was prefigured in the development of caragana as a uniquely civilizing plant by nineteenth-century Canadian scientists. Rather than regarding caragana as an invasive species, I argue that caragana is a 'monstrous disturbance,' a figure which thrives in the decay of the industrially devastated landscapes of the Capitalocene, and also congeals the very histories that produce it. As a monstrous disturbance, caragana disrupted and defined different projects to make and remake Mill Creek Ravine as an abandoned space and ultimately as a 'natural' park.

The fourth chapter is entitled ''Save Tomorrow, Oppose Pollution': The Restoration of Mill Creek Ravine." In the 1970s, influenced by the rising ecological movement, the local community around Mill Creek began to highlight the dangers of pollution in the creek itself and urged the restoration of Mill Creek Ravine as a space of nature and the protection of the area as a city park. The campaign was ultimately successful, helping to make the Edmonton the 'greenest' city in Canada, boasting the biggest urban park system in North America. During the same period, the Papaschase First Nation began to reassert their identity and make legal claims to the land around Mill Creek. In contrast to the successful park campaign, Papaschase claims to their old reserve, and even the right to be considered as a recognized band were denied under a statute of limitations. Drawing on the extensive 'Build A Park' Mill Creek community archive, this chapter shows how the success of the park campaign hinged upon a certain mobilization of the lively decay of industrial waste in Mill Creek Ravine through the rubrics of both pollution and history. At the same time, I highlight how this approach to the industrial waste of Mill Creek ultimately elided Papaschase history and political present.

The fifth chapter is entitled 'Daylighting Decay: Mill Creek Ravine's Present Past.' Over the past two decades various governmental and communal groups have drawn on the logic of conservation to curate and police the park as a natural and historical resource. This chapter tracks how these projects have attempted to purify the natural and cultural history of Mill Creek Ravine, and elided the multiple ways that the early industrial history of Mill Creek Ravine continues to effect the present. Drawing from my excavations of Vogel's Meats I argue that the decaying remains of early industrial waste in Mill Creek Ravine resists the ethic of conservation. Instead I argue that Mill Creek Ravine can better be thought of as a site of *Industrianatur*, a landscape of plants and animals that emerge out of a landscape of industrial wreckage. Attending to the *Industrianatur* of Mill Creek Ravine, the way early industrial waste remakes the soils, mediates ecologies, and unevenly distributes harms across the ravine, also highlights a different way to memorialize its history.

Chapter 1:
The Sacrifice of Mill Creek Ravine:
Industrial Space, Meat-Packing, and the Lost Reserve

On January 17, 1881, *The Bulletin*—Edmonton's first newspaper—published a strongly worded opinion article directed at the federal Canadian government, opposing the recently surveyed Papaschase reserve in southern Edmonton:

> "If the Indians take the reserve at present a lasting injury will be done to this settlement, without any corresponding benefit accruing to them. Now is the time for the government to declare the reserve open and show whether this country is to be run in the interests of the settlers or the Indians."

Frank Oliver, the publisher and author of this article, had founded *The Bulletin* only the month earlier to serve as a mouthpiece for his political opinions and ambitions. One of Oliver's primary concerns, trumpeted across *The Bulletin* over the next decade, was the presence of the 40 square mile Indian Reserve 136 of the Papaschase Band. Designated as the home reserve for the 241 members of the Papaschase band, the land—located two miles south of Edmonton township and bisected by the deep Mill Creek Ravine—had been surveyed and granted to the Papaschase in August 1880. From the perspective of Oliver and his readers, the land and its plentiful resources were essential to the development of Edmonton, the settlement of Alberta, and the broader project of civilizing Canada's Western frontier.

By 1886, under constant lobbying from Oliver and his newspaper, the Department of the Interior advanced a proposal to remove the Papaschase from their reserve (Bruneau n.d). Through a mix of lies, financial incentives, and legal tricks, Thomas Wadsworth, Inspector of the Indian Agencies, obtained a formal surrender of the reserve, and moved all of the residents to the Enoch reserve, twenty miles west of Edmonton. On October 12, 1889, this surrender was formally recognized by Henry Petty-Fitzmaurice the Governor General of Canada, and significant portions of the former reserve land were put up for sale (Treaty 6 Annuity Paylists, 'Papaschase'; Treaty 6 Annuity Paylists, 'Enoch'. CLA RG10 Vol. 9420). Sales were a significant boost to the settler economy of nascent Edmonton. In 1891, a railway line running through the former reserve and terminating at on the south bank of the Saskatchewan river connected the Edmonton area to Calgary. By 1899, Mill Creek Ravine, which bisected the former Papaschase reserve, had been chosen as the pathway for the Edmonton, Yukon and Pacific Railroad. This would be the first railroad to cross the North Saskatchewan River and directly connect Edmonton to the rest of Canada. By the time the EY & P railroad was completed in 1902, Mill Creek Ravine had been transformed into one of the first major industrial areas in Western Canada.

Between 1902 and 1914, Edmonton thrived as a boomtown. With the new railroad providing access to Edmonton and its hinterland, settlers rushed into the city, its population skyrocketing rising from 3,000 to 72,500 over the twelve-year period. Along with settlers, the railway also brought new possibilities for economic and industrial development. The population center of the region, Edmonton also became a center of industrial processing and manufacturing in Central Alberta, serving as the central node for transforming the region's resources into commodities for the rapidly expanding local market, as well as the larger, more established markets in Eastern Canada. More than economic profit, these industries symbolized the modern promise of Edmonton as the "New Chicago." Fueled by the rich resources of Mill Creek Ravine, the new possibilities engendered through rail transportation, the availability of new agricultural products and resources throughout Central Alberta, and an unwavering belief in the bright future of Edmonton, industries sprung up all along the EY&P line. Many of these were concentrated in Mill Creek Ravine, which hosted four meatpacking plants, a brick factory, a coal mine, and a lumber mill. One of the meatpacking plants, Vogel's Meats, especially suited the fantasy of modernity that Edmonton strove to embody. Using cutting edge technology shipped directly from Chicago's gargantuan state-of-the-art meatpacking industry, the establishment of Vogel's Meats materialized the long-fantasized arrival of modernity to Edmonton. However, by 1914, Vogel's Meats was closed, and a long economic downturn drove the abandonment of most of the industries that lined Mill Creek. As they abandoned the ravine, industrialists also abandoned the material remains their businesses had left behind: the ruined packing plants, the massive piles of coal overburden, and the decades of organic refuse (bones, blood, hair, and sinews) that the meatpacking plants had dumped in the ravine.

The industrialization of Mill Creek Ravine, and the transformative effects it had across Edmonton and all of Central Alberta, were built on the speculative frontiers of profit and the colonial fantasies of progress and modernization that industrialization embodied. In this chapter I argue that these colonial fantasies facilitated the transformation of the ravine not simply into a landscape of production, but simultaneously into a landscape of waste, an area where the sacrifice of environmental health was accepted for the sake of profit. The material remains of this double transformation is recorded in the piles of waste that this historical industrial production left behind, notably in the waste of its once cutting-edge meatpacking plant of Vogel's Meats. Archaeologically investigating the industrial waste that was left behind, this chapter reveals the success of the industrialization of Mill Creek Ravine to remake the local economy as well as the local ecology. At the same this material waste also shows the flaws in the fantasies of progress and modern efficiency that facilitated this industrial project.

Resource Frontiers

The production of Mill Creek Ravine as central location for industrial meatpacking was not solely dependent upon the functional utility of Mill Creek Ravine and the richly available resources it contained. Before it could be exploited as a prime industrial landscape, Mill Creek first had to be defined as a 'free' landscape rich in necessary industrial resources (coal, water, timber, and pastureland). In *Capitalism in the Web of Life,* Jason Moore highlights the manner in which capitalist production is defined by a constant expansionary drive to find and locate untapped sources of 'Nature' (2015). The depiction of Nature as external, and fundamentally "cheap" in Moore's terms, is the "governing conceit" of capital (2015: 2, 221). Capitalism's tireless drive for surplus value is premised upon the ongoing ethical and epistemological appropriation of new untapped landscapes as 'natural', empty and therefore as a cornucopia of raw materials free for the taking. This logic of appropriation reaches its zenith ("peak appropriation" in the words of Moore (2015)), in the Euro-American colonial projects of the late nineteenth century.

This production of 'wild' landscapes filled with 'free natural resources' to be appropriated is not a single act that precedes capitalism but is an ongoing feature of the way that capital moves throughout the world, producing endless "resource frontiers" of potential value (Tsing 2005: 28). Any frontier—of settlement or resources—is never given but must be produced as an "always already empty" space (Tsing 2005: 72). Local communities, histories and ecological relations are ignored, stripped away, or made unintelligible in order to render the landscape "inert: ready to be dismembered and packaged for export" (Tsing 2003:5001). The production of a frontier landscape, a 'wild' place that can be ostensibly "coded, quantified, and rationalized to serve economic growth" (Moore 2015: 2), does not rest merely on the cold calculation of profits. As Anna Tsing points out, the frontier is the "space of desire", a place defined by the fantasies of limitless wealth and progress (2005: 32). Frontiers evoke strong passions, they invoke nation-building projects, colonial violence, and they leave piles of rubble and waste in their wake.

The flip-side of the production of a landscape as part of the frontier, stripped of its social relations and filled with resources to be exploited, is that it depicts the landscape as an inert container, a space valuable only through its relation to profit. Those bodies and ecologies that are not deemed valuable as resources are deemed degradable in the pursuit of value. As Moore points out in his discussion of how capital produces, appropriates, and consumes 'Cheap Nature,' 'Nature' is made cheap to capital "in the double sense: to make Nature's elements "cheap" in price; and also to cheapen, to degrade" (2016). Industrial waste, deemed disposable by the industrial process, settles in the spaces deemed degradable by the frontier logic of appropriation.

The logic of this degradation is not merely a direct result of the rational commodification of the resources. Just as the appropriation of resources and landscapes as part of the frontier is conditioned by desires and fantasies, so is the designation of the space as degradable. Ecological health and community ties are not exchanged in some kind of rationalized trade, in the words of Chris Hedges and Joe Sacco, they are sacrificed in the "name of profit, progress and technological advancement" (2012: 1). Beyond its use as a rhetorically powerful indictment of the "cost of our rough-and-tumble, winner- take-all economic system" (Lerner 2010: 15), the linking of a loaded religo-political concept like sacrifice to the discussion of appropriation and degradations provides a useful entry point into the non-rational supplement at the heart of the frontier. In traditional anthropology sacrifice is viewed as a ritual act of material self-denial as a form of reverence to sacred ideals, beliefs and deities. In performing an act of self-denial, "the purpose of sacrifice is to restore harmony to the community, to reinforce the social fabric" (Girard 1977: 8). As Bataille approvingly notes, the process is explicitly non-rational, the logic of sacrifice represents the opposite of the rational commodity exchange (1988: 56). While consumption is the destruction of an object for the sake of its utility, sacrifice is the destruction of an object's thingness and a rejection of its utility for the sake of the sacred social order. While the frontier landscape is on one hand appropriated for the sake of exploiting and consuming its resources for the sake of profit, it is also sacrificed in the name of the higher colonial ideals of modernity and progress. The cold abstracting of resources from their landscape is supplemented by the allure of spectral visions. Together, they serve as the justification not just for the stripping of community rights to land, but also the long-term degradation of the landscape.

Concentrated in landscapes sacrificed at the altar of progress, the waste and rubble of these (former) frontier landscapes congeal both the history of production, as well as the history of their own degradation. At the same time this waste serves as an archive for the critique of the fantasies that underwrit the frontier, and the sacrifice of the landscape. The fantasies of capitalism, and subsequently those of colonial power, rely upon the appearance of coherence of both production and governance (Gordillo 2014: Adorno 1973). In the face of the history of technological progress and economic development which highlights the frontier as a vital stage of growth and modernization, the piles of industrial waste materialize the flaws in these positive images. The ruinous and fractured appearance of industrial waste provides a critical edge that strips away the fetishistic fantasy of progress (Gordillo 2014). At the same time, as Tsing points out, while the fantasies that drive the frontier may appear universal, how they touch down in different places at different times is itself particular (2005). The critique congealed in waste is not simply a generalized allegorical critique that emphasizes that ruin, abandonment and devastation is the dark side of capitalist expansion. It also congeals a particular critique that speaks against how the fantasies of progress, modernity, and civilization touch down in a particular place at a particular time. To investigate this critique requires a method that attends to waste in its particularity.

The Archaeology of a Degraded Frontier Landscape

Since its inception in the 1950s, Industrial archaeology has been predominantly focused on using archaeology as a method to explore the and preserve the Industrial Revolution for its formative role in human progress (Palmer and Neaverson 1998). Those archaeological projects which have been critical of the progressive view of industrialization and its role in history have largely situated this critique from the standpoint of labour (Wurst 2015; McGuire 2005; Shackel 2009). These scholars have emphasized the ability of archaeology to serve as a corrective to the historical narratives of industrialization and capitalism as inherently progressive by showing the histories of violence, exploitation and resistance of the working class that defined these historical processes. At the same time these scholars have have largely elided the role of industrialization in colonial settlement (Lawrence 2005). As Susan Lawrence points out, this elision of discussions of colonialism within the archaeological investigation into industrialization is particularly untenable in the context of 19th century settler colonialism. In her analysis of the archaeology of the Australian Gold Rush, Lawrence points out that the 19th century settlement and colonization of the Australian mainland was not just the extraction of resources from Australia to support industrialization in England, it was the expansion of an industrial society throughout the interior of the continent itself through the logic of the frontier (2005). The frontier was itself industrialized, with settlement, resource extraction, and colonial exploitation facilitated by the new social forms and productivities that defined industrialization.

Following Lawrence's imperative that industrial archaeology within a settler colonial context is also necessarily colonial archaeology, an analysis of the industrialization of Mill Creek Ravine must necessarily consider the intimate relationship between industry, capitalism, and the fantasies of the colonial frontier of 'The West' that defined settler colonialism throughout the nineteenth century and into the twentieth century. Exploring the material remains of industrial sites that were produced as part of the expanding frontier reveals the economic and ecological transformations that industrialization wrought both regionally and locally. At the same time, exploring the rise, fall, and degradation of the landscape through the material waste also reveals the specific ways that the reality of industry failed to live up to its fantastical *raison d'etre.*

In order to interrogate the history of Mill Creek Ravine as part of the expansion of an industrialized colonial frontier, I combined archaeological excavation, archival research and environmental testing to unpack the histories of the remains of Vogel's Meats, one of the first industrial processing plants established in Edmonton following the arrival of the railroad. The goal this study of Vogel's Meats through its remains is at once to study the historical conditions of possibility of the building's production and use, the environmental transformation it facilitated, but also the capitalist fantasies out of which it was born—critiquing in its presence the functionalist ideology of production as well as the myth of progress and modern efficiency. The aim of integrating these different methods and lines of evidence is to produce a broader understanding of the industrialization Mill Creek Ravine, in a way that situates its history as an industrial center within the context of its colonial conditions of possibility *and* its degraded environmental afterlives.

In 2015, I surveyed Mill Creek Ravine and located the remains of animal bones coming out of the creek bank near the pedestrian bridge at 88th Avenue. Additional survey work from 2016 located exposed bricks along a dirt bike path, and a partially exposed piece of concrete foundation in a directly adjacent field. Based on these three finds and two historical photos of Vogel's Meats, I identified the northern end of a large flat grassy area and a small copse of trees in Mill Creek Ravine Park as the likely site for three buildings historically associated with Vogel's. In 2016, I used utilized ground penetrating radar and magnetometry to identify the subsurface remains of Vogel's Meats (See Appendix C). This analysis identified an area of roughly 50 square meters defined by numerous concentrations of dense material to the northern end of the flat area; however, there was no clearly identifiable order to the data. In 2017, based on the results of GPR and magnetometry, my team and I team dug twenty-six shovel tests throughout the fifty square meters of this flat grassy area, as well as in a dense copse of trees and shrubs directly to the east. Due to the uneven ground, this treed area had been impossible to analyze with GPR and magnetometry equipment. While shovel tests identified some material culture from the appropriate time period, only eight contained coherent stratigraphy with non-mixed matrices containing early twentieth-century material culture. These eight shovel tests were clustered in a roughly 30m x 20m area and identified three different zones characterized by different material culture deposits. At the western end of the site, the first was defined by thick layers of clinker (a coal-by product), charcoal, and small fragments of burnt bone. The second, in the north-east section, contained a dense concentration of brick and concrete rubble alongside significant amounts of broken window glass. The third, in the eastern section, within the dense copse of trees and shrubs, a thick deposit of large animal bones was uncovered.

In order to investigate these three areas, six units were excavated. In the first area, three adjacent units exposed ten square meters of archaeological contexts. These units uncovered the concrete foundation and floor of the two main structures of Vogel's packing plant. In the second area, two units covered six square meters, revealing the floor of a smaller structure associated with the plant. In the third area, one-unit 2x1 m unit was excavated, identifying the remains of the slaughterhouse dumping ground. Two cubic meters from this unit yielded over 6,000 mammalian bones. In order to determine the effects of Vogel's Meats and its waste on the local environment, soil samples were collected from the top of each excavation level and feature. I tested the pH of each of these samples, and chose ten[1] to be analyzed at the Canadian Center for Microscopic Analysis for heavy metals commonly associated with coal use (Beryllium, Nickel, Arsenic, Selenium, Cadmium, Antinomy, and Lead).

The Papaschase Reserve

The conditions of possibility for Vogel's Meats and the sacrifice of Mill Creek Ravine emerged with the opening up of Western Canada as a frontier for Euro-Canadian agriculture and settlement. By 1850, Fort Edmonton was a critical trading node in the Hudson Bay Company's (HBC) fur trading empire. In that year, the HBC trade monopoly, which dominated the vast North-West region of Canada, was sold to the colonial government. After the decline of the fur-trade, and the end of the HBC monopoly, the Canadian and British governments began

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[1] Samples were chosen based on coverage and notable levels, one sample was chosen from the center of each unit, three more samples were chosen from levels associated with the garbage pile, and two more samples were chosen from the levels associated with the use of the main packing building.

emphasizing the North-West as an empty region that could serve as the next frontier for colonial settlement. While some settlers began to trickle into the area, most potential settlers were concerned with the lack of resolution on the 'Indian Question.'

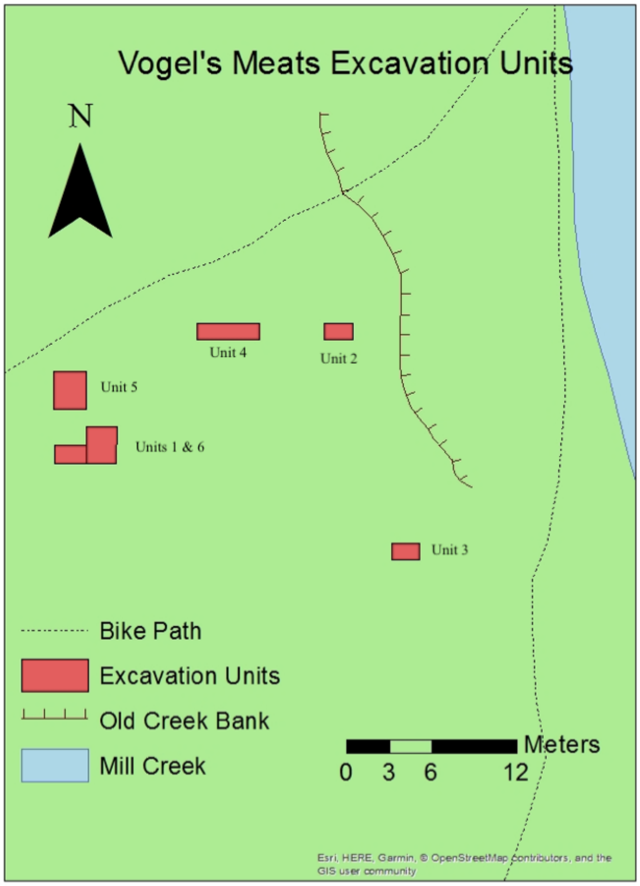

Image 1.1 Units Excavated at Vogel's Meats Site. Map courtesy of author.

The vast majority of the people living in the North-West region were Cree and Athabaskan speaking Indigenous peoples who continued to exercise their rights to and long-standing relationships with the land. These concerns dampened colonial fantasies of settling and exploiting the frontier, because rather than an empty and inert landscape ripe for exploitation, settlers were faced with the inconvenient presence of communities with relational ties to the land stretching back millennia.

Intent on opening up the North-West for colonial settlement, the Canadian government began pressuring Indigenous communities to sign over the rights to their lands and then relocating those communities to small plots of reserved land. Between 1869 and 1877, Indigenous communities signed what are known as the numbered treaties, trading in the rights to their land in exchange for government support, food, and health.[2] In additional to political pressure, the declining numbers of bison and the resultant starvation of Indigenous communities played a crucial role in the signing of these treaties. In 1876, the Plains and Woods Cree of the Central Prairies and Woodland region signed Treaty Six, ceding claims to the large watershed of the North Saskatchewan River, an area that is now the central region of the provinces of Alberta and Saskatchewan. In 1877, Papaschase, the chief of a Cree Band that lived just south of Edmonton, signed an adhesion to Treaty Six on behalf of the Papaschase Band. He secured a 48 square mile reserve directly south of Edmonton. The area was bisected by a long and deep ravine, through which ran a fast-moving creek that flowed north to its drainage into the North Saskatchewan river.

Even before the ravine had been surveyed, political pressure from Euro-Canadian settlers in Edmonton rallied to limit the size and scope of the Papaschase reserve. On August 3, 1880, T.P. Wadsworth, Inspector for the Department of Indian Affairs, denied the legitimacy of 84 members of the Papaschase band, therefore shrinking the area of the reserve down to 40 square

[2] There is considerable debate in contemporary Indigenous studies about the meaning behind the Treaties, and what was being agreed to in the treaties, that is a topic for a different paper.

miles from an original 48. For the Euro-Canadian residents of Edmonton, this was not enough. On an otherwise treeless plain, the ravine was a unique and prized resource: densely wooded, filled with game, a valuable source of water, and—of especial interest to future industry—home to rich and easily accessible coal deposits. Using his newly minted newspaper as a megaphone to galvanize public support, Oliver published a constant stream of articles demanding the denial of the Papaschase reserve (January 17, 1881, *The Bulletin*). Simultaneously, Oliver used his platform to help organize mass meetings of Edmonton's business leaders to petition the federal Canadian government to help solve the "Indian question" (Edmonton Bulletin, Jan 17, 1881). As argued in a petition written by committee on January 13, 1881, the federal government should deny the Papaschase their reserve land, because: 1) the presence of a reserve will curtail the expansion of Edmonton; 2) the reserve land has significant resources that will go to waste if left to the Papaschase; and 3) that "the land is needed by better men" (*Edmonton Bulletin*, January 31, 1881).

Mirroring this petition, Oliver's writings outline two main arguments for the removal of the Papaschase, arguments he repeated ad nauseum in the *The Edmonton Bulletin*. First, he argued that the Papaschase had no right to the land because they were a fundamentally "lazy" community that "ha[d] done no work and ha[d] no intention of doing any." Second, he believed the reserve was "the best land in the country" (*Edmonton Bulletin*, Jan 17th, 1881), with "well-watered" farm lands and the "best timber" in the area (*Edmonton Bulletin,* August 2, 1884). He believed the Papaschase were wasting the potential of the land by refusing to make progressive "improvements" upon it (farming, resource extraction, and manufacturing). Through the pages of the *Edmonton Bulletin,* and the legal petitions to the federal government, Mill Creek Ravine became defined as a space by virtue of the resources it held, the profits they promised, and the progress achievable through their exploitation. The social and legal rights of the Papaschase band to this land were deemed fundamentally valueless, and irrelevant because they did not articulate with the logic of Edmonton as an exploitable frontier.

Boosting Edmonton

Oliver was dedicated to the exploitation of Mill Creek Ravine's resources as a frontier of settlement, 'improvement', and industry vital to the broader colonial project. Beyond agricultural development, Oliver saw urbanization and industrialization as the true frontiers of colonial profit and progress. He was specifically concerned that the Papaschase reserve limited Edmonton's transformation into a major urban node in the emergent Prairie economy—what William Cronon would call "the central city" (2009: 39). Oliver sought to use his platform as a journalist to depict Mill Creek Ravine and its resources as essential to not just the economic success of Edmonton but the urbanization and modernization of the entire region. According to Oliver, the presence of the Papaschase reserve inhibited the realization of the modern city that Edmonton was destined to become. He envisioned it as the future boomtown of the West, a New Chicago, a modern industrial manufacturing center.

Oliver was not interested in the dissolution of the reserve system per se, but rather in moving Indigenous populations and their reserves as far away from Edmonton as possible in order to facilitate the boom of the city. In his eyes, the "supposed" rights of the Papaschase (August 2, 1884, *Edmonton Bulletin)* were nothing more than empty words, a "drawback to colonization," and a severe impediment to Edmonton's transformation from outpost to regional hub (April 29, 1882, *Edmonton Bulletin)*. The reserve extended across the southern border of the city, limiting local access, as well as regional transportation between Edmonton and Calgary. For

Oliver and his supporters, the Papaschase's 'misuse' of the land was a direct threat to the fantasy of development, and even the survival of Edmonton. Oliver was so concerned with the possibility that Mill Creek Ravine's resource might go to waste that he saw its development as a higher priority than the maintenance of law and order. Forcing the issue, Oliver explicitly agitated for incoming settlers to squat in the ravine and to begin exploiting the valuable resources on what he referred to as the "supposed Indian reserve," writing, "Wish they would, somebody ought to get it" (*Edmonton Bulletin,* August 2, 1884).

On October 12, 1889, the Papaschase rights were officially dissolved and the reserve was appropriated by the Canadian federal government, to be surveyed and sold off to settlers, speculators, and a railway company. With the completion of the Calgary and Edmonton (C&E) rail line in 1891, the economic prospects of Edmonton's boosters—including Oliver—were getting brighter. However, there was a considerable impediment in the way of Edmonton's meteoric rise as the central city: the North Saskatchewan River. While technically called the Calgary and Edmonton line, the new railroad ended two kilometers south of downtown Edmonton in the newly incorporated town of Strathcona, undeniably hindered by the swift 200m wide river only traversable by a single ferry. As Strathcona grew, Oliver and other Edmontonian businessmen and boosters became increasingly fearful that Edmonton would be outpaced and replaced by its southern neighbor. While Edmonton's population was larger (1,100 people in 1895), the growth rate of Strathcona was much faster, and new businesses (brewers, flour mills, and dry goods stores) increasingly located themselves conveniently near the rail terminus.

To protect their investments and facilitate their fantasy of Edmonton as the city of the future, by 1896 a group of wealthy businessmen began raising money for a bridge across the river and a new railroad to connect Edmonton and Strathcona (MacGregor 1967). Due to the ready accessibility of coal, timber, and water, and the possibility of an easier grade down to the river, engineers chose to build the railroad through Mill Creek Ravine. In the same year, Oliver left Edmonton—and day-to-day operations of the *Edmonton Bulletin*—when he won the federal parliamentary seat for the District of Alberta as part of Sir Wilfred Laurier's first Liberal Government. Now a federal politician, Oliver's primary goal was to speed up the immigration and settlement of the West, with a secondary goal of making sure that Edmonton benefited from this settlement[3]. This reflected the central goals of the Liberal platform: attracting immigrants into Canadian Prairies[4], and promoting homegrown industry.

To attract new immigrants, the Liberal government began marketing the Prairies as "The Last Best West," plastering posters and advertisements in newspapers across the United States and Europe (eg. see image 1). The campaign identified the Canadian Prairies as the last frontier in the Americas, the last place where the resources of nature could be appropriated freely ("Free 160 acres"), where land was both abundant, free and untouched. Fueled by 'The Last Best West Campaign,' Euro-Canadians and Europeans (especially Ukrainians), began to stream into Alberta. In 1902, the Edmonton, Yukon & Pacific (EY&P) rail line was completed, running through Mill Creek Ravine and across the newly built Low-Level Bridge. Finally, Edmonton was connected to the rest of Canada via Strathcona and Calgary. This connection to the East

[3] As federal member of parliament, and later as Minister of the Interior and Superintendent of Indian Affairs, Oliver was the driving force in the naming of Edmonton as the provincial Albertan capital, and the site of the provincial university. Oliver was also instrumental in created the first Canadian National Park at Banff, and drawing the first electoral boundaries in Alberta (to benefit his Liberal party).

[4] While both Oliver and the Liberal party shared a belief in the necessity of immigration, Oliver believed immigrants should only come from British stock. When Oliver became the Minister of the Interior in 1905, he curtailed immigration from Eastern Europe, which had flourished between 1896-1905.

facilitated rapid growth; between 1901 and 1903, Edmonton's population tripled. For Oliver's *Bulletin* and many of the new settlers, this was the realization of Edmonton's promise. As the *Bulletin* assured its readers, "The future of our city is now assured and no setback will be experienced" (September 22, 1903). With the fantasy of Edmonton as the city of the future fueling speculation, land prices skyrocketed, with F.T Fisher, the Secretary of the Edmonton Board of Trade, noting "astonishing prices" (*Edmonton Bulletin,* April 29th 1905). By 1905, Edmonton had the highest land prices of any similarly sized city in North America (*Edmonton Bulletin,* April 29 1905).

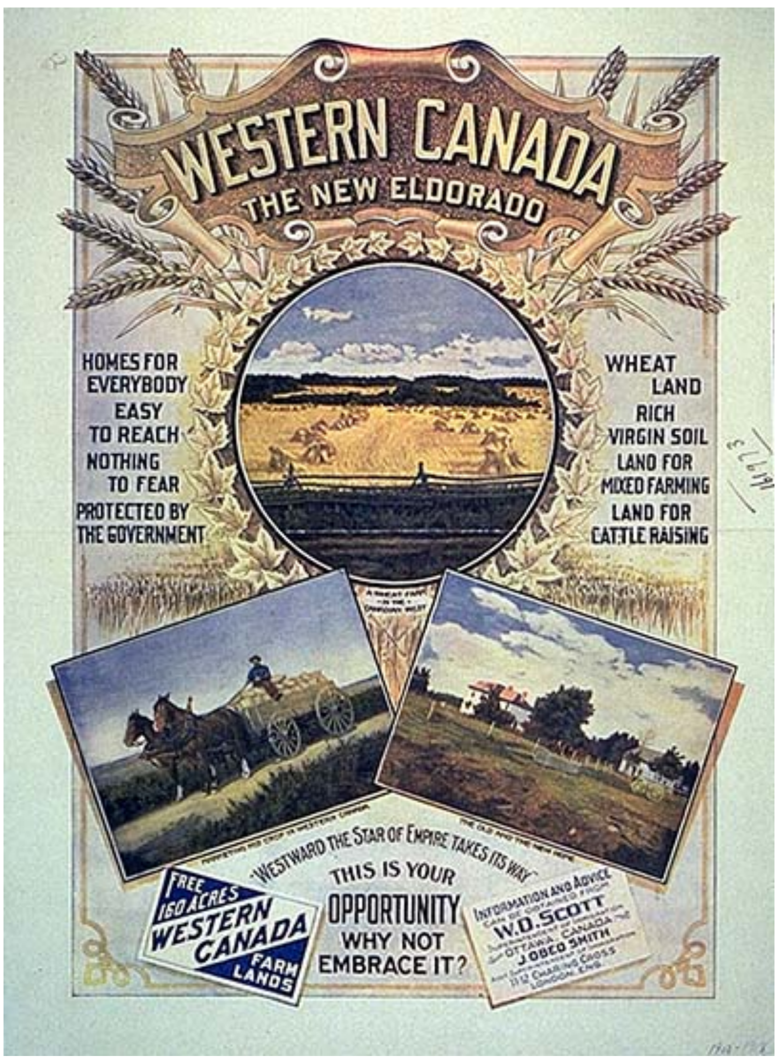

Image 1.2 Western Canada - The New Eldorado. Image courtesy of Canadian Library and Archives online (CLA 1622 File number 161973).

Fantasies of real estate fortunes danced with fantasies of industrial profit. Laden with cash windfalls from land sales and high-valued real estate serving as collateral, capital flowed into Edmonton, feeding industrialization projects. Local businessmen and newly arrived settlers alike began sinking vast sums into new modern industrial businesses, and Mill Creek Ravine became the preferred location for many such enterprises. The same resources that had made it attractive to Oliver, along with the transportation capabilities of the new railroad, made it the most attractive industrial zone in the province. Four meatpacking plants were established along the EY&P, as well as with a brick-making factory. One of these meatpacking plants, Vogel's Meats was established in 1901, when Wilhelm Vogel, a German national and long-term resident of Strathcona, borrowed on his bustling Whyte Avenue butcher business in order to set up a state-of-the-art meat-packing plant just below the EY&P railroad track near 88th avenue in Mill Creek Ravine.

Industrial Meat Packing

Inspired by the exemplary model of nineteenth-century Chicago, meatpacking was one of the first modern processing industries to develop in Edmonton. By the 1870s, the spread of railroads across North America and the invention of refrigeration technology had facilitated the emergence of meat as commodity that could be shipped, and modern meatpacking plants emerged as modern marvels. No longer restricted to the local butcher, meat could be processed, chilled, and shipped by rail across the continent. By the 1870s, massive centralized meatpacking plants had emerged in Chicago, Cincinnati, and Toronto. The rise of industrial meatpacking not only facilitated easy access to meat for consumers across socio-economic classes, it also increased the ability of farmers to get their livestock to market, transforming the economic relationship between agricultural production and sales. Meat and livestock could both be shipped significant distances, on a grand scale, which in turn smoothed the way for farmers, ranchers, and their livestock to move into underpopulated areas of the West. While grain required good soil, large tracts of land, and expensive farming equipment to turn a reliable profit, livestock could be raised on rougher terrain.

Meatpacking hubs served as centralized markets where farmers and ranchers from the hinterland could ship their stock by rail. These centralized hubs of slaughter and butchery also served as distribution centers for meat products that could be transported to both local butcher shops or further afield (again, by rail) to more densely populated cities. The meatpacking plant was the embodiment of the commodification of the newly settled landscape *qua* frontier, the materialization of an efficient and unfeeling process by which the resources of the frontier landscape could be transformed *en masse* into commodities and profits. In other words, the meatpacking industry made manifest the fantasy of the Prairies as a frontier for resource extraction. By the turn of the century, the meatpacking plant was figured as the embodiment of industrialization and modernity itself. No less than Henry Ford got his idea for the automobile assembly line from an inspiring visit to the great *dis*assembly lines of the packing plants in Chicago (Pacyga 2015). More than a profit-making machine, the modern meatpacking plant was defined by efficiency, channeling Philip Armour's immortal phrase "using everything but the squeal" (Geib 1994). Beyond meat for the table, the industry began developing and selling new commodities made of animal byproducts (e.g. soap, glue, fertilizer, margarine, horn combs, buttons, etc.), ostensibly leaving nothing to waste and even designing profit-margins specifically around the sale of non-meat byproducts to fellow industrialists for further transformation into mass produced commodities. Just as the drive towards progress facilitated the production of the Prairie landscape as an inert frontier for development and exploitation, the ideal of modern industrial efficiency imagined the modern meatpacking plant as the perfectly realized space where resources could be transformed into commodities and profit, not a single drop wasted.

As railroads spread across the Prairies in the 1880s, so too did urban meatpacking plants, indexing the West's transformation from an abstract hinterland into an urbanized landscape peppered with modern industrial cities and towns. The spread of packing plants along the railways facilitated the profitability of raising livestock on a large scale, and the spread of both settlers and their livestock across the Prairies. In this way, the market was directly connected to the frontier of the West. The building of the EY&P railroad through Mill Creek Ravine heralded the development of four meatpacking plants and the emergence of Edmonton as a major center for meatpacking in Alberta. In 1900, Cornelius Gallagher-Hull built a large two-story plant near the confluence of Mill Creek and the North Saskatchewan River. This was quickly followed by Joseph Hehsdoerfer's Edmonton Meat Market packing plant located near the EY&P bridge. Following suit, on January 24th, well known sausage maker and butcher Wilhelm Vogel founded Vogel's Meat and Packing Company Limited (hereafter: Vogel's Meats), building a large two-story multi-structure abattoir and packing plant down in Mill Creek Ravine along 88th Avenue (December 23, 1901 *Edmonton Bulletin*). Finally, John Gainer opened a slaughterhouse along the bank of Mill Creek Ravine to the south of Vogel's. These four businessmen, originally retail butchers for the local Edmonton market, established abattoirs and packing houses explicitly in order to cash in on the nascent export market. As these new enterprises began filling their stockyards with livestock, they transformed the area around Mill Creek into the central market for cows, pigs, sheep, and goats in central Alberta. The resources of the newly settled landscape, concentrated in the sinew, muscles, and fat of these animals, were driven daily into Mill Creek Ravine by local farmers. Slaughtered and dismembered, their bodies were transformed into hundreds of different commodities, shipped and sold across Canada.

Vogel's Meats

Funded by speculative capital banking on Edmonton's future prosperity, fantasies of progress and modernity were materialized in the gleaming metal, modern refrigeration, and whirring conveyor belts of the newly built packing plants. Vogel's Meats was particularly notable for its purchase of expensive equipment, including a state-of-the-art German-made Linde ammonia refrigeration system purchased in Chicago (*Strathcona Plaindealer,* July 10, 1903). With its modern equipment and techniques, Vogel's Meats was considered a "credit to the district" (*Edmonton Bulletin* Dec 12 1902), vital to the "development of the town and country" (*Edmonton Bulletin* Feb 28 1902) and "one of our most important and growing industries" (*The Edmonton Bulletin* Dec 12, 1902).

With their large holding pens, and capacity to slaughter and package hundreds of animals per day, the meatpacking plants mediated between farmers, railroads, and marketplaces. At Vogel's Meats, this mediation was integral to the physical design of the plant, following a scientific flow-through spatial layout. According to documentary evidence, archaeological data, and archival photo records, the plant was built according to a plan that drove live animals in at one end, processed them vertically, and then loaded products directly into train cars at the other end of the plant. When it was opened in 1902, Vogel's Meats consisted of three main buildings and a series of large pens. In addition to directly abutting the EY&P railroad, the stockyards were directly adjacent to a large road that led up the ravine bank into Strathcona, as well as the community of Bonnie Doon, and beyond to the rich farm areas surrounding the township. Access was everything—to hinterland, to railroad, and to urban markets.

Vogel's would buy stock from local farmers year-round (December 12, 1902). Local farmers would drive their livestock down the hill to the flat plain on which Vogel's was situated, where animals would be weighed and sold, and secured in pens located in a large holding area which spread along the flat plain and up the cleared hills to the south, with capacity for 500 animals. If this was not enough to fill the stockyard, more animals were delivered by train from Calgary, sometimes even eastern Canada. Directly connected to the stockyard, via a long gangway ramp, was a two-story tall, 24 foot-square brick building (*Edmonton Bulletin* Dec 12, 1902). At least three times a week, animals from the stockyards were led up the ramp, which connected to the top floor. This was the killing floor, where animals were slaughtered, hooked on conveyor belts, bled, cleaned, and then cooled. In 1901, the *Edmonton Bulletin* noted that with the labor of eight men, 200 animals could be slaughtered and processed at Vogel's in one day (December 12, 1902). For contemporary observers, the killing room was equipped with "all conveniences": electric lights, hot and cold water, and steam pipes to steam the bristles off of pigs (*Edmonton Bulletin* Dec 12, 1902). The ceiling had tracks for a conveyor belt to carry the carcasses north, into the main building and down to the cutting floor. Directly below the killing floor were the boiler and engine room, providing electricity, heat, and steam for the plant.

North of the killing floor was the main building, a tall two-and-a-half-story structure constructed of wood and brick. Ninety feet long and forty feet wide, the building ran north-northwest on a flat open field and terminated half-way up a steep embankment. This building was long and open, used for all processing and packing at the plant. In the first section of the building was a cutting floor, with conveyor belts moving animal carcasses between different cutting stations. Alongside the cutting stations were two lard vats, a grease tank and two sausage machines (*Edmonton Bulletin* Dec 12, 1902). The second section of the building was where meat was salted, cured, and packed into barrels. A third structure, directly north of the packing building and further up the hill was the brick smokehouse, built directly on the spur of the EY&P railroad. A fourth building, a second brick smokehouse was located closer to the cutting floor, down near the creek. In 1903, the area around the EY&P spur was rebuilt to store the newly shipped Linde refrigeration unit (*Strathcona Plaindealer,* July 10, 1903). All told, the packing plant produced a wide range of commodities for both the local and the export market: fresh cuts of meat, barrels of salt beef and pork, Vogel's famous sausages, as well as byproducts like offal and lard.

Image 1.3 Early Vogel's Advertisement. Note the high prices which were paid for hogs, the availability which were always an issue for the packing plant. Image courtesy of Peels Prairie Province Online Collection (PPP December 19, 1902, *Edmonton Bulletin*).

New Farming in Central Alberta

As William Cronon (2009) notes, by radically increasing the market for meat and opening up western North America to livestock ranching, the meatpacking industry also transformed the economy and the ecology of the newly settled areas that produced livestock. The remaking of Mill Creek Ravine into an industrial meatpacking landscape and Edmonton into a center for meat-processing facilitated the sprawl of new farms across central Alberta. The cluster of four packing plants, with railroad access to the East, allowed incoming farmers a year-round market where they could "dispose of [their] cattle, hogs, etc. at very good prices" (*Board of* Trade 1911, 19). This radically increased the potential profitability of farming in the area, and facilitated the spread of famers and their livestock throughout Central Alberta

Image 1.4. Unit 3. Level 8, Earliest Bone Layer. Note the bottle. Its production can be tightly dated to 1900-1904. Photo by author.

Faunal remains recovered from the garbage pit at Vogel's present a record of animals slaughtered at the plant, the types of livestock present in Edmonton and its hinterlands. These remains speak to the broader transformations facilitated by the introduction of meatpacking to the region. Two distinct strata of meatpacking waste were identified. Beyond the historical information which locates the founding of the plant in 1901 and its ultimate abandonment in 1914, the date-range of this feature was reinforced by the presence of two bottles with firm production dates. The first was recovered at the very top of the garbage pile; it is an early fully automated beer bottle produced using the Owen's process, a production method not fully utilized in North America until 1910. At the bottom, an intact amber beer bottle was recovered with an embossed makers mark of "ECE Co" on its heel, referencing the Edward H. Everett Company of Newark, Ohio. This mark was only used by the company between 1900-1904 (Lockhart et al, 2015) suggesting that this earlier stratum likely dated to the 1902 opening of Vogel's Meats. The interface between the two strata, marked by a clear layer of charcoal, likely dates to 1908, when part of the plant burnt down and had to be rebuilt.

In the material culture from the strata associated with the early years of the plant, only 17 pig bones were located, compared to 109 sheep bones and 198 cow bones. The minimum number of individuals (MNI) for these levels was calculated as 11 cows (8 juvenile), 3 pig, and 9 sheep (2 juvenile). This largely corroborated early advertisements of Vogel's which highlighted their sale of "beef, pork, mutton and lamb". At the same time, these faunal remains suggest pig was the least common of these three animals to be slaughtered and sold. According to news reports which breathlessly covered the design and construction of the new meatpacking plant, it was designed for the slaughtering of pigs (*Edmonton Bulletin* Dec 12, 1902). However, faunal remains from the garbage pit suggest that Vogel's processed mostly sheep and immature cows. The lack of pig remains, coupled with the common advertisement in the early years of Vogel's operation (1902-1905) signaling the need for large pigs, suggests an insufficient local supply of pigs for the packing plant.

This lack of pigs represented in the early faunal remains suggest not just a lack of pigs in the area, but a lack of successful pig farming in the area. The higher percentage of cow and sheep bones recovered from earlier strata of Vogel's garbage pit reflect the increasing success of of sheep and cow farms that developed in central Alberta during the period. While sheep and cattle were more profitable than pigs (and cattle more so than sheep), they required significantly more land to graze, and thus more initial capital investment. Because raising sheep and cows requires significant ranch and pasturelands, they were normally raised on larger farms, requiring more specialization and capital (Brody 2016). Pigs, on the other hand, could be raised by non-specialist farmers with less capital (and land). The high demand for pigs, and the small number of pigs processed at Vogel's indicates a limited number pigs being raised for commercial sale in the surrounding area. It also suggests a general lack of the number of dedicated small-scale pig farm in central Alberta, in comparison to the larger sheep and cattle ranches.

This lack of pigs and pig farmers points to a flaw in Vogel's original design as a hog plant, and it also speaks to some general flaws in governmental settlement policy. One of the central goals of the federal Liberal government following the 1896 election was not merely to open up the Canadian North-West, but specifically to open it up for small-scale farmers with little capital. The government wanted to avoid the monopolization of farmland and water resources by massive cattle ranches, that had taken place in southern Alberta after the arrival of the railroad in Calgary in 1883, and the first industrial meatpacking plant in 1890 (Maclachlan 2001). Even before the population of Calgary had reached 2,000 people, wealthy cattle barons from eastern Canada and the United States began leasing and buying huge tracts of land and securing water rights for large scale cattle ranches. Through the efforts of boosters such as Oliver, the Liberal party sought to emphasize central Alberta as the 'land of opportunity' for low-income farmers and immigrants and to avoid the monopolization of the land and the economy by cattle barons. However, the higher profits of beef, combined with the huge production capacity for slaughtering and packing meat in Mill Creek, favored farmers with large herds. Despite government attempts to open the rich farmlands of central Alberta to small-scale mixed farming, the notable presence of cows and sheep recovered in Vogel's speaks to a failure in this regard, and to the rise of large-scale ranches in the central Albertan area. Vogel's, despite being designed to process pork, invariably turned to more profitable (and more available) mutton and beef processing. According to boosters at Strathcona's board of trade, by 1906, "Ranching [was] carried on extensively" throughout the district (1906: 13). The rise of cattle ranching in this area was so successful that by 1910, the ranching areas of Central Alberta were producing as many cattle as the well-established ranching areas in Southern Alberta (Evans 2004: 146).

Strata Dates		Cattle	Pigs	Sheep
1902-1908	Identified Bone Count	198	17	109
	MNI	11 (8 juvenile)	3 (1 juvenile)	8 (2 juvenile)
1908-1914	Identified Bone Count	490	8	4
	MNI	22 (11 juvenile)	2	1

Table 1.1 The raw count of identifiable bones recovered and the Minimum Number of Individual (MNI) of animals they represent in the two strata of the garbage pit.

The remains of the garbage pit's second strata, dated to 1908-1914, confirm the overwhelming rise of cattle ranching and cattle slaughtering as the driving livestock industry in the area and paint an even bleaker picture for the fate of small-scale pig farming around

Edmonton. Fueled by waves of incoming immigrants, the population of Edmonton shot up from 18,000 to 72,000 over this six-year period, accompanied by skyrocketing real estate prices. Bones recovered from the later strata of the garbage pile indicate the continued domination of large cattle ranchers over the livestock and land of the region. Of 500 bones identified in the later strata, 97% were from cattle. An MNI of the bones identifies the remains of at least 22 cows (half of which were juveniles), 2 pigs, and 1 sheep. In the latter half of Vogel's productive period, the plant shifted to exclusively to the slaughter and processing of cows. Cattle from throughout the central Alberta region was sent to Vogel's to be slaughtered (June 22, 1908 *Edmonton Bulletin).* This adaptation indexes a change in suppliers, an increase in the percentage of cattle ranchers in Central Alberta, and integration between Edmonton and Central Albertan farmers. The material culture of this strata also suggests that the shift to processing cattle was linked to a shift towards increased export. Along with the mass of cow bones, this stratum is also defined by a significant presence of large barrel rings, used for packing salted beef intended for export.

Image 1.5 Unit 3, Level 5, Top. The top of the second layer of bone. Note Barrel Rings. Photo by Author

The popularity of beef and dressed cattle as the main meatpacking commodities sold by Vogel's, and the dominance of large wealthy cattle ranchers over small farmers, culminated in March 1911 when Vogel's sold his packing plant to P. Burns & Co., a massive Calgary-based conglomerate. P. Burns & Co. was the largest meatpacking company in western Canada at the time, and its founder, Patrick Burns, was the pre-eminent cattle baron of southern Alberta, owning 700,000 acres of land around Calgary. Indeed, Burns was a major force for the growth of cattle ranching in southern Alberta, and precisely the kind of man that the federal Liberal government was trying to curtail with their pro-immigration and small-farming policies. It is notable that Burns successfully expanded into the Edmonton market the same year that the pro-immigration Liberals were replaced by the pro-cattle baron Conservatives in the federal government.

Despite the best attempts of the federal Liberal government, the speed of meatpacking, the deep pockets of cattle barons, and the high profit margin of cattle raising helped to transform central Alberta into a landscape dedicated to cattle ranching and controlled by a few wealthy ranchers and businessmen. The rise of large cattle ranches had long-term ecological effects as well. As opposed to pig farming, cattle ranching requires large amounts of space and suitable grass to graze on. The requirements of raising cattle, including the transformation of thousands of acres of farmland into hay fields inhibited the variety of native wild grasses that normally thrived on the prairies. At the same time, as some environmental scholars have noted, the introduction of cattle onto the Prairies filled in an ecological niche that had been left by the eradication of the bison (Savage 2011). Cattle, with a few notable exceptions, acted similarly to their bovine cousins: they consumed grass in the same manner as bison, they ruminated in the same manner as bison, and their dung was consumable by the same coterie of insects as was bison's. To prominent early environmental scientists of the plains like Frederic Clements, the impact of the introduction of grazers like cows was relatively neutral (1936). While similarities between bison and cows might have been notable, equally notable was the drastically different manner in which they interacted with the landscape. As Candace Savage (2011) notes, the difference was not necessarily in the animals, but in their relation to the broader infrastructure of farming. The major difference is found in the fences, hedges, and property lines that prevented cattle—and other animals—from roaming freely. The mass production of barbed wire in the late-nineteenth century, in particular, provided farmers with an easy and cheap way to stop livestock from wandering across the prairie range, containing them within manageable property lines. The cutting up of the landscape into discrete plots, and inhibiting the movement of grazers, had a significant impact on how grasses and associated flora grow. This fencing off of the prairie grasslands destroyed what Savage refers to as the productive "patchiness" of the Prairies: the manner in which a roaming grazer would create a patchwork of prairie grass at different stages of growth, which facilitated a diverse ecology of birds, insects, and prairie grasses (Savage 2011: 119; see also Bascompte and Rodriguez 2001). Cows and sheep, prohibited from roaming, with their grazing activity concentrated by barbed wire and other containment mechanisms, drastically reduced this patchiness and the ecological benefits that went with it.

Waste and Inefficiencies

Beyond marking the broad transformations of the economy and ecology of central Alberta, the material remains of the garbage pit also speak to the basic inefficiencies of Vogel's plant. At the surface level, Vogel's was the model of modern efficient industrialization, making a profit by bringing in all the latest slaughtering and meat processing equipment. In reality, despite channeling the "everything but the squeal" model of modernity and efficiency that defined industrial meatpacking, Vogel's was an inefficient plant. Efficiency suffered from the incompatibility between the plant's original design and the livestock available for slaughter, a lack of skilled labor, and an inability to commodify all of the animal byproducts.

The material remnants of this incompatibility, and the general inefficiencies inherent in Vogel's techniques, are marked by high numbers of bullet cartridges recovered from the earlier strata of the garbage pit. 236 bullet cartridges were located, of which 82% were identified as the remnants of .44mm bullets—one of the most powerful commercially available bullets, normally associated with a handgun. The presence of large handgun bullets in the plant's refuse, alongside other slaughtering equipment, suggests that during the first half of the plant's productive life (1901-1908), workers were frequently using guns as a method for slaughtering their livestock. While it is unclear whether or not this was the primary method of slaughter, or (more likely) a backup method when the primary method failed, the high density of these bullets speaks to the inefficient method of slaughtering in use at Vogel's plant. Slaughtering livestock with a gun is both expensive and disruptive, due to the high cost of ammunition and the propensity of gun fire to spook other animals in the pens and along the ramp (MacLachlan 2001). The use of a handgun at Vogel's would have significantly slowed down production and increased costs. The method used in Chicago and other large packing centers in the east—a stunning blow with a hammer followed by exsanguination—required highly skilled hammer wielding stunners, a job specialty that was not available at Vogel's (Pacyga 2015). The city directory for Edmonton/Strathcona in 1907 emphasizes this lack: of ten men who identify as employees at Vogel's, only two list themselves as expert butchers, the rest identify themselves as general laborers, or as non-physical experts, such as bookkeepers and sausage makers. None of these individuals identified themselves as skilled laborers in the slaughtering process, suggesting that nonskilled labor was employed at Vogel's, resulting in the slaughter of animals with firearms.

Such a method suggests inefficiencies in production; meanwhile, the massive quantities of bones in the garbage pit speak to inefficiencies in processing. According to the business model outlined by Chicago businessmen such as Philip Armour and Gustavas Swift (and quickly adopted by packing plants across the continent), most of the profits gleaned from the packing process were from selling animal byproducts, i.e. fat, bone, hair, and hides (Pacyga 2015). The presence of significant bone waste at Vogel's suggests that this source of profit was not exploited. Over 36 kg of bones (over 6,000 by count) from at least 86 individual animals were recovered in a mere two square meters of the Vogel's garbage dumping area. According to shovel test pits, the total dumping ground was somewhere between 100-200 square meters in area. 99% of recovered bones were from the head or the lower limb region, parts of the animals associated with little-to-no meat. The complete absence of meat-bearing bones in the garbage pit suggests that meat was sold to retailers bone-in. The presence of so many non-meat-bearing bones, especially hooves, suggests that Vogel's did not have access to a byproduct market. In a more developed marketplace, both the bones and the hooves could have been easily sold: bone for the production of fertilizer and bone-meal, and hooves for glue production. With no complementary local businesses buying large quantities of bone and hooves, Vogel's would have had to ship the heavy cargo of waste down to Calgary or out east to Winnipeg in order to commodify these byproducts. Both options being far more costly than profitable, bones, hooves, sinews, and blood were simply dumped along the bank of Mill Creek and left to fester. This is not to claim that Vogel's did not profit from any meat byproducts. Animal hides, for example, were likely sold to the tannery of F. Bedard, located only two kilometers west of Vogel's, founded in 1898 (Gilpin 1978).

Sacrificing Mill Creek

The thousands of bones left behind in the garbage pit reflect the other side of industrial production: the impact of industrial waste. More specifically, they represent the historical production of Mill Creek Ravine as a place *suitable* for waste. As the industrial core of the broader central Alberta meat economy, Mill Creek became the place where livestock from the entire region were shipped and processed; this also meant that the ravine became the landscape in which waste from the entire region was ultimately dumped and concentrated. The production of Mill Creek as a frontier landscape filled with valuable resources, and the exploitation of these resources in order to transform the area into an industrial heartland was shadowed by a supplemental production: the remaking of the landscape as a place of abjection and waste.

While Vogel's Meats prospered by drawing on livestock from across central Alberta, it functioned by drawing heavily on the natural resources of Mill Creek Ravine. Along the flats of Mill Creek, located to the west of the garbage pit, excavations located the remains of the main packinghouse structure, as well as those of the original brick smoke house. Excavations of the main building revealed a one-meter-thick concrete foundation, the concrete floors of the packing room, as well as the thick concrete floors of the cutting floor, with large steam pipes running to power the conveyor belts and the sausage machines. These architectural remnants also show that Vogel's functioned through the exploitation of the bountiful free 'natural' resources provided by Mill Creek Ravine—the same resources that Oliver had argued made Mill Creek too valuable for occupation by the Papaschase. Mill Creek "provided a never-failing supply of water" (*Edmonton*

Bulletin, Dec 12, 1902) for hydrating livestock as well as running the plant. Powered by steam, with constant a constant supply of hot and cold running water necessary for the smooth functioning of the plant, Vogel's guzzled creek water. Trees were plentiful throughout the ravine, and clearing them provided a convenient resource for building and heating the plant, in addition to clearing ever larger areas for holding stock. Finally, coal was plentiful and cheap in Edmonton, and easily accessible in the ravine. In fact, in 1906 Vogel's discovered a large viable coal seam on the property that the plant came to rely on in order to power its daily operations (*Saturday News,* December 22, 1906).

Just as Vogel's Meats stripped the ravine of its trees, hollowed out its coal reserves, and consumed creek water to facilitate production, it also pumped incredible levels of waste into the ravine and the creek itself. The flip-side of the production of Mill Creek Ravine as a frontier landscape, an inert landscape filled with discrete resources ready to be exploited, was the degradation of those spaces not deemed valuable in resources. The land was not just there to provide cheap resources, but also to be cheapened by the productive might of industry. The rest of the land around Mill Creek, the material substrate that had no direct role in the production of value, was only useful as a space that could be casually degraded. This is not to argue that Mill Creek Ravine became a place of waste productively, in the same was that a landfill does. The dumping of waste into Mill Creek Ravine was not organized or systematic, it was haphazard. Blood, fat, and hair were washed off the factory floor and drained into Mill Creek. As shovel tests and unit excavations of the garbage pile reveal, bones, animal hair, bullet casings, broken barrels, and slaughtering tools were merely tossed to the side and left to rot. Clinker, the hard and crumbly non-carbonous material left behind after coal has been burned, was dumped throughout the area, scattered liberally on and around the garbage pit, and beyond. At its closest, the garbage pile was situated only ten meters east of the main structure. No hole was dug to contain the waste, no attempt was made to move it further afield. In some sense, the degraded spaces that had meatpacking waste dumped on them were useful, since this waste *did* need somewhere to go. At the same time, these spaces were neither defined by their utility, nor produced for their utility in the way the resources of Mill Creek were produced. Instead, these spaces were defined by their degradation, by their role as spaces wasted by industry.

This degradation was not merely symbolic, it was material and ecological and reverberated across the landscape. Blood and other organic waste dumped into the creek promoted its eutrophication. Clinker was dumped along the creek bank by the tonne. During the 2017 excavation season, 86.8 kgs of clinker were recovered and weighed from a total of eighteen square meters excavated. Given the concentration and ubiquity of clinker recovered from every unit excavated, and that the identified location of the ruins and garbage pile of Vogel's are roughly 20m x 40m, or 800 square meters, it is likely that there are still between three and four tonnes of clinker left behind from Vogel's production. The large amounts of clinker left behind at Vogel's are not just a testament to the significant consumption of coal by the packing plant over its twelve-year history. These tonnes of clinker remade the soil chemistry of the surrounding area. As the byproduct from the combustion of coal's carbonous content, clinker can contain a variety of elements and compounds that are highly reactive and potentially toxic including highly acidic and alkaline materials. In the case of the low-quality, low-carbon sub-bituminous coal that runs beneath Mill Creek, coal byproducts like clinker, coal ash, or fly ash often contain high concentrations of calcium oxide, which is highly reactive, and produces alkaline solutions when it contacts water (Im-Erb et al 2004).

Testing the soil Ph from each excavation level documented the impact of clinker alkalinity on soil chemistry and pointed towards the acute and long-term effects of Vogel's industrial waste. In units 1, 5 and 6—those associated with the main plant structure—the average Ph across all excavation levels exceeded 8. Eight of the twenty-five levels tested in these units had a Ph of 8.5+, definitive of highly alkaline soils. In comparison, Unit 2, located at a distance from both the garbage pit and the packing plant, contained relatively low concentrations of clinker and had an average Ph of 6.9. Like the soils tested in Unit 2, the average Ph for soil in the Central Alberta region, specifically the well-drained flood plain of the North Saskatchewan is slightly acidic, normally under 7 (Alberta Agriculture and Forestry, 2017).

In other words, the amount of clinker dumped in Mill Creek Ravine was so substantial, and contained so much calcium oxide, that it not only caused significant alkalization of the soil during Vogel's heyday, but continues to do so today. Given the drainage of the ravine, the proximity of the creek, and the decomposition of the clinker over the past hundred years, it is almost certain that the alkalinity caused by clinker was significantly higher in the past than it is today. Alkaline soils (those with extremely high PH of 8.5+) have a poor structure, impede water infiltration into the soil and nutrient solubility, and contain substantial amounts of sodium (Peverill et al. 1999). While some plants may flourish in alkaline soils, most are unsuited to it and grow poorly. The lack of water infiltration limits the amount of available water for plants, as well as the bioavailability of soil nutrients such as magnesium, iron, copper, zinc, and manganese. Most of the plants that flourished in the riparian and deciduous forests pre-dating Vogel's (white spruce, aspen poplar, birch, wild rose, highbush cranberry, and Saskatoon berries) are not well suited to the alkaline soils. White spruce, for instance, the most common tree in the riparian forests of central Alberta, grows in acidic soils with Ph 4.7-7. Birch and aspen poplar, likewise thrive in acidic soils, although the aspen poplar can grow in more alkaline soils, up to Ph 8. Of the low brush plants (wild rose, highbush cranberry, and saskatoon berries) all prefer neutral to acidic soils, with only saskatoon berries being hardy enough to grow in more alkaline soils.

Clinker also routinely contains high concentrations of elements and metals found alongside coal deposits in the ground (most commonly arsenic, lead, mercury and cadmium) (Montague 2008). Compared to soil samples taken from other locations at the site, levels with dense layers of clinker showed considerably higher concentrations of lead, cadmium, antimony, and beryllium. Heavy metal tests of soils recovered from excavated levels suggest that the tonnes of clinker in the area surrounding Vogels, have leached significant amounts of heavy metals into the soil over the past century. As the clinker decomposes in the soil, it continues to do so today. High concentrations of heavy metals, including cadmium, beryllium, antinomy, and lead, were notable in excavated soils that consisted of dense clinker. For instance, mean cadmium concentration in three soil samples taken from the levels with the densest amount of clinker was 1.1ppm—over three times the average concentration of cadmium found in Alberta soils (Millenium Solutions 2016). One level, recovered from a layer of clinker directly adjacent to the packing plant floor, measured 1.85ppm of cadmium, well above the 1.4ppm legal limit for acceptable remediation levels in Alberta. Antinomy levels in these three levels was also very high compared to expected background levels. The mean concentration of antinomy in Alberta is 0.3ppm, with 95% of soils in Alberta under 0.7ppm of antinomy. The average concentration of antinomy in these three soil samples was 1.9ppm, with one sample at 2.85. While neither of these samples is above the legal limit for remediation, they all show concentrations of antinomy almost ten times greater than would be expected in naturally occurring soil. Beryllium was detected at an average concentration of 1.8ppm across all three levels, at almost four times the mean background level of 0.5ppm and almost twice the 95th percentile of 1.0ppm. Lead was detected at an average concentration of 108 ppm, over ten times the mean background level of 9.0ppm, and well above the legal limit for acceptable remediation of 70ppm (Millennium Solutions 2016).

Soil Samples	Cadmium (ppm)	Antinomy (ppm)	Beryllium (ppm)	Lead (ppm)
Sample #1 (Unit 3, Level 3)	0.94	2.85	2.5	218
Sample #2 (Unit 6, Level 5)	1.85	1.48	1.6	37.8
Sample #3 (Unit 3, Level 2)	0.58	1.37	1.4	68.2
Sample Mean	1.12	1.9	1.8	108.0
Alberta Mean	0.37	0.3	0.5	9.0
Legal Limit for Remediation	1.4	20	5	70.0

Table 1.2: Heavy metal concentrations identified in the three densest levels of clinker compared against average concentrations of these heavy metals in Alberta soils and the legal provincial requirement for remediation activities.

The seven samples taken from other, non-clinker, levels across the site, also show that elevated levels of heavy-metals have leached throughout the area. Across the site, soil tests show elevated levels of antinomy and lead compared to background levels normally expected in Alberta soil. Across these seven soil samples, a mean concentration of 1.08ppm of antinomy was recovered, over three times the mean background concentration in Alberta. Also, a mean lead concentration of 42.1 ppm was recovered, over four times greater than the mean background concentration in Alberta. The concentrations of cadmium, and beryllium in soils near clinker deposits, and the leaching of lead and antinomy across the site points to the long-term ecological effects of Vogel's packing plant. Even in low concentrations, lead can limit growth and photosynthesis in plants, stunt botanical growth, effect population genetics, and harm the nervous systems of animals (Greene 1993). Some studies also suggest that elevated levels of lead can harm the life cycles of microorganisms, slowing the breakdown of organic material and the production of new soils (Green 1993). Similarly, even low levels of cadmium in the soil can be deadly for worms, limiting worm populations and, therefore, soil health (Hirano and Timae 2011).

The combination of clinker, blood, and bone waste from Vogel's reorganized the ecology of Mill Creek. The enormous quantities of blood pumped into the creek over the twelve years Vogel's was in operation (in addition to waste from the other packinghouses) would have deoxygenated the water, killing off local fauna (both aquatic and land-based) and contaminated drinking water for those living downstream in various shantytown settlements, such as Ross Acreage. Increased alkalinity in the soil limited plant growth. The elevated levels of these heavy metals had (and continue to have) a direct and harmful impact on animal and plant life, limiting growth and ecological diversity in Mill Creek Ravine. Furthermore, situated directly on the banks of Mill Creek, heavy metals from industrial activity have leached into the creek and dispersed throughout the entire North Saskatchewan River system. Over the same period, three other meat-packing plants used and degraded Mill Creek Ravine to better facilitate their profits. Each of these packing plants pumped blood and waste into the creek, shoveled clinker haphazardly across the ground, and scattered bone debris down the ravine. Just south of Vogel's, the deepest coal mine in the city pulled out hundreds of tons of coal waste, and left it in massive piles, leaching out heavy metals and toxins. In doing so, these industries materialized the abjection of the landscape in the degradation of the soil, the creek, and the harmed ecologies.

End of an Era

The ruined packinghouse floor, the concrete foundation, and mounds of abandoned clinker leaching heavy metals into the creek, speak to not only the devastating ecological impact of Vogel's, but also to its failure as a profitable business. On the surface, at its founding, Vogel's presented as the embodiment of efficient industrialization and associated fantasies of modernity. It wowed the local population by importing the latest technologies and equipment. However, in spite of the fantasy of modern efficiency, Vogel's was marred by inefficient production, and material inefficiencies were discarded as waste. This waste, still scattered across the ravine, continues to pollute the soil and to define the local ecology. The remains of Vogel's also speak to the bust of the Edmonton frontier boom, and the harsh reality of capitalism's trademark boom and bust cycles. Despite all the heady predictions that it would be one of Edmonton's most important businesses, Vogel's did not last even 12 years in business.

After Wilhelm Vogel retired in 1911, P. Burns and Co. continued operations at the Vogel's Meats plant until 1914. Despite the deep pockets of P. Burns and Co., no major investments were injected into the Vogel's plant, leaving it increasingly too small and too antiquated to compete with larger and newer packing plants, which began to crop up in North Edmonton starting in 1908. Gainer's packing plant (Vogel's neighbor to the south) embarked on an expansion project in order to remain competitive. Conversely, Vogel's failed to expand, eventually relegated to small player status in the Edmonton meat market. Larger, more efficient packing plants were able to undercut Vogel's prices in its later years. By 1914, however, declining market share was the least of Vogel's problems. With the outbreak of World War I and a large real estate sale of HBC's downtown land reserve, Edmonton's real estate bubble finally burst. Due to the outbreak of the war, available capital dried up, and sources of European investment were cut off. Many settlers abandoned the city, and many businesses—including Vogel's Meats—unable to cut a profit or finance their debt, closed their doors. By 1915, Edmonton's population had declined by 18% (13,000 people).

In the wake of this economic downturn, Vogel's packing plant was left abandoned. Local residents trying to make ends meet scoured Mill Creek Ravine for salvageable goods, and the ruins of Vogel's were primed for picking. According to one resident of the Bonnie Doone neighborhood, in the 1920s, his grandfather used dynamite to dislodge chunks of brick and concrete so that he could repurpose the brinks to build his own house (Personal Communication, 2017). Excavations at the small smokehouse corroborated stories of salvage: the entire eastern end of the smoking house's brick floor consists of unfinished concrete, marked with the impressions of dozens of bricks, since removed. The area, once a brick floor, was picked clean by salvagers before it was overgrown and covered with dirt.

In other words, despite its abandonment by industry and the polluted waste that the plant left behind, the Vogel's site (and ravine at large) still had value and importance as a place of salvage. Yet, the value of the plant site as a source of salvage elided the drastic manner in which the area had been deemed expendable and degradable. In other words, the salvaging of industrial waste served as a positive result of an otherwise negative logic, the production of Mill Creek Ravine as a landscape primed for degradation. The definition of Mill Creek Ravine as a degradable landscape did not occur at the moment of abandonment, or even at the founding of the railroad or Vogel's. The origins of the piles of industrial waste in Mill Creek Ravine stemmed from the fantasy of the frontier, and the early boosters of Edmonton arguing for their right to the resources of the Papaschase Reserve. Mill Creek became a landscape defined by its exploitable resources. The vast resources that Mill Creek Ravine was identified as containing were also its curse, drawing incoming settlers who saw it and the resources it contained as the lynchpin to their frontier fantasies of wealth. The promise of these resources was *so* great, and the production they facilitated *so* modern, that the surrounding area was deemed expendable. The landscape was produced as both incredibly valuable due to its unique assemblage of resources; but, at the same time, it was made utterly expendable and degradable through its subsumption into industrial pursuits. By the time Vogel's was abandoned, the area had long been a degradable landscape, an area willing sacrificed not just to facilitate the diminishing returns of profit, but to pay homage to the fantasies of progress and modernity. To access those resources and to utilize them in a way that was productive of value and profit, the elements of Mill Creek Ravine—the land, the ecology, and the rights of Indigenous people—were all sacrificed in the name of progress, profit, and colonial expansion. Still stuck in the soil these remains materialize the colonial fantasies of their production, and serve as a medium of the harms that these fantasies created. At the same time, by reflecting the limits and failures of these fantasies as they touched down, this waste reveals its critical potential.

Chapter 2:

Life on the Fenceline: Early Twentieth-Century Life in Ross Acreage

On Valentine's Day 1928, the City of Edmonton Health Department was in crisis. A typhoid fever scare at the municipal hospital had led to the discovery that many of Edmonton's impoverished residents—living off of the city's water grid—were using raw river water for domestic purposes. In response, a sign was hung from the Low-Level Bridge, warning that the river water was "dangerous" and "unfit for domestic consumption," and could cause the spread of typhoid fever (Whitelaw, *Letter to City Commissioner*, CEA RG11 7.3 File 70). One of the intended audiences for the sign was the community of Ross Acreage, a loose collection of shanties and shacks spread out in Mill Creek Ravine, just south of the Low-Level Bridge. One year later, concerned that the occupants of Ross Acreage had not received the message, the Chief Medical Officer, Dr. T. H. Whitelaw, along with the Chief Sanitary Inspector W. R. Graham, surveyed the shantytown. In his report of March 15, 1929, Dr. Whitelaw notes the sorry state of Ross Acreage, providing the city of Edmonton with its first systematic view of a twenty-year-old shantytown. While "25 houses or shacks" situated to the north of Connor's Road and closer to the bridge were "of a somewhat better type", the 32 shacks located south of Connor's Road and up into Mill Creek Ravine were for the most part barely inhabitable, per his estimation. Six of these 32 shacks were identified as reasonable dwellings, while the other 26 were described as "very poor structures" occupied only because their occupants were "too poor" to live anywhere else. Beyond the quality of these structures, the settlement was drastically lacking in city amenities. 31 shacks had no access to city sewers, while 29 had no access to running water. In short, as Dr. Whitelaw observed, "it would be hard to find a more undesirable place to live." ("March 15th, Letter to City Commissioner", CEA RG11 7.3 File 70).

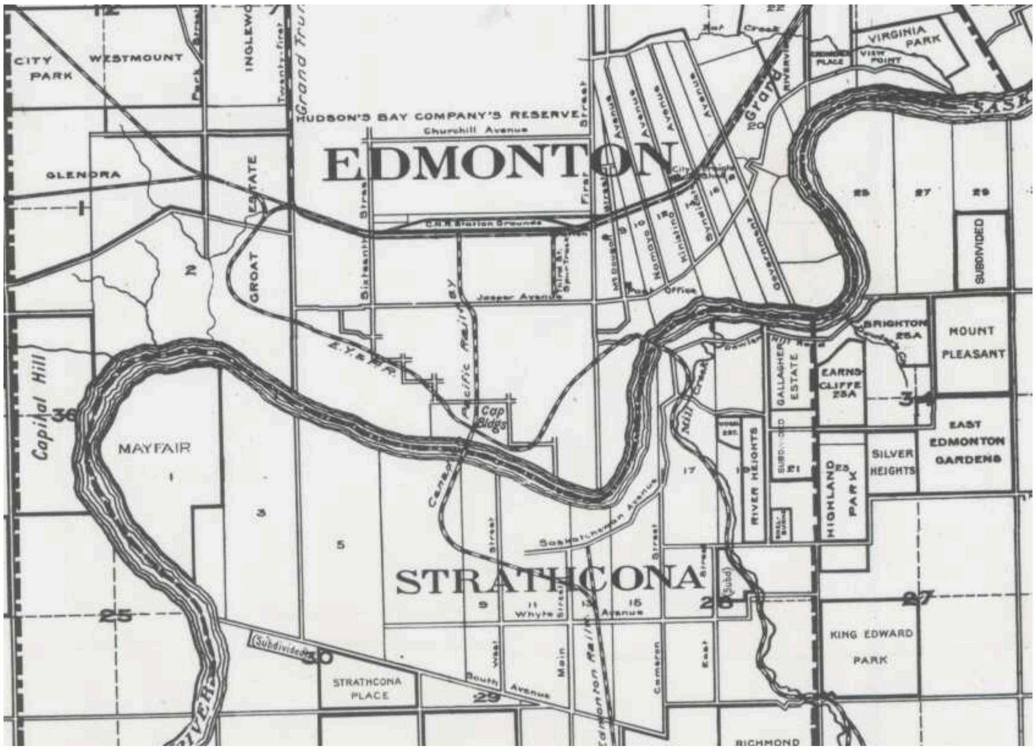

Image 2.1 A map of Edmonton and Strathcona in 1909, three years before amalgamation. Mill Creek Ravine is the wavy line running N-S into the North Saskatchewan River. The EY&P Railroad follows its course. Map Drawn by L. Heuperman, courtesy of Peels Prairie Archive's Online Collection (Map 86).

While Dr. Whitelaw's shock at the deleterious state of the community was new, the community itself was not, nor was the abject state of their landscape. From its founding in 1905 life in the community of Ross Acreage was defined by its proximity to local industry and the pollution that industry produced. Following the completion of the Edmonton Yukon & Pacific Railroad in 1902 (Fig.1), which ran along the top of Mill Creek Ravine, industrial activity in the area was bustling. Unable to afford plots of land in the city, the settlers of Ross Acreage squatted in tents and shacks built up along the banks of Mill Creek, concentrated at the northern end of the ravine. Situated between a large industrial zone upstream and another directly downstream, the community was well positioned for access to work opportunities; however, this proximity to industrial jobs also meant that Ross Acreage existed in a landscape suffused with industrial waste. When industry abandoned the area during the 1920s, the community stayed, and struggled to get by after the loss of access to their jobs. While the jobs were gone, the industrial waste persisted in the piles of rubble that lined the ravine and the heavy metals that leached into the creek.

This chapter tracks the history of Ross Acreage through archaeological excavation and archival research to illustrate how daily life in Ross Acreage was ordered by the changing dynamics of local industrialization and global capital, as well as the persistent decay of harmful industrial waste. Drawing from the archaeological excavation of Ross Acreage this chapter demonstrate how the rise of industrial-scale production in Western Canada remade daily life in the community by providing new consumer goods and manufacturing jobs, as well as—due to the rampant dispersal of industrial waste—remaking the landscape and the ways in which the local population interacted with it. Over the fifty years of Ross Acreage's history, three distinct occupations lived in Mill Creek Ravine, each representing different populations living distinctly different lives. However, despite these multiple occupations this chapter argues that Ross Acreage is what Steve Lerner would call a fence-line community; a single community defined by forces of industrial production as well as the toxic harms that industrial waste produces. The processes of daily life in Ross Acreage and other similar communities were continually complicated by the ongoing persistence of industrial detritus, from old bricks to microscopic heavy metals such as beryllium and arsenic. Ross Acreage, defined by its relation to industrial waste, represents a paradigmatic example of how communities in the Capitalocene are constituted by the long-term afterlives of the waste it produces. The persistence of industrial waste throughout the history of Ross Acreage did not just represent a challenge for the community living in Ross Acreage, it also presents a challenge for archaeological representations of communities and periodizations in the Capitalocene.

Archaeology of Marginalized Communities

As part of a project to critically investigate the experiences of marginalized communities under capitalism, industrial and historical archaeologists have become increasingly focused on the study of impoverished communities in the industrial period, both the working class and industrial underclass (Paynter 1989; Orser 1996; Orser 2011; Leone 1995; Spencer-Woods and Matthews 2011; Wurst 2015). On a practical level, these communities are under-represented in the archival record. Archaeologists, through the study of domestic waste, have the ability to give a voice to those communities that are otherwise voiceless in history. Paul Shackel identifies the political potential of archaeologically studying quotidian aspects of these communities, arguing that in studying the material remains of everyday activity, archaeology allows an interrogation of the social issues that accompanied industrialization and can provide a counterargument to official historical archives, one that can speak for marginalized histories and against dominant historical narratives (2009).

In this research, archaeologists have emphasized that the study of the daily lives of these communities can highlight not only exploitation, but also solidarity, agency, and resistance in the face of that exploitation (Paynter 1989; Nassaney and Abel 1993; Shackel 2000; Starbuck 2004; Matthews 2010). Against the abstracting logic of capitalism, everyday life is seen as serving as an irreducible counterpoint to this force of homogeneity, constantly producing novelties and particularities through individual acts of agency, ingenuity, and bricoleurship. In other words, by providing a terrain for non-conformist activities, daily life represents a site of resistance against capitalism. From a similar standpoint, archaeologist Daniel Sayer has argued that, living on the peripheries of the social, spatial, and economic dominance of capitalism, communities at the extremes of marginalization (maroon communities, shanty-towns, homeless camps, and hobo villages) represent a partial freedom from the domination of capitalism (2015a; 2015b). Instead of viewing this marginalization purely negatively, the use of ostensibly non-capitalist practices in these communities (barter, subsistence hunting and gathering, salvaging, etc.) is lionized as a form of life outside of capitalism.

While much of this analysis has provided powerful insights into communities that would have otherwise be forgotten by history, this scholarship has also failed to acknowledge the many insidious ways that the harms of capitalism are re-inscribed upon marginalized communities. In identifying life in marginal spaces with anti-capitalist praxis, this scholarship also elides the ways that non-conforming practices of social reproduction are caught up in the way that capital makes space. Despite focusing on marginalized communities, this scholarship has overlooked one of the most salient aspects of life lived in industrial spaces: the persistent effects of industrial waste on the lives of impoverished communities stuck living in peripheral place. In Ross Acreage the recursive practices of daily life served as the one of the main points of articulation between the dynamic of capital and Ross Acreage, via the long-term afterlives of industrial waste. This is not to suggest that the residents of Ross Acreage had no ability to build their own lives within the broader structures of political economy. Rather it is to suggest that their ability to build their lives was mediated both from above, by the boom and bust pressures of an exploitive economic system, as well as from below, by the lively decay of toxic industrial waste.

Archaeology of a Fence-line Community

Marginalized communities like Ross Acreage—created, abandoned and polluted by the immediate needs of profit—are ubiquitous in the Capitalocene. As spaces tied to the ever-accelerating pace of capital, as well the ever-increasing concentrations of capitalist waste, Capitalocenic landscapes are populated by communities of humans and non-humans whose reproduction is tied to global capital, yet made increasingly difficult by its very development. The accelerating boom and bust cycles of capitalist production are contrasted with, yet integrally linked to, the long-term cycles of industrial waste distributed across the landscape and throughout local ecologies.

Exposure to the toxic effects of industrial waste is uneven both within the bounds of a human population and within the larger ecology of humans and nonhumans. The decay of industrial waste does not just distribute toxic harms, by distributing harms it also defines new relationships and communities. In John Dewey's theory of a "community of interest," communities emerge, not around consensus or collective self-realization, but around a problem and relations of shared interest in reference to the problem—what Jane Bennett has defined as politics defined around the emergences of harms (Bennett 2010; Dewey 1927). Members are brought together not based on a shared self-identification, but are instead defined materially, with a relation based upon the relationship to a third object that threatens or harms the community. Toxic industrial pollution and objects defined by their harmfulness assemble a community of bodies they harm.

Environmental justice advocate Steve Lerner points to one such kind of community of harm in his book *Sacrifice Zone,* identifying how marginalized communities are not just exploited for their labor in an industrial capitalist economy; they are endemically exposed to industrial pollution in their homes (2010). As discussed in Chapter 1, a sacrifice zone is defined as a geographic area that has been impaired by environmental damage from heavy industry. And yet, as Lerner points out, many of these areas are not fully abandoned, but occupied by low-income "fence-line communities" who—due to the allure of cheap land/access to wages—are "exposed to disproportionately elevated levels of hazardous chemicals" (2010: 2.). Fence-line communities, as Lerner defines them, are communities directly adjacent to industrial production, faced with elevated levels of pollution and toxic harms. I refine this definition, identifying fence-line communities as a collection of inhabitants whose daily lives are influenced by immediately adjacent industrial refuse—a relationship which is neither removed from the relations of production, nor constrained by the cessation of production. Fence-line communities are organized by the entanglement of production and waste, class and toxicity, the lure of wages and cheap land entangled with the harms of a sacrificed landscape. The first difference between this definition and Lerner's lies in the question of time. Due to the long-term effects of industrial pollution, the damages caused by sacrifice zones are not contained by their contemporary moment. Industrial toxins remain, in sediment and in bodies, causing harm over months, years, even decades. As Rob Nixon argues, it is this facet of industrial pollution—what he terms "slow violence"—that is the most harmful for marginal populations because it is the hardest to identify and the easiest for governments to ignore (Nixon 2011). Fence-line communities, therefore, remain long after the industry has ceased. The second difference from Lerner's definition lies in the question of scale. The remains of industrial production do not exist merely at a microscopic level, but remain as visible refuse—rubble—that can be salvaged, remade, and reused by impoverished communities. Fence-line communities, as I define them, are marked by *ongoing* cycles of industrial production and abandonment, toxic harms that intersect with local cycles of impoverishment. As opposed to Steve Lerner and other environmental justice activists who study fence-line communities and their contemporary struggles with industry, the complex nature of fence-line communities come into focus through a long-term historical analysis, one that is attentive to the numerous relationships a community may have over time to an industrial landscape and the industrial refuse that marks it.

This redefinition of fence-line communities indicates an opening for archaeological intervention. Archaeology has the unique ability to capture the intersection of global dynamics and daily activity in fence-line community sites. Through archaeology's ability to excavate the daily lives of marginalized populations, track the social lives of industrial refuse, and situate the intersection of these dynamics within long time frames, archaeology has the capacity to unpack the life of a fence-line community in a manner that is inaccessible to other methodologies. Furthermore, the recursive and everyday practices that archaeologists study are precisely those that expose individuals to the toxins and the slow violence that define life in fence-line communities. That is, the daily routines of eating, washing, sleeping and working that expose families to the toxins that suffuse their domestic landscape. Attending to the persistence of toxic waste in a fence-line community like Ross Acreage over time, archaeology can trouble the easy periodizations, and occupations that define archaeological and historical treatments of places like Mill Creek Ravine. By tracking how industrial waste continues to define social and ecological life long after its deposition, archaeology can reveal the flaws in claims of post-ness inherent in studies of post-industrial.

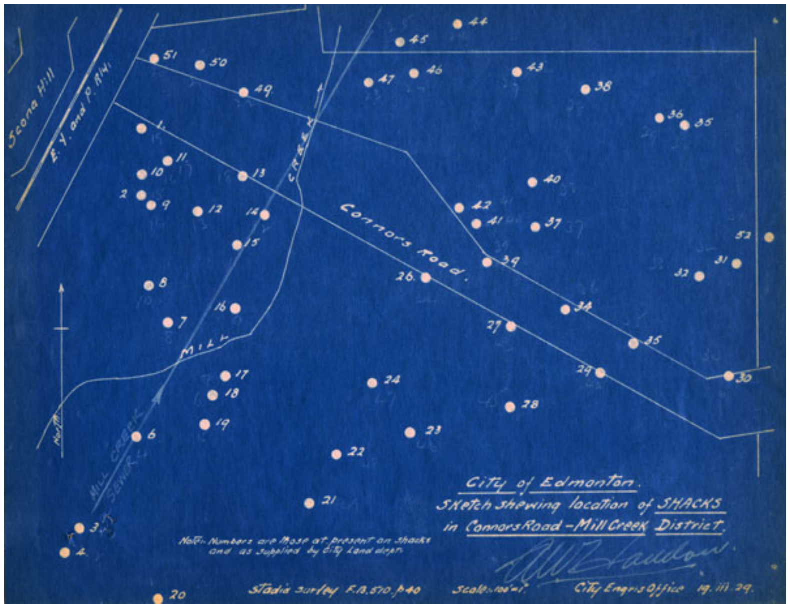

Image 2.2 Map commissioned by Dr. Whitelaw to provide a rough idea of the layout of the shacks in Ross Acreage in 1929. Image Courtesy of City of Edmonton Archives (CEA 11 7.3 file 89).

The Remains of Ross Acreage

Ross Acreage was founded during the same period that industry began to develop in Mill Creek Ravine. Spurred by the arrival of EY&P railroad, and the florescence of industry in the ravine, incoming settlers began to settle in the northern section of the ravine. Due to the poverty of its inhabitants, Ross Acreage is almost entirely absent from the archives. Ross Acreage was never officially surveyed by the city of Edmonton. Residents had no fixed addresses, no access to the city water mains or fire service, and paid only a nominal yearly ground rent payment to the city, an average cost of $24 a year. This lack of legal claim to the land resulted in a lack of historical documentation. There are no fire insurance maps, and city directories merely locate individuals living in Ross Acreage with numbers based on roughly how far south they lived from Connor's Road. In its fifty-year history there are two surviving maps of Ross Acreage shanties: the first is a rough sketch of the shanties locations in the area from 1929, commissioned by Dr.

Whitelaw (Fig 2); the second map, made in 1949 just before the settlement was demolished, was commissioned as part of the city's effort to relocate residents. These maps, combined with city directories and aerial photos from 1950, show evidence of a community's self-organized partition of land. While tents or shacks were moved frequently, and some residents would leave Ross Acreage only to be replaced by others, the plots of land they occupied, divided by caragana hedgerows, stayed relatively constant throughout its history.

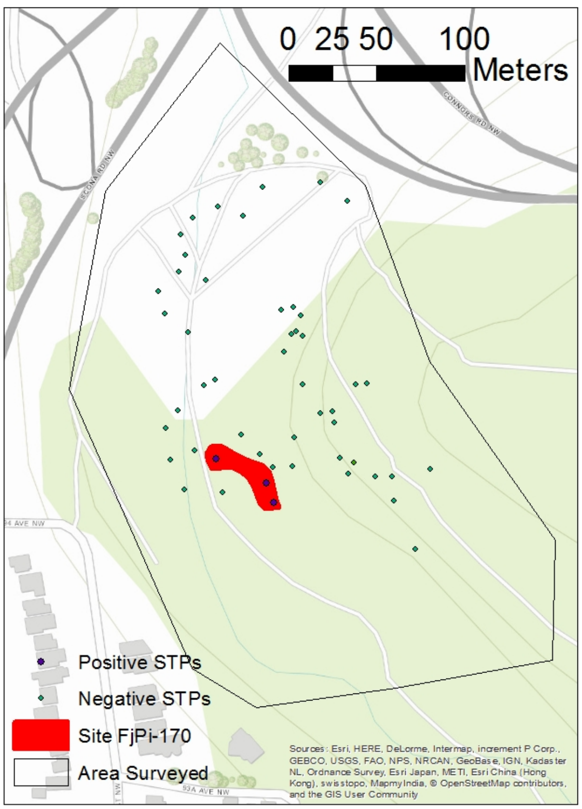

Image 2.3 Shovel Test area in the North Side of Mill Creek Ravine. Map by Author.

To locate the material remains of Ross Acreage I geo-referenced these historical maps onto contemporary ones. Guided by this data, as well as the contemporary layout of caragana hedge[1] stands throughout the ravine, I dug fifty shovel test pits were into the northern section of Mill Creek Ravine Park (Fig.3). Through these shovel tests, I identified two concentrations of early-twentieth-century material culture (Area 1 and Area 2). Based on historical aerial photos, and the different types of materials recovered in each area, I identified each area as representing an individual shanty plot. These two material culture concentrations are situated adjacent to one another, one along the ravine floor, the second up along a small ledge directly overlooking the ravine. Roughly 25m apart, the two areas were identified as a single archaeological site, designated as FjPi-170 according to Canadian Borden terminology.

The material recovered through shovel tests—a mix of molded and machine-made glass, tea service china ceramics, butchered animal bone, and significant numbers of wire nails—suggested that both areas were associated with domestic activity in the early-twentieth century, likely connected to the occupation of Ross Acreage. The southern section of the site, Area 1, is situated on a small flat embankment overlooking the Mill Creek valley (Fig. 3). The northern portion of the site, Area 2, is situated on the far eastern edge of the Mill Creek flood plain.

[1] *Caragana arborascens*, also known as Siberian peashrub, is a very fast growing and hardy tall shrub that was introduced into Alberta during the late-nineteenth century. Due to its hardiness, it was heavily promoted and given away for free by the federal government to be used as windbreaks and hedges, and was adopted as the preferred property line demarcation for hedgerows by most Edmontonians. The contemporary spread of caragana stands throughout the northern section of Mill Creek is not random and correlates strongly with the aerial photo identified locations of the shanty-plots.

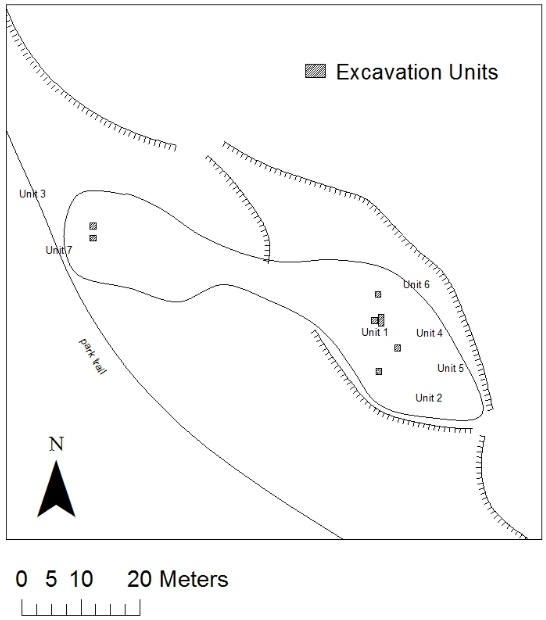

Image 2.4 Excavation Units in FjPi-170. Area 1 is the cluster of Units to the right, Area 2 is the cluster of units to the left. Map by Author

The small ledge on which Area 1 is situated lies roughly 10 meters above the ravine floor. The ledge is located up a steep embankment on the east side of the ravine, and almost completely hidden from view of the path due to a dense covering of caragana shrub that runs along the slope of the ledge. This shrub, along with a large lilac bush to the north of Area 1 serves as the border between Areas 1 and 2. The ledge is roughly oval shaped, 13m long and approximately 5m across at its broadest point. To the north of the ledge is a slightly sloped grassy area filled with birch trees that served as the entrance to the shanty plot in Area 1. A number of domesticated plants of unknown provenience, including a flowering peony and a hazelnut tree are scattered throughout this grassy area. The shovel tests in Area 1 identified the remains of a deep and stratified domestic occupation located in the center of the ledge. The surrounding caragana and domesticated plants suggested that the ledge had once been occupied as a home and garden area, with the caragana acting as a hedgerow. Five units were excavated in Area 1, three focusing on the domestic area identified by the shovel tests, and two others to the north and to the south of this domestic area.

Area 2 is located on a flat grassy area, formerly the flood plain of Mill Creek. A lilac bush is situated directly east, slightly up-slope. The flood plain was produced through the frequent flooding of the creek and the deposition of fine creek sediment, as well as the deposition of sediment from the erosion of the ravine walls/ridge. After the demolition of Ross Acreage in 1950, Mill Creek was rerouted to flow through a culvert and no longer flows beside the site. Area 2 is situated 30m east of the old creek bed and roughly 500m north of the culvert. Two units were excavated in Area 2, focusing on the area adjacent to the shovel test pit where deep stratified levels of domestic and construction refuse had been located.

From the data recovered through excavation in Areas 1 and 2, three discrete occupations were identified in each. The sequence of occupations in Area 1 was derived predominantly from the shared stratigraphy of Units 1 and 4, combined with data recovered from two features shared between those units: a storage pit feature and a domestic structure feature. In Area 2, broadly similar stratigraphy between Units 3 and 7 pointed to three different occupation surfaces. The three occupations of Area 1 are almost exactly contemporaneous with Area 2, however, material culture and archival evidence suggests a slightly different timeframe for the occupations of Area 2 compared to Area 1, indicating that Area 1 was occupied more consistently than Area 2.

Occupation 1: Settlement in an Overcrowded City

The Edmonton, Yukon & Pacific railroad, finished in 1902, ran along Mill Creek Ravine, through the Cloverdale flats and over the Low Level Bridge[2]. This rail connection facilitated a rush of settlers, tripling Edmonton's population between 1901-1903. Industrial factories were established along the length of the railroad, many concentrated in Mill Creek Ravine. Newly built grain mills, meatpacking plants and creameries along with brick factories and coalmines combined to make Edmonton not just the population center of central Alberta, but the industrial processing center of the region as well. This shift in the local economy also caused a shift in the type of settler that moved into the city. Before 1900, most incoming settlers were farmers, often from Eastern Canada, with enough skill and capital to work the land. After 1900, most newcomers were laborers, often unskilled, destitute immigrants from England or Eastern Europe. The rapid population growth of the city left Edmonton with a significant housing shortage. By 1907, over 20% of Edmonton's population was living in tents (*Edmonton Bulletin*, July 20, 1907). The river valley and ravines were dotted with informal communities—clustered shacks and tents that would shift around from year to year. One of these informal tent communities, the shantytown of Ross Acreage was founded at the Northern End of Mill Creek Ravine, in close proximity to Vogel's Meat-Packing Plant, Gallagher Hull's Meat-Packing Plant, Anderson's Brick Yard, and Hehsdoerfer Meat-Packing Plant.

Archaeologically, there is evidence of two small scale habitations, one in Area 1 and one in Area 2, during this first occupation (1905-1910). Analysis of the material culture suggests

[2] Originally named the Edmonton Bridge, the bridge was renamed the Low Level Bridge in 1913 when the High Level Bridge was built in 1913.

that the occupants of both areas were very poor population and had little available cash. Instead of purchasing goods, these occupants survived off of resources from the ravine. 91% of recovered material culture from both areas was associated with either construction or heating. In Area 1, we recovered an *in situ* wooden post associated with the first occupation. Stratigraphically, a 10cm thick cut into sterile brown clay running into the east bulk of Unit 4 was linked to this post and identified as the residual imprint of a long flat rectangular platform. To the west of these features we recovered an ovular 1m deep storage pit (Fig. 5). Together, the pit, the post, and the thick cut in the soil indicate the presence of a raised living platform directly to the east of a small storage pit or cellar. A lack of a significant concentration of construction material culture (primarily a lack of the variety of nails associated with permanent construction) in these levels, along with the presence of heavy-duty construction fabric suggests the structure on the platform was likely a canvas tent lined with low-cost, heavy-duty construction lining. This corresponds with other contemporaneous tenting communities in the river valley (*Edmonton Bulletin*, July 20, 1907). In contrast to Area 1, we located no *in situ* architecture in Area 2. However, as in Area 1, almost half of all material culture recovered was associated with architecture. The concentration and variety of the construction material indicate the presence a shack, rather than a tent-and-platform construction. We recovered some remains of concrete in Area 2, suggesting that the shack was built out of partially salvaged materials. While the lack of *in situ* architecture makes it difficult to know the exact location of the structure, the concentration of construction material in the north of Area 2 suggests that the structure was in that vicinity.

Image 2.5 Area 1, Unit 1, South Profile. Pit. Photo by Author.

Faunal remains recovered from levels associated with Occupation I were limited. Those recovered show the exploitive paradox of industrial labor. Despite living and working in an industrial landscape dominated by meat-packing, the inhabitants of Ross Acreage in Occupation I relied on hunting and fishing along with the occasional purchasing of local farm-raised meat. Seven of the nine bones recovered from Occupation I were from wild game animals, associated with subsistence hunting and fishing. In Area 1, two bones were identified as cattle. Both bovine specimens showed evidence of hand-cutting rather than mechanical sawing, indicating that the meat was likely purchased from a local butcher rather than a packing house. In Area 2, eggshell remains suggest there may have been chickens being raised locally.

Too poor to purchase coal, the residents of Ross Acreage gathered wood from the ravine and used it for heating. Small amounts of burnt coal recovered in Area 2 suggest that the occupants were engaged in limited *ad hoc* mining of exposed coal seams from the ravine bank. This widespread use of wood over coal corresponds to the heavily wooded ravine, and the general lack of coal production in the ravine during this early period. Ultra-trace heavy-metal testing of creek silt recovered from Occupation I, compared to creek silt found in sterile stratigraphic levels, shows an average of a 20% increase in the concentrations of heavy metals associated with coal mining, such as arsenic, lead, cadmium, beryllium and antimony. This suggests that some limited amount of coal extraction *was* taking place, but at a significantly lower scale than in the following occupation period.

The material culture of Occupation 1 suggests a small-scale tent city, existing on the cusp of full industrialization. The only evidence of purchased commodities was a significant number of glass beer bottles. Nowhere is this represented better than by the remains of a hand-blown bottle found in Feature 4 of Unit 1. This bottle provides a glimpse of how changing industrial technologies were changing the affordability of commodities even for impoverished communities like Ross Acreage. The bottle is a hand-blown quart-sized amber bottle, produced through a two-part cup-bottom mold likely around 1900. By the 1830s the introduction of bottle molds had drastically increased the speed of bottle production, and facilitated the mass production and affordability of alcoholic beverages, soft drinks, and pharmaceuticals. Increase in demand across North America combined with changing molding techniques allowed North American glass container production to double between 1897-1905 (Miller and Sullivan 1984: 83).

The amber bottle's presence in Area 1 is representative of both the increase in demand of bottled beverages across all social classes, as well as the drastic increase in bottle manufacturing.

The bottle was originally produced to hold alcohol, likely beer. While bottled alcohol had been an established part of the trade in the North-West region for centuries, transport costs for pre-bottled beverages made it relatively unaffordable as a mass market item. The establishment of local brewers, creameries, and bottling companies in Edmonton changed this. By the 1900 two breweries were established, one on each side of the river, along with the first homegrown bottling plant producing its own line of mineral waters and soft drinks (*The Edmonton Bulletin*, August 3, 1900). This quart-sized bottle would have been produced in a hand-blown glass manufacturing factory in Eastern Canada but bottled in Edmonton, by either the Edmonton Brewing Company or the Strathcona Brewing Company. Costs were still relatively high for these beverages; for example, a bottle of mineral water from the Edmonton Bottling Company in 1905 was 1$, a price far too expensive for most Edmontonians, much less the newcomers living in Ross Acreage. Bottled beer was considerably cheaper, but still a luxury for special occasions that the inhabitants of Ross Acreage could only occasionally afford. In 1903 the first fully automatic bottle machine, the Owen's machine, was developed, and by 1906 it had begun to be sold throughout North America, allowing the production of glass bottles at ten times the speed of hand blowing. By 1920, automatic bottle machines were producing 90% of the bottles in North America. The end of Occupation 1 represents the end of the dominance of hand-blowing technology. During Occupation 2, hand-blown bottles were used alongside machine-blown glass bottles, making a wider array of beverages cheaper and more affordable to the occupants of Ross Acreage.

Occupation 2: New Industries, New Commodities, New Toxins

In 1908, the Twin City Mine opened up a couple hundred meters south of Ross Acreage, less than a five-minute walk from Areas 1 and 2. Between 1908 and its closing in 1921, Twin City was the deepest mine in Edmonton, and one of the most productive ("Twin City Coal in Every Kitchen" *The Edmonton Bulletin*, March 22, 1918). The founding of Twin City was part of a significant shift in the industrial activity of the ravine and the city at that time. Spurred on by a ballooning population and rampant land speculation, both Strathcona and Edmonton collaborated with local and foreign businesses to facilitate large-scale industrial and infrastructural projects. The High Level Bridge was built across the North Saskatchewan and a smaller bridge was built across Mill Creek. New capital-heavy businesses popped up throughout the river valley and ravines, and old businesses expanded. In Mill Creek Ravine this period of free-flowing speculative investment helped fuel the expansion of Vogel's Meat-Packing plant, Gainer's Meat-Packing plant, the building and expansion of the Edmonton City Dairy, as well as the founding of the Arctic Ice Company, all in 1908-1909. The expansion of industry was mirrored by a new concern for workers' rights and collective action. From 1905 to 1911 almost all skilled labourers in the city collectivized, forming into thirty-three unions by 1911. Unskilled labourers, on the other hand, had only limited success organizing, due to their poverty, the large incoming settler population, and significant animosity felt between different ethnic groups (Goyette 2004: 179).

Image 2.6 Artist Rendering of Shanty 1 in Occupation 2. Image drawn by Reed Stewart.

Domestic life in Ross Acreage changed as well. The rise in industrial activity in the ravine led to an increase in available jobs for residents, and a subsequent increase in available consumable goods. In the ravine, tents were replaced by shacks, shacks were renovated and relocated, garden plots were planted, and residents set up hedgerows to define their property. Material culture recovered from both Area 1 and Area 2 indicate that this occupation took place between 1910-1920[3]. In Area 1, this occupation is defined by a rebuilding of the wooden platform with a wooden shack built on top. A second post-hole, located directly next to the post-

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[3] These dates are based on the presence of a number of early machine-made bottles and utility jars which were produced between 1910-1920, the presence of a number of lead foil cigarette packaging (TPQ 1918), and an end date based on a 1928 TPQ from material culture found in Occupation 3

hole from Occupation 1, suggests the wooden platform was rebuilt in the same location as it had been in Occupation 1 (Fig. 7). Based on the orientation of the platform and the distance from the ravine, the platform would have been relatively small, with four medium-sized wooden posts sunk into the ground. The range of different nail types that were recovered (siding, roofing, framing) suggests that this shack was made to last. The walls were probably built with plywood, or some other cheap, flat wood, and the walls and roof were sided with a thick tarpaper. The presence of thick colorful interior construction lining (likely a form of heavy-duty cheap wallpaper such as lincrusta) probably lined the interior of the house as a decorative form of insulation. Below the living surface, the old storage pit from Occupation 1 was rebuilt and lined with milled wood planks. Material culture found in the storage pit (glass bottles, tin cans, ironstone and stoneware crocks) suggests the feature was used as a cellar. In Area 2, Occupation 2 began with the constructions of a new platform and wooden house. Similar to Occupation 1, there is a dense concentration of construction material culture in the north end of Area 1, suggesting that the structure was rebuilt in the same location. South of this structure, the area was used for domestic refuse disposal. While materially Occupation 2 appears as a distinct occupation from Occupation 1, the continuities in time along with the rebuilding of shacks and cellars in the same location suggest that the occupants themselves were potentially the same people.

In both Areas 1 and 2, the amount of food consumed, and the variety of different foods consumed increased dramatically between Occupations 1 and 2. In Area 1, material culture associated with food consumption makes up over 25% of all material culture located, and over 15% in Area 2; this compares to 5% and 6% respectively during Occupation 1. Except for a couple of sherds of an ironstone plate and a few sherds of a china tea cup, all food-related materials are related to food storage. The increase in foodstuffs suggests a general increase in the income and well-being of Ross Acreage, while the lack of food service items points to both the practical function of the area (cellar) for food storage. At the same time, certain indulgences were too good to miss out on: during the First World War, mass-produced soft-pack cigarettes began flooding into North America. The presence of crumpled lead foil found throughout Occupation 2, likely from these early cigarette packs, suggests that cigarettes, at least, were worth the 15 cents per pack (Robinson 2014).

Image 2.7 Area 1, In Situ wooden posts in Unit 4. The one on the left had been removed, the one on the right was still intact. Photo by Author.

Compared to Occupation 1, the diet in Ross Acreage veered sharply away from hunted game and fish, and towards purchased beef, mutton, and pork (Tables 1 & 2). The majority (66%) of identifiable bones from this period came from domesticated animals (cows, sheep, pigs). Two-thirds of identified domestic animal bones show evidence of mechanized sawing; this indicates their processing in industrial meat-packing facilities. The commoditization of meat, and the subsequent drop in meat prices, allowed the occupants of Ross Acreage to come to rely on cheap, purchased meat. However, purchased meat did not completely replace hunting and fishing; a number of squirrel bones, hare bones, and pike bones found in Areas 1 and 2 suggest that local hunting and trapping were still practiced. Evidence of a garden located directly to the north of Area 1 also suggests that gardening was an increasingly important source of food in Ross Acreage.

Faunal Analysis

Area 1				**# of Bones from different types of animals**					**Industrial Markings**
Occupation	# of bones	Weight of bones (g)	# of Identifiable Elements	Large	Medium	Medium-small or small animals	Domestic	Wild	Saw Marks
1	9	70.89	5	2		3	2	3	0
2	62	340.72	30	19	15	9	13	8	9
3	357	713.5	32	15	5	19	18	15	5
Abandonment	66	477.06	44	26	10	14	22	8	20
Deep Pit	5	67.79	2	1	0	1	2	0	2

Table 2.1 Faunal Data associated with the different occupations of Area 1 in FjPi-170.

Area 2				# of Bones from different types of animals					Industrial Markings
Occupation	# of bones	Weight of bones (g)	# of Identifiable Elements	Large	Medium	Medium-small or small animals	Domestic	Wild	Saw Marks
1	10	5.09	3	0	0	4	0	4	0
2	28	89.32	5	5	0	1	5	1	3
3	17	10.56	5	3	0	10	1	4	1
Demolition	7	6.63	1	1	0	1	1	1	1

Table 2.2 Faunal Data associated with the different occupations of Area 2 in FjPi-170.

The material culture found in Occupation 2 contrasts with the stereotypical view of desperate and dejected life in a shantytown. A rapidly changing city provided opportunities for a marginalized communities such as Ross Acreage. Cheap and plentiful coal, and a large publicly-owned coal-fired power plant on the north side of the river (founded 1902), made citywide electricity cheap and accessible. Cloth-covered electrical wires along with fragmented shards of light-bulb glass from this period suggest that during Occupation 2, some of the households in Ross Acreage could afford electricity and used electrical lighting in their shanties. Furthermore, contrary to common presumptions about early-twentieth-century shantytowns, the population of Ross Acreage did not entirely consist of male bachelors. Two children's toys found in Area 1 suggest that children—likely whole families—were living in the shantytown. Along with these toys, the remnants of pencil lead and a piece of slate pencil recovered from Unit 1 were likely used by school-aged children to attend the nearby King Edward School, opened in 1914 (Olson 2016: 123).

Along with the turn towards electricity, Occupation 2 marks the switch to coal as a main heating source. Evidence of coal and burnt coal products appear in levels associated with Occupation 2. Coal and coal-related material culture makes up 12% of all recovered materials, compared to less than 2% for burnt wood. However, while coal use was ubiquitous throughout the period, the quality of coal varied greatly. High-quality bituminous coal burns very hot and produces coal ash. When coal is low-quality (sub-bitumanous or lignite) it has a much lower percentage of carbon to burn. The lower quality of the coal, the lower the heat and the more clinker is produced; coal of the lowest quality, with low concentrations of burnable carbon burns greyish red, revealing a high concentration of clay. In Occupation 2, remnants of coal range from glassy clinker to reddish-brown burnt coal, revealing that the residents of Ross Acreage would frequently use coal that was barely more than creek clay. The low quality of coal suggests that occupants of Area 1 were not solely purchasing their coal from mining companies but were also digging it out of the creek themselves, a common activity for impoverished communities at the time (Ironside and Hamilton 1973: 10). This coal, containing much higher moisture content than high grade coal, as well as a much higher percentage of non-carbon volatile elements, not only burns at a much lower temperature, but produced a thicker smoke, filled with higher concentrations of toxic heavy metals and carbon monoxide. It suggests that in Ross Acreage during the very long and cold winters (Edmonton averages 25 days a year below -20 Celsius/-4 Farenheit), coal shortages were a significant danger (Environment Canada 2016). In the limited confines of the Ross Acreage shanties, this dense smoke would have suffused daily life during the winter months--the smell of burning creek mud mingling with stinging eyes and wheezing lungs.

While the proximity to a very productive coal mine, and numerous raw sources of surface coal had its benefits, it also had its severe drawbacks. As industry expanded throughout Mill Creek Ravine in 1908 it also transformed the environment of Ross Acreage. Situated on a floodplain, Area 2, along with its gardens, was flooded out seasonally. Evidence of water staining and flood silt completely cover the occupation surfaces of Area 2. This flooding did not merely cause mess and seasonal disruption to those living in the floodplains, but regularly polluted their homes and gardens with run-off from two meat-packing plants and the large coal mine located just upstream. Ultra-trace heavy metal analysis of the flood silts associated with Occupation 2 show elevated levels of heavy metals associated with coal mining, specifically arsenic, beryllium, cadmium, lead, nickel, and antimony. On average this silt has, concentrations of heavy metals 61% higher than sterile silt dating prior to the occupation. Measured concentrations of arsenic, beryllium, and vanadium in the silt significantly exceeded appropriate concentrations for agricultural or garden soil (Moterjemi 2014: 112).

Occupation	As (ppm)	Be (ppm)
Pre-industrial	6.2	1.14
First Occupation	6.6	1.15
Second Occupation	**8.9**	**1.54**
Third Occupation	8.0	1.00
WHO Maximum Tolerable Concentration for Garden Soil	8.0	0.20

Table 2.3: Concentrations of Beryllium and Arsenic in Soils

While the chronic toxic effects of vanadium are not well studied, the effects of exposure to both beryllium and arsenic are well documented. Geologically, beryllium is a metal, however, low concentrations of it are often found in coal. Beryllium is a toxic by-product of coal mining and consumption, entering the air through the burning of coal and entering the water system through run-off and industrial waste produced through coal mining. Due to the local burning of coal, as well as the runoff from the Twin City mine, a mix of river silt and soil from Level 10 in Unit 7 has a measured beryllium concentration of 1.54 ppm. While this concentration is below the legal limit for beryllium in soil in Canada, it is 6 times the "maximum tolerable soil concentration" for agricultural or garden soil (0.2ppm) according to studies from the World Health Organization (Moterjemi 2014: 112). The exposure of humans to high concentrations of beryllium can cause serious health side effects, such as the severe inflammation of the lungs, eyes, and skin. Beryllium is not merely dangerous at high concentrations, long term exposure to even low levels of beryllium can cause a condition called chronic beryllium disease. This disease, while slow to onset, can cause weakness, lethargy, weight loss, and heart disease.

Like beryllium, arsenic is commonly found in coal. During the mining process, arsenic is mobilized via exposure to water and oxygen. Runoff from the coal mine, as well as runoff from coal storage facilities and coal mining spoils, releases this mobilized arsenic into local waterways (USGS 2006). After mining, the burning of coal concentrates arsenic and other heavy metals into coal ash and clinker. Coal mining, as well as coal burning, are both significant sources of arsenic toxicity. In Unit 7 a mix of river silt and soil from Level 10 had a concentration of 8.9ppm of arsenic, higher than the 8.0ppm that is the "maximum tolerable soil concentration" for agricultural or garden soil. Unlike beryllium, which is a more sedentary toxin, arsenic is quite mobile, and it's easily transported out from the soil into plants and animals. This suggests that over the decades the concentration of arsenic has dissipated and that 100 years ago this concentration of arsenic would have been considerably higher. Furthermore, arsenic bioaccumulates in plants and animals, concentrating in leafy vegetables grown in contaminated soil, as well as the animals that live off these vegetables. Arsenic is a carcinogen that causes damage to a number of different organs. Acute arsenic toxicity can cause death and internal bleeding. Chronic exposure to elevated levels of arsenic can cause long term health problems: liver and kidney damage, along with nerve damage and skin thickening. During Occupation 2, the inhabitants of Area 2 were likely exposed to elevated levels of arsenic and beryllium via the smoke of the coal they burned in their houses, the water they washed their clothes in, and the vegetables they grew in their gardens. Beyond the mine runoff, the creek was also polluted with organic waste from Gainer's and Vogel's plants. The two meat-packing plants dumped blood and other animal waste into the creek on a daily basis. Newly built storm drains for the southern portion of Edmonton also funneled into Mill Creek, dumping car oil and residential chemicals into the creek as well.

In short, Occupation 2 represents the height of prosperity for Ross Acreage, where easy access to wage-labor also provided access to new commodities. Instead of hunting and fishing, residents bought and served packaged meat to their families. Along with packaged meat, residents purchased canned food, cigarettes and tea, storing canned goods and preserved vegetables in small newly dug cellars under their homes. They ate their meals off of sturdy ceramic dinnerplates and drank tea out of tea sets manufactured in England. To heat their homes during the winter and to cook their food, residents bought coal from Twin City Mine. In one of the shanties children played with a small animal figurine. On school days, the same child likely attended the nearby King Edward School, using a slate pencil to write his or her daily lessons. The rise in industrial production did not just provide new wages and commodities it also transformed the local environment around Ross Acreage. Every spring, Mill Creek would flood its banks, covering the narrow floodplain in water and industrial waste. Those living on the floodplain would have their homes, their gardens, their pathways inundated with icy creek water and covered with polluted silt after the flood receded. As industry upriver of Ross Acreage flourished, the flooding got worse. Filled with increasing levels of blood, animal waste, human waste, and coal tailings, the volume and frequency of the flooding increased, and the quality of the water in the creek became more and more unhygienic. Through the flooding of Mill Creek, the environment also became suffused with toxic heavy metals from Twin City Coal Mine.

In 1912, the boom of industry south of the river and the massive population growth north of the river led to the amalgamation of Strathcona into Edmonton. However, by 1914, the industrial boom that had transformed life in Ross Acreage suddenly stalled. As pre-war tensions in Europe built up, European capital ceased to flow into the city. This loss of outside investment, combined with the departure of First World War volunteers and a poorly-timed sale of large tracts of prime Edmonton real estate by the HBC led to a bust of the real estate market. Since land speculation and visions of future earnings had served as the bread and butter of Edmonton's economic and industrial development, the implications of this real estate bust rippled through the industries lining Mill Creek. In 1915, those companies were further hit when a massive flood swept through the river valley, including the northern end of Mill Creek. Many industrial enterprises located in the ravine, including Vogel's Meatpacking and the Edmonton Lumber Company, shut down.

A slow decline amongst all the industries along Mill Creek set in. A combination of falling profits, as well as the fear that the river valley would flood again, forced most of these enterprises to close down or to relocate over the course of the 1920s. While this decline led to economic hardship in Ross Acreage, the abandoned industrial ruins also provided ample opportunity for salvage. Ross Acreage shanties, mostly cobbled together from wood, began incorporating sturdier materials such as salvaged bricks and concrete from the ruins that dotted the ravine. In Area 1, firebricks, scavenged from an old industrial furnace were used to buffer the house from the heat of a coal-fire stove. Unfortunately, salvage could not replace lost wages. By the early 1920s, many residents of Ross Acreage had left. In Areas 1 and 2, Occupation 2 ends with the destruction of domestic structures and their likely abandonment.

Third Occupation: Global Depression

The closing of the Twin City mine in 1921 did not simply signify the collapse of a single business, but the beginning of the end of coal mining as one of the main industries within city limits. Edmontonians became increasingly concerned by local mining, and increasingly fond of natural gas as a form of heating. In 1923, confronted with the damage to public infrastructure caused by undermining, a first bylaw was passed to restrict coal mining within city limits (Ironside and Hamilton 1973: 12). As coal mining slowed, the river valley and ravines became largely cleared of industrial activity. At the north end of Mill Creek, a garbage incinerator was built where Anderson's Brick Factory had been. The sites of Vogel's Meat Packing plant and the Twin City mine were both left to the wild.

Business stagnated in Edmonton throughout the 1920s, by 1926 the population was still seven thousand people less than it had been in 1914. However, successive years of drought throughout southern Alberta and southern Saskatchewan sent increasing numbers of impoverished farmers and their families into urban settings like Edmonton. Shantytowns like Ross Acreage began to be re-occupied, with newcomers once again settling in the valley that had so recently been industrial. By the following year, as destitute farmers continued to stream in, Edmonton's population grew beyond its 1914 high. The ballooning population of the shantytowns became of increasing concern to the city government: they were health hazards, fire hazards, and nightmares to legislate.

Between 1928 and 1950 Ross Acreage experienced its third and final Occupation, defined by the Great Depression and the eventual economic recovery. In 1928, a new house was built in Area 1, slightly to the south of the tarpaper shack from the previous occupation. In the city survey, this house was given the address 20 Mill Creek and was occupied by the family of a man named Raymond Bruner. At the same time as this house was being built, a small mine shaft was dug two meters straight down into the abandoned storage pit. Fuelled by incoming occupants desperate for heating sources, this mining activity was short lived and the deep hole was quickly filled in. With the closing down of most local coal mines and the inability of Ross Acreage occupants to afford natural gas, the search for heating sources was frantic. In Area 2, wood was used to supplement low coal reserves. In Area 1, inhabitants dug up coal wherever it could be found, including directly beneath their own home. At the time of the 1929 survey, Area 2 was still abandoned. However, by the early 1930s, as the population of Ross Acreage once again expanded, Area 2 was re-occupied[4]. During this occupation a new structure was built. Two post-holes and a high concentration of construction material suggest that this new structure was built on a raised wooden platform and shifted slightly to the south. The presence of tarpaper suggests its use over wood siding, similar to the domestic structure in Area 1 during Occupation 2. As the Area 2 structure moved to the south, the disposal area for domestic refuse moved to the north.

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[4] These dates derive from archival documents as well as material culture recovered. The digging of the mine shaft has a TPQ of 1928 de to the presence of a lead tube toothpaste bottle. A number of GWG brand jean buttons were identified with a design produced between 1934-1937. In Area 2, These dates are based on the presence of several pieces of solarized amethyst glass and a single piece of solarized straw machine made bottle glass found in levels associated with occupation 3. Solarized amethyst glass was produced by a technique that dates between 1890-1920. Solarized straw glass was produced by a technique that dates between 1920-1950. In Area 1, a Vaseline bottle with a design dating to 1945 and a bone china fragment with a maker's mark that dates to 1949 are associated the complete abandonment of the site.

The economic catastrophe of the early 1930s left many formerly comfortable families unemployed and destitute. During this period Ross Acreage became home to newly impoverished people simply trying to scrape by. Compared to Occupation 2, Occupation 3 is marked by a significant change in associated domestic material culture. For both areas there is a marked increase in the number of purchased commodities and non-utilitarian items combined with a significant rise in evidence of subsistence hunting and gardening and a decrease in the reliance on purchased meat. While material culture associated with food storage (tin cans, glass bottles, and ceramic crocks) are still ubiquitous across both areas, food service vessels are three times as frequent as they were in Occupation 2. Utilitarian ceramic crocks were found less frequently, whereas there is a sharp increase in china tea service ware along with glass candy bowls. The remains of the occupants' clothing display a similar trend. While utilitarian clothing, represented by denim buttons, was still commonly worn, other non-utilitarian dress clothing (represented by small mother-of-pearl buttons) were also present. Large faceted glass beads from a necklace suggest the presence of women living in Ross Acreage. These beads also suggest that those women and their families had once had disposable income. While this could suggest the occupants of this period were wealthier than those of previous occupations, it is more likely that for many families during the Depression, these beads, serving vessels, and dress clothes were vestiges of a middle-class lifestyle that had been lost.

One artifact vividly illustrates the hard times that this newly impoverished family was experiencing. Just as the house in Area 1 was being completed and the old cellar transformed from a mining pit into a garbage dump, a broken piece of ceramic was tossed into it. The ceramic, a small ceramic saucer, is only 4.5cm in diameter with a 2cm wide depression in the bottom. It is a toy porcelain saucer, part of a child's tea set used for play tea-time. The saucer is undecorated, and was made from a semi-porcelainous stoneware with a clear feldspathic glaze, and while not the highest quality of ceramic (true porcelain or bone china), it was well made and of good quality. Through the 1910s and 1920s, the china tea set this saucer came from was one of the more expensive toys available for middle class families, as well as one of the most popular, especially targeted towards young girls, consisting of a number of child-sized saucers, tea-cups, and a tea-pot. Cheaper than dolls and sleds, but more expensive than stuffed animals and jacks, china toy tea sets were a commodity that was affordable to middle class as well as many better off working-class families. The cost of the child's china tea set was roughly 25 cents in 1913 (*Red Deer News*, December 10, 1913) and up to 35 cents by the 1920s (The Edmonton Bulletin, October 4, 1921). By 1922 in Edmonton, coal miners--some of the highest paid industrial labourers--were paid five dollars a day, making the purchase of a child's tea set a small luxury that was within reach. During the Great Depression, with unemployment skyrocketing and wages crashing, toys like this saucer were no longer affordable for most families. For those working class families who did retain some disposable income, glass or tin toy tea sets were often purchased instead of the more expensive ceramic ones. The small broken toy saucer was likely part of a tea set purchased in the mid 1920s, when the Bruner family had money. By 1929 this tea set had made the journey with the Bruner family to Ross Acreage, acting not only as a toy, but as a memento of a time in their life when they had disposable income.

Even while these families still had access to good quality non-utilitarian items as a form of family heirloom, unemployment and a lack of available cash forced them to hunt locally in the ravine to supplement their diets. In Occupation 3, sustenance was equally dependent on hunted squirrels and muskrats and purchased beef and pork. 50% of all bones identified from both areas came from small wild game, a combination of pike, hare, muskrat, squirrel and rabbit. An increase in the importance of hunting is also supported by the presence of significant numbers of .22LR small game cartridges from a hunting rifle, as well as small leg trap. The purchase of meat as a commodity declined sharply, marked by a decrease in evidence of bones clearly processed and packed in industrial packing houses. While 43% of all identified bones showed evidence of mechanical sawing in Occupation 2, only 16% of identified bones in Occupation 3 showed such evidence. Along with hunting, gardening and locally raised chickens were used to supplement diets during Occupation 3. In Area 2, a garden plot was tended to along with a number of potted plants. Chickens were likely raised in Area 1, as evidenced by the presence of two complete articulated chicken skeletons. Due to a lack of city water service in Ross Acreage, along with a very limited supply of naturally occurring fresh water (one spring at the top of the ravine was the only source of fresh water for the two dozen families living south of Connor's Road), during this period creek water was used for most domestic activities (cleaning, cooking, and gardening) (Office of Waterworks "May13th, Letter to City Commissioner", 1929, CEA RG11 F89).

The decrease in purchased food, the importance of locally raised food, and the rise of hunting testify to the hardships of life in Ross Acreage throughout the Depression, but also reflect a flexibility and ingenuity in sustenance practices of resilient residents. Ultra-trace heavy metal tests of Occupation 3 levels show a sharp decrease in the concentrations of heavy metals in the flooding silts of Mill Creek, a result of the closing down of Twin City Mine. While the decline of industry in Mill Creek may have ended the production of new coal waste, the polluted silt that suffused Ross Acreage in Occupation 2 continued to persist in the soil, and to leach its heavy metals into the environment, long after industry abandoned the area. Looking for materials to build their homes, new shanties and shacks were built with wood, brick and concrete salvaged from the ruined industrial buildings that lined the creek. Instead of buying meat, the residents of Ross Acreage hunted and trapped squirrels and muskrats from the ravine for subsistence and relied on their gardens for fruits and vegetables. With the coal mine abandoned, and coal more expensive, residents of Ross Acreage scrounged for low quality coal from the banks of the ravine. During the long and cold winters coal shortages were a significant danger. In the limited confines of the Ross Acreage shanties, the dense smoke of poor-quality coal suffused daily life during the winter months--the smell of burning creek mud mingling with stinging eyes and wheezing lungs. Stuck without connections to the city water main or the city sewers, residents relied on creek water. The raw water of the creek, still suffused with city waste, rusting industrial ruins, and leaching metals from the abandoned Twin City Coal Mine, was drawn on and used for cooking food, cleaning dishes, and washing clothes.

Salvaging, scrounging, hunting and gardening in their backyards, the residents of Ross Acreage were continually exposed to the heavy metals and decomposing industrial waste that saturated the landscape. This exposure was so bad that city officials became increasingly concerned over Ross Acreage as a vector for typhoid fever. Residents themselves spent what little cash they had on medicine and hygiene, medicinal ampoules and other hygienic artifacts become increasingly popular during this period. In 1929, Dr. Whitelaw, the Chief Medical Officer of the City, fearful of a typhoid outbreak in Ross Acreage, visited the community to warn them against using raw water from the creek. Struck by the “very poor structures” and the poverty of the occupants, Dr. Whitelaw also pointed out the appalling state of the environment they lived in, noting "it would be hard to find a more undesirable place to live". The creek constantly flooded, the area was pockmarked with industrial waste and ruins, and everywhere the soil and the plants were exposed to industrial waste decaying in the ground.

While industry had abandoned Mill Creek Ravine, the area was far from a post-industrial landscape. Poverty and unemployment forced the families of Ross Acreage to live intimately off of an area that had long been steeped in industrial toxicity. The toxic soils and silts that had polluted Ross Acreage during Occupation 2 continued to persist in the soil, and to leach their heavy metals into the environment, and into the lives of residents during Occupation 3. Even while stratigraphy and material culture show three periods of occupation, the toxic decomposition of industrial waste troubles this easy distinction. Occupation 2, and the industry that defined it, did not really end when industry left, but persisted in the guise of lively toxins in the soil, remaking ecologies and bloodstreams,

Economic Rebound and the End of Ross Acreage

By the end of the 1930s and the onset of the Second World War, the economy of Edmonton began to rebound. This rebound also benefited the occupants of Ross Acreage, resulting in a prosperous second half of Occupation 3. While the overall population of the community fell after the end of the Depression, by 1949, fifty dwellings were still occupied. Over fifty children lived in the community, making up over one third of its population ('JK Cornwall Report' 1949, CEA RG-11 6.3 File 145). In Area 1, subsistence hunting had almost completely ceased. Unlike during the Depression the Bruner family no longer relied almost exclusively on purchased meat. The Area 2 occupants had managed to build a sturdy house out of salvaged brick and concrete. The rise in living standards within Ross Acreage lead to an increasing dissatisfaction with the city regulations. In 1948 residents began petitioning the city to rezone the area as residential and to let them buy the land on which their homes were built.

However, the city, eager to use its recent prosperity to facilitate massive new infrastructure projects, saw the jumbled expanse of Ross Acreage as a golden opportunity for highway expansion. The impasse between Ross Acreage residents and the city came to a head in 1949, when a fire broke out at the Kozak family's shanty. Michael Kozak, a four-year-old child, died in the fire (*Edmonton Journal* Feb 22, 1949). This death traumatized and galvanized the Ross Acreage community, convinced that access to a city hydrant could have saved the boy. The city on the other hand, used the death as proof that Ross Acreage was too dangerous to be left alone and needed to be cleared out. Eviction notices were sent out in June 1950. Before he and his family left, Raymond Bruner dismantled his home, and filled in the old cellar pit. In Area 2, the old house of brick, concrete and wood was bulldozed. Along with this bulldozing the city covered the area with a thick layer of sterile sand. In the south, the area was left abandoned, and used as a dumping ground for residents living on top of the ravine ridge. In the north, the city began a massive engineering project, raising up the surface level of the ground to facilitate the building of the new Connor's Road, a large highway that would connect downtown with the city's growing suburbs.

Life of a Fence-Line Community

Between its foundation and destruction, there were three distinct occupations in Ross Acreage that are stratigraphically identifiable in the archaeological record. These occupations are largely consistent with three historically identifiable periods in Mill Creek Ravines's history: early settlement (1902-1908), industrialization (1908-1920) and Great Depression (1929-1939). On a macro scale, the transformations that distinguished the three occupations can be linked to regional and global economic developments. These broad social and economic changes had a direct impact on daily life in Ross Acreage. The development of local industrial manufacturing and the availability of new mass-produced commodities provided the residents of Ross Acreage increasingly affordable goods for their daily lives. Fully automatic bottle production helped the tenants of Ross Acreage to afford beer and milk. Newly packaged cheap cigarettes facilitated the luxury of smoking. A wide variety of new pharmaceuticals helped make some degree of hygiene and sanitation affordable. Most importantly, industrial meat-packing provided a relatively cheap supply of protein for Ross Acreage families.

At the same time, while these new commodities provided new possibilities for consumption, these novel benefits came with significant drawbacks. Through these three occupations and their interconnections with broader historical trends, this research shows the harsh effects of the boom and bust cycle of capitalism on marginalized populations. Many commodities that were affordable during Occupation 2 ceased to be affordable in Occupation 3. By Occupation 3 and the Great Depression, Ross Acreage families could barely afford the packaged meat they relied on almost exclusively ten years previously.

Life in Ross Acreage was buffeted and defined by the dynamics of the regional and global economy. However the residents dealt with these dynamics in a profoundly local way, drawing on their own skills and ingenuity to make the most out of their local landscape in order to survive. To deal with this increasing poverty the residents of Ross Acreage looked outside of the cash and commodity marketplace to their own backyards. The creek provided water necessary for gardening and cleaning. The salvaging of nearby industrial sites was necessary for home construction and upkeep. Gardening and the hunting of local squirrels, muskrats and hares were necessary to put food on the table. The small-scale mining of surface coal seams was necessary to make it through the brutally long winters. The abandoned industrial landscape provided salvageable building resources and good habitats for small game, it also marked a landscape full of industrial pollutants. The very ingenuity that allowed them to make lives out of salvaging, gardening, and hunting also exposed them to the harms from the past that suffused their landscape. The ability of the residents of Ross Acreage to rely on Mill Creek Ravine for their food, water, heat, and construction material did not allow them to escape the effects of the global industrialized economy, but instead forced them to engage with the toxic side of this industrialized economy on an intimate, daily basis. On a macroscopic and microscopic level, as both a presence and an absence, industry suffused the lives of the residents of Ross Acreage.

Poverty and unemployment forced the families of Ross Acreage to live intimately off of an area that had long been steeped in industrial toxicity. While industry abandoned Mill Creek Ravine in the 1920s, the area was far from a post-industrial landscape. The high levels of coal waste that been distributed across Ross Acreage during Occupation 2 continued to persist in the soil, and to leach their heavy metals into the environment, and into the lives of residents during

Occupation 3. The persistence of waste in Mill Creek did not just trouble the attempts of Ross Acreage residence with toxic harms and injuries, it troubles the very chronology that the material culture and the stratigraphy suggest. Even while stratigraphy and material culture show three distinct periods of occupation, and at least two distinct populations who likely shared little in terms of history of background, the toxic decomposition of industrial waste cuts through these distinctions. Occupation 2, and the industry that defined it, did not really end when industry left, but persists in the guise of lively toxins in the soil, remaking ecologies and bloodstreams. Similarly—although to a lesser extent—the heavy metals of industrial waste from Occupation 1 continue to persist in the soil to the present day. While these three occupations represent different populations, who relied on different jobs and lived different daily lives over significantly different periods of time, the three distinct occupations that were identified do not define three distinct communities living in Ross Acreage. They are not three communities, but rather three different periods of life in a fence-line community, defined not by a continuity of population, or by a shared temporal frame, but by a shared experience of living in the same landscape and engaging with the same industrial refuse. In other words, the residents of Ross Acreage across all three occupations were one fence-line community, organized around the very industrial remains they lived amongst.

The traditional story of a working-class shantytown is one of exploitation and solidarity, a community defined by its relationship to industrial production. In Ross Acreage, as a fence-line community, this is only one part of the story, eliding the long afterlives of industrial pollution and the communities and landscapes they create. This is not to argue that its occupants of Ross Acreage had no say over their own social ties. Instead, this is to argue that the decay of industrial waste served as a persistent force that mediated, facilitated, and troubled the reproduction of daily life in Ross Acreage. The occupants of Ross Acreage built lives within these structures, using incredible ingenuity and resourcefulness to scrape by. The tragic paradox of this kind of community is that it was precisely in scraping by that they exposed themselves to the slow violence of their toxic industrial landscape. For the occupants of Ross Acreage, just like other marginalized communities throughout modern history and in the present, this slow violence was literally unavoidable.

Beyond the specific history of the Mill Creek Ravine area, this research on Ross Acreage provides a better understanding of how landscapes and the communities that live in them are defined by industrial waste. Specifically, as a discipline that focuses on waste and daily life, archaeology is well-suited to explore how the traumas of industry and industrial waste manifest themselves in the daily lives of vulnerable communities that are silenced in archival records, precarious populations where poverty and pollution enforce recursive daily practices that facilitate long-term toxic exposure. By attending to the persistence of industrial toxins in the soil, and their effects on Ross Acreage after the end of industry, this research also shows how the materiality of waste complicates any easy historical periodization that would understand spaces like Ross Acreage as post-industrial, or for that matter, post-colonial. An archaeological focus on the liveliness of toxins troubles the easy periodization of both stratigraphy and history, challenging the claim that once history is in the ground it is finished. Instead, it points to different ways that communities are formed and can be imagined, not through shared material culture, or shared temporality, but through shared space and shared harm.

Ross Acreage represents a paradigmatic example of the kind of community that proliferates in the Capitalocene. By attending to broad global dynamics, specific regional dynamics, and particular material decay, this archaeological investigation of Ross Acreage highlights how the decaying afterlives of industrial pollution continued to engage with ongoing social and ecological dynamics long after the end of industrial production. It is this shift in attention, from the clear-cut lines of production to the complex entanglements of production and its troubling afterlives, that allows archaeology to not just attend to capitalism, but to the Capitalocene itself. Or, to put it more accurately, it allows archaeology to attend to what capitalism has always been, a dynamic that develops through socio-natural relations and geo-physical forms.

Chapter 3

Caragana: Ecologies of Abandonment

By the time Ross Acreage was in the process of being forcibly evacuated in 1954, most of the industry that had once lined Mill Creek Ravine was long gone. Vogel's Meats had closed down in 1914, and the land sold to city in 1918. Twin City Mine was closed in 1921. Most of the remaining industries north of Ross Acreage had shut down prior to the Great Depression. Near the southern end of Mill Creek Ravine, Gainer's Meatpacking was expanding, but had removed itself completely from the ravine, locating itself on a large city block overlooking the creek. The EY&P rail line continued to run intermittently until 1951, but had lost the importance it once held during the height of Mill Creek's industrial heyday. By 1933, the city had bought up most of the property in the ravine, and left it fallow. For the most part, the ravine was abandoned, and the detritus of industry was left to decay. Residents removed the usable bricks and metal from the old foundations of Vogel Meats, the entryway of Twin City Mine began to slump, and everywhere, creeping shrubbery began to grow over the ruins.

Following the abandonment of the Ravine, the hedgerows of caragana that lined the old factories and mines spread. After Ross Acreage was bulldozed, the caragana hedges that had demarcated the boundaries between residents began to overgrow their rows, spreading out across the thick rubble and domestic waste. Thriving in the disturbed soil, caragana grew over meatpacking factory foundations, the tailings and overburden from abandoned coalmines, and domestic trash heaps. The ravine was left abandoned and neglected until the 1970s when emergent environmental sensibilities amongst the local population began to pressure the city to transform the ravine into a park. While the Ravine was being abandoned, caragana was renowned as one of the most successful, useful, and civilized of plants, a central figure used in the appropriation and settlement of Edmonton and Alberta. By 1970, instead of a valued plant, caragana became identified as an invasive species that did not belong in Mill Creek Ravine. Local residents and environmentalists, concerned by the health of the ravine, began to see caragana as one of the most prominent representatives of alien species that had 'invaded' the ravine, which they desired to be restored into 'natural' parkland.

A significant amount of academic ink has been spilled over the conceptual and critical weight of the ruined capitalist landscape. A focus on ruins and ruined landscapes brings attention to the unique relationship between capitalism and abandonment. The accelerating logic of capital is itself defined by a never-ending treadmill of the commodity production which continually creates and abandons objects, factories, infrastructures, and landscapes that have become redundant. As Chapter 1 outlined, industrial ruins and abandoned waste provide useful points of analysis, not only for understanding the logic of this accelerating dynamic, but how it touches down in particular locations and the long-term effects it has long after it has moved on. As richly symbolic allegories of decay and temporality, industrial ruins have become popularized in social scientific study as objects which—in congealing multiple temporalities—trouble the totalizing claims of power and the easy periodization of modern progress (Dawdy 2009; Boym 2003; Gonzalez-Ruibal 2008). Walter Benjamin, the scholar most associated with this line of thinking, argued that it was in the cracks and weeds of a ruin that "human history is physically merged into the natural setting" (Benjamin, 1977*:* 178). Manifested in the rotting roofs and disintegrating concrete, pierced and fragmented by roots, the material cycles of decay and growth poke holes in industrial factories and the promise of wealth and progress that they conjure.

However, within this framing, nature only serves as a trans-historic backdrop, an unchanging material force that reveals a critical standpoint against the totalizing claims of capitalism and its fantasies. Highlighting the allegorical power of natural decomposition in order to deflate the totalizing claims of progress misses the historic conditions of possibility embedded in that decay. Industrial landscapes are not neutral in their relationship to surrounding ecosystems and natural processes. Instead, as environmentalists and scholars of the Anthropocene have argued, industrial landscapes are a primary site of long-term ecological degradation, transformation, and toxic harm (Crutzen 2002; Campbell, 2016; Ross 2017). The flip side of this point is that the decay of industrial ruins, the material processes by which the remains of industry are decomposed by bacteria, fungi, wind, and roots, is neither neutral nor ahistoric, but mediated by the both the history of the environment as well as the industrial transformations of the landscape.

The abandonment of an industrial landscape, and the decay of industrial remains are the result of the interconnection between the dynamic of industrial capital and local environmental history. The ecology that emerges out of this abandonment and decay—the relations of industrial waste, plants, animal and humans—is therefore a dense entanglement of biological and historical relations. What kinds of plants and animals thrive in an industrially disturbed and abandoned landscape, what human activities proliferate? What history is remembered and traced through this thriving, and how are these thriving species made meaningful by human communities? These question become especially poignant in the case of colonial and settler colonial interactions, where the very projects of civilization and settlement that industrialization played a major role in were also intended to transform and settle 'nature' itself.

In this chapter, I attend to the history of the 'natural setting' that the industrial remains of Mill Creek merged into over the course of 1933-1970, the history of the roots and shrubs that began to grow over the foundations of Vogel's Meats, the tracks of the EY&P, and the bulldozed shanties of Ross Acreage. Specifically, this chapter traces the history of *Caragana arborescens* (caragana), the introduced shrub which was used for hedgerows by the community of Ross Acreage, flourished in the disturbed landscape of Mill Creek after it was abandoned. While now considered an invasive plant, caragana was once seen as a vitally important species in the settlement and transformation of the prairies. By attending to the history of caragana, I argue that the decay as well as the critical potential of the industrial remains of Mill Creek Ravine was mediated by the historical particularities of the ecology that grows out of it, what I term the ecology of abandonment, both in terms of the material and semiotic relations that define this ecology.

In Mill Creek, the contact between caragana and the industrial ruins was not an interaction between a trans-historic ecosystem and a historic dynamic of industrialization and collapse. It was the interaction between industrialization and a long-term colonial experiment of environmental transformation. The ecology that emerges out of the abandonment of Mill Creek Ravine is the result of two deeply interconnected projects. The first of these projects was the colonial transformation of the prairie environment to facilitate the appropriation of Indigenous land and the transformation of the prairies into a profitable agricultural landscape. The second of these projects was the transformation of Edmonton into an industrial hub for the production and processing of agricultural goods. Subsequently, the meanings and images that emerged out of these abandoned industrial spaces were not tied solely to the appearance of industrial decay, but colonial growth as well. Through the figure of caragana, a central species in the colonial transformation of the Prairies, this chapter will investigate how the prairie-wide project of environmental transformation touched down in Mill Creek during the period of industrialization, and how the fantasies and ecologies of this project continued to define Mill Creek long after abandonment. Rather than seeing ruins as the entry-point into a critique of capital and its fantasy of progress, I argue that the ecologies of industrial waste and caragana in Mill Creek provide an entrypoint into the analysis and critique of the entangled temporalities and fantasies of colonial settlement and industrialization that mark the Capitalocene.

For the most part, in environmental science, ecology, and in the environmentally concerned social science and humanities, scholars have attended to the historical relations of species like caragana, and their relations to their ecosystems, through the binary of invasive/native (Elton 1958; Russell 2017; Nunez and Simberloff 2005). Identifying caragana as an invasive species, while ostensibly critiquing the species and its history, veils the complexity of its history and the critical potential it holds. Tracking the colonial and capitalist historical relations which define the conditions of possibility of caragana in Mill Creek, as well as the human and non-human entanglements which define the ecology of Mill Creek as an abandoned industrial landscape rejects the simple categorization of invasive/native. Specifically, as scholars like Anna Tsing and Heather Swanson have argued, rather than keeping within this dichotomy, it is precisely these thriving and monstrous entanglements of human and non-human bodies and relations that serve as entry points for the analysis of disturbed industrial landscapes (2017). In contrast to the negative connotation of the monstrous, these monsters are reimagined as more ambiguous and productive characters, serving as a complex of historical relations and bodies that are both disturbed and disturbing, creatures that thrive in the devastated world of the Capitalocene.

In breaking free of its hedgerows and spreading across industrial rubble, caragana was not just growing in ruins, it was itself a form of what Ann Stoler would call imperial debris, a tangible and tenacious extension of a "protracted colonial project" (2014). On one hand caragana was an extension of a project of colonial appropriation and industrial production, a remnant that grew even while its form (hedgerow) decayed. On the other hand, this growth was not sober but monstrous, and this extension was not determinant but disturbing. Arguing against the widespread view of caragana as a noxious invasive species, I posit that caragana can be better thought of as a monstrous disturbance: a dense node of bodies and historical relations which thrives in the polluted landscapes of the Capitalocene while retaining traces of its historical conditions of possibility. Indeed, these are linked. In its monstrous thriving caragana recollects and extends the experimental colonial project that brought it to Mill Creek. Attending to caragana as a monstrous disturbance reveals the forgotten and entangled histories and relations that facilitated the industrialization and abandonment of Mill Creek, critiques the colonial and capitalist fantasies of progress and development that facilitated this industrialization, and provides techniques of survival within the disturbed and abandoned landscapes of the Capitalocene.

The figure of monstrous disturbance does not merely serve as an avenue to explore the material conditions upon which abandonment is followed by new plant growth, but also defines the appearance of abandonment itself. That is, abandonment maintains both objective and subjective elements: an abandoned landscape is both a landscape which is objectively abandoned—no longer used directly for the activities that are productive of value—as well as a landscape which subjectively has taken on the appearance of abandonment or absence. A monstrous disturbance like caragana thrives in abandoned landscapes, and abandoned landscapes take their abandoned *appearance* through the thriving of this monstrosity.

Invading Mill Creek

Today, caragana is regarded as a nuisance and a detriment to the park, both ecologically and aesthetically. As one resident of the nearby neighborhood of Bonnie Doone told me, it is a plant that should be removed, and would be if it was not too entrenched to eradicate. This dislike of caragana by local residents is mirrored by a prairie-wide antipathy to what has been called the "curse of the prairies" (Penner 2014). Among environmentalists and urban ecologists across Alberta there is widespread concern over caragana as a threat to the province's 'natural' ecosystems. A study by *Alberta Sustainable Development* identified caragana specifically as a problematic invasive species causing extensive environmental and economic damage province-wide (McLay et al. 2004). The same study claims that caragana "escaped from cultivation" (McLay et al. 2004), while a Calgary newspaper warned their readers that caragana "will aggressively spread and take over your garden…choke out flowering shrubs" (Calgary Herald, June 25, 2015). As the category 'invasive' suggests, local concern over caragana is not just worry over its foreignness, but over the fact that its foreignness is tied to a virulent and accelerating agency located in its biology, a refusal to be limited or controlled. As the claim that caragana 'escaped from cultivation' suggests, the category of invasiveness is also a way to historicize ecology, even while locating the agency of this history in the species itself.

Such concern over the harm of 'invasive species' is not unique to Alberta. Ever since Charles Elton published *The Ecology of Invasions* in 1958, invasive species have been identified as the focus of a sub-discipline in its own right, and as a severe problem to the environment and the economy across the globe. One study of invasive species in the United States identified invasive species as infesting 100 million acres, costing the United States $120 billion in damages annually, and causing a decline of 42% to threatened and endangered species (Pimental et. al 2005). In Canada, invasive species have likewise caused extensive damage to local environments, agriculture, and infrastructure (Canadian Food Inspection Agency 2008). However, as environmental philosopher Kristin Schrader-Frachette has noted, beyond the easy good/bad dichotomy the definition of what an invasive species is varies widely across different studies and disciplines (2001). While there is broad agreement about the environmental and ecological threats posed by invasives, there are significant differences as to what marks the line between invasive and non-invasive species.

Schrader-Frachette and biologist David Lodge define invasive species as "the subset of non-indigenous species that cause economic or environmental damage" (2003). Yet even in this seemingly straightforward definition, a wide range of value judgements remain to be clarified. What counts as environmental damage? Economic damage to who? Elsewhere, the *Convention of Biological Diversity* defines an invasive species as: "an alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity" (1992). While substantially different, both definitions reveal the basic contours of invasiveness, not as a precise analytic but as a general set of values. First, invasiveness is built upon the distinction between foreignness and belonging; it is the intrusion of a foreign thing into an already existing community. The nature, scale, and identity of this pre-existing community are left ambiguous. Second, invasiveness relies upon the presumption that immanent to this foreignness is the potential to cause harm. These two assumptions are themselves based upon other assumptions about normalcy and environmental history. In this conceptualization, the environment is presumed to be constituted by largely coherent biotic communities. These communities are defined by a 'normal' functioning; a normalcy that itself defines how the community transforms or stays the same over time. An invasive species is a disturbance to the normalcy of these communities, a disturbance which is historical and tied to human activity, but even more so is tied to a transformative disruptive agency within the species.

Beyond urban ecology and environmental studies, the concept of invasive species has itself been quite influential in the fields of colonial studies and colonial ecology. Ecologists, environmental historians, colonial ecocrit scholars, have shown how European colonization was defined by both the intentional and unintentional introduction of species (plant and animal) into different ecosystems (Franklin 2007; Elton 1958; Johnsson 2010). While examples of the unintentional introduction of new species proliferate in the historical record of colonization, they are more often than not the accidental side of a colonial infrastructure that was intentionally transforming the local ecosystem via the introduction of new species. The intentional introduction of new species (rabbits, cane toads, cows, sheep, wheat, sugarcane, etc.) into colonial landscapes was not tangential, but central to the colonial project. It facilitated the undercutting of Indigenous livelihoods, the commodification and settlement of land, and the extraction of profitable resources. As Sarah Franklin writes in her account of sheep raising along the Australian frontier "sheep were used not only to displace indigenous people, but to ensure the nonreproducibility of the subsistence ecology supporting the Aboriginal way of life" (Franklin 2007:122). Sheep were used to create and maintain a certain environment and landscape that was unusable by Indigenous peoples.

This deep interrelation between colonization and invasive species also calls into question the seemingly commonsense definitions of 'invasive species' provided by Schrader-Frachette and Lodge, or the Convention on Biological Diversity. What does the "economic or environmental damage" of introduced cattle, wheat, and canola on the Canadian Prairies look like for the incoming Euro-Canadian settlers compared to what it looked like to starving Indigenous communities who relied on vanishing herds of bison for food? From one perspective, these introduced species are economically and ecologically destructive on an existential level, from another, they define the economy that must be protected from other invasive species. Furthermore, to think of invasive plants as "agents of change" that 'escape' their intended purpose, elides the interwoven histories of humans and non-humans that are the conditions of possibility of these invasive species being deemed as such. To locate the agency solely within the biology of the plants ignores the history and the dynamics of capital and imperial power that facilitated the research, design, production, and spread of 'invasive' species into new ecosystems.

More than merely eliding the human source of invasive disruption, the underlying assumptions of 'invasiveness' are premised upon a problematic native/foreign dichotomy. This dichotomy presumes that foreignness is intrinsically harmful, and represents nativeness as inherently timeless, untouched and ahistorical. Drawing on Mamdani's distinction between settler and migrant, Fillipo Menozzi attempts to rectify the native/foreign dichotomy by arguing "invasiveness should not be confused with alienness" (2013: 184). Instead of invasiveness being a problem of foreignness, it is "a problem of unequal power and vulnerability". According to this logic, an invasive species is not merely defined as an 'other' that arrives and disrupts normalcy, but is marked by a violent entrance, followed by an excessive proliferation and accumulation that "eliminates the space for survival of other living beings" (Menozzi 2013:185). This aggressive expansion and accelerating proliferation are not nested solely within the genetics or biology of any individual species, but arise out of the complex of historical and biological interconnections and entanglements that define the species in a particular place at a particular time.

Monstrosities of Mill Creek

The category of invasiveness attempts to capture the interrelation of history and environmental degradation, but elides both the complexity of the history as well as the complexity of the environmental effects of these so called invasive species. Recent anthropological scholarship concerned with the devastation of landscapes and their ecologies has rejected the good/bad binary of invasiveness as well as the attempt to locate blame in a single individual or species. In *"Arts of Living on a Damaged Planet"* Heather Swanson, Anna Tsing, Nils Bubandt and Elaine Gan argue that singling out individual species as the culprit of environmental degradation misses the fundamentally entangled histories, bodies, and relations that lead to 'invasive' devastation (2017). Instead of identifying individual villains, these scholars suggest analyzing the multispecies, multi-corporal symbiotic entanglements that define a contemporary landscape saturated with ecological disruptions. Behind every so-called 'invasive species' there is a dense connection of human and more-than-human histories, relations, and bodies. These are the monsters, the symbiotic multispecies entanglements that simultaneously destroy and thrive in anthropogenic landscapes. "If jellyfish are monsters," they write in a discussion of the global environmental damages caused by invasive jellyfish, "it is because of their entanglements—with us" (2017: M1). Attention to such monsters is double-sided: these monsters are both "the wonders of symbiosis and the threat of ecological disruption" (M2). In other words, attending to the monstrous crises of invasive species requires both an interrogation of the historical human entanglements that served as their conditions of possibility, as well as attending to the lessons of symbiosis that have led to their thriving. Monsters are not villains of the contemporary environment that must be vanquished, but nodes of relations and bodies that provide entry points into the analysis of historical dynamics, and ambiguous characters that cause destruction while at the same time providing clues as to how to survive in a disturbed and toxic world.

As congealed symbiotic relations, monsters are not unique to the Capitalocene, but are a trans-historic relation of relations, an ancient history of "chimeric entanglements" (Swanson et al, 2017: M2). However, due to the global reach of human entanglements, the specific forms of the monsters that define the contemporary landscape are unique to the contemporary period. The "monstrosities of Modern man" that these scholars point to as facilitating all other contemporary monstrosities, are the product of the global reach of a dynamic that subsumes humans and non-humans into its value producing exercise: in a word, capital (Swanson et al 2017: M2). At the same time, monsters are not the determinate result of capitalist logic, a coherent tentacle of the commodity-chain. Instead, they are the orphaned bastards of value creation, thriving in spaces that were devastated, sacrificed, and abandoned to power the ever-accelerating treadmill of commodity production.

Monsters grow in the tears in the globe that are endemic to value creation. As such, Monsters serve as an entry-point into the analysis of how, via the logic of capital, the accelerating drive for profit makes remakes landscapes and ecologies not just through production, but through sacrifice and abandonment. Attending to so-called invasive species as monsters means tracing out how the human-centered dynamics of capitalist value-production serve as the conditions of possibility for abandoned and devastated landscapes. The accelerating speed of the capitalist dynamic not only creates new landscapes productive of value (factories, farms, mines etc.) but also new abandoned landscapes of waste that serve as voids facilitating the emergence of monstrous entanglements. Monsters emerge from ruined, abandoned landscapes, they thrive in the landscapes that carry the traces of past ways of life, past forms of capitalist production.

An Experimental Landscape

The caragana stands of Mill Creek Ravine are the monstrous result of a complex historical symbiosis of humans, caragana, rhizomes, bacteria, aspen poplar, etc. that allowed them to flourish and thrive in the abandoned industrial landscape of meat-packing and coal mining. This thriving itself recalls a history. As a monster of the Capitalocene, the caragana of Mill Creek Ravine has a befittingly monstrous history: the result of a colonial experiment to transform the prairie environment, and to appropriate and commodify Indigenous land. While caragana continues to flourish in Mill Creek, it was completely unknown to the local environment as late as 1900. It, along with an array of plant species deemed suitable by the Canadian government, was purposefully introduced as part of a project to transform the prairies and the aspen parkland environments of the vast Canadian North-west.

As scholars such as William Cronon have noted, settler colonialism requires not only the appropriation of new lands, but a radical transformation of the environment to facilitate capitalist accumulation (1983). In Canada, the shift in the colonial economy from extraction (fur trading) to settlement marks a significant break in the environmental history of the region. That is not to claim that the prairie environment prior to settlement was unspoilt by humanity, or that the fur trade did not have a drastic impact on local ecosystems. Both are far from the truth. Prior to the fur-trading period there was a ten-thousand-year history of Indigenous populations cultivating, engaging, and influencing the environment of the Prairies, from hunting big game to the cultivation of prairie fires (Lewis and Anderson 2003).

The fur trade had even more drastic impact on the prairie, aspen parkland and boreal forest biomes of the North-west, through its removal of a vital keystone species, the beaver (Maenhout 2013). Beavers, through their felling of trees and building of dams, had significant effects on their local ecosystems. Beaver dams transformed shallow moving water into deep slow-moving pond systems, supporting large and diverse populations of insects, fish, amphibians, reptiles, and birds. These ponds also mitigate the effects of extreme heat in the summer, extreme cold in the winter, and the detrimental effects of drought. Driven by two hundred years of a voracious thirst for furs in the European market, the removal of tens of millions of beavers from the Canadian North-west, and the subsequent disintegration of their dams, radically transformed the local ecosystems. As Dr. Walter Cheadle notes in his travelogue from his journey across the North-West in 1862, rather than pristine nature, he found a landscape of beaver ruins.

> "On the way we frequently met with marks of the labours of the beaver in days long gone by, when they were a numerous and powerful race; and at one place we found a long chain of marshes, formed by the damming up of a stream which had now ceased to exist. Their dwelling had been abandoned ages ago, for the house had become a greasy mount on the dry land and the dam in front of a green and solid bank." (Cheadle 1865: 178-179)

By the 1860s the fur-trade was on its last legs. As Cheadle notes, the absence of the beaver was palpable as well as the ecological transformation that occurred through its absence.

The environmental effects caused by the overhunting of the fur-trade dovetailed with the effects caused by the near extinction of the massive bison herds between 1850 and 1890. Bison, which grazed the open prairies, were a keystone species in limiting tree growth and preserving the grassland biome. The near annihilation of the bison population was sponsored by wealthy ranchers, railroad barons, and government officials in the US and Canada, who wanted to undermine Indigenous autonomy and open up the land for cattle, railroads, and settlement (Daschuk 2013). In Canada, the devastation of the bison herds had its intended effects. Removing the main Indigenous food source forced starving Indigenous communities to sign land treaties with the Canadian government in exchange for food and small land reserves. Ecologically, the destruction of the buffalo herd also had a significant effect, facilitating the growth of taller shrubs and trees, and limiting the growth of native grasses.

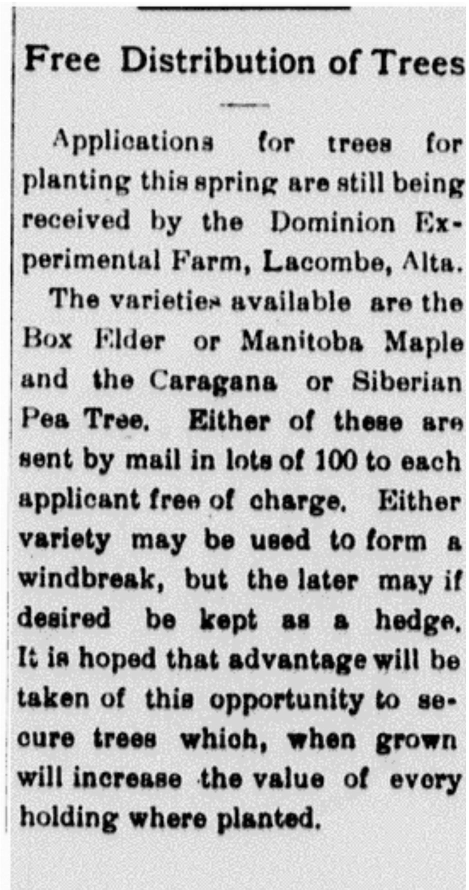
Following the defeat of the Métis and First Nations in the Northwest in 1885, and the removal of what the Canadian government saw as the last barrier to settlement of the region, Euro-Canadians began moving into the Northwest. To facilitate this settlement the federal government sought to transform the Prairies into an environment that could foster farming, ranching, and manufacturing. As the frontier opened up vast new lands to appropriate, the Canadian government developed a scientific infrastructure devoted to the transformation of this appropriated land into commoditized and profitable space. In 1886, five experimental farms were established nationally. Of the five original farms established, three (one each in present day Manitoba, Saskatchewan and British Columbia respectively) were located in Western Canada. Named the Experimental Farm System, these farms were meant to serve as a centralized research system for experimenting with and introducing new agricultural methods and products. As proclaimed on the historical plaques that memorialize each farm, the system "sought thereby to broaden Canada's agricultural frontiers, especially in the still sparsely settled North-west". While a portion of this research was focused on established farming areas in eastern Canada, the impetus for creating the farming system, and its central *raison d'etre* was research on the development of the vast unsettled areas across Western Canada. According to William Saunders, the founder of the farm system, the most important of these farms, and the one that had to be "begun without delay" was the Indian Head Experimental Farm, established in current-day Saskatchewan, specifically to focus on the North-west territory (1886: 65).

The main goal of these experimental farms was not merely to develop new strands of crops that could survive the brutally cold winters and short dry summers of the Canadian prairies, but to test a whole range of trees, shrubs, and plants that were hardy enough to be used to create a more desirable ecosystem for settlers. To the early Euro-Canadian settlers, the prairies were a barren and inhospitable landscape. While the soil was very rich, the flat, sparsely treed landscape was deemed barren and empty, and proposed serious challenges to incoming settlers. The lack of significant vegetation in the area stood as a significant barrier to the promise of settlement, facilitating high speed winds, and hampering moisture retention in the soil. For prospective settlers from Eastern Canada, the prairies were too cold, too dry, and too windy to support the kind of small-scale commercial farming to which most were accustomed and could make a profit from. The fear of the harsh landscape greatly limited settlement of the Prairies between 1885-1896, despite the completion of the railroad, and the promise of 160 acres of free homestead land (Anderson 2016).

To temper and transform this harsh landscape, the experimental farm system promoted the introduction of trees and shrubs as vital to the settlement and civilizing of the North-West. Trees and shrubs were seen to modify and temper the existing harsh and 'barren' Prairie grassland both materially (by changing local microclimates) as well as aesthetically (creating a more pleasing and civilized landscape for potential settlers). As Saunders outlined in a speech to the Royal Society of Canada in 1882, trees and shrubs were not the enemy of settlers, but their greatest ally, providing "shelter against storms, equalizing temperature and moisture, and purifying the atmosphere" (1882: 36). In order to determine the perfect shrubs and trees to use, the central experimental farm in Ottawa amassed hundreds of samples and saplings of trees and shrubs from other hardy climatic regions of the world, sending them on to the farms in Indian Head, Saskatchewan and Brandon, Manitoba to test their resilience and performance. Saunders' preferred region to draw from, due to a comparably harsh climate to the Canadian North-west, was Siberia, a region from which he ordered numerous varieties of plant species, including a number of wheat strains, the Siberian crabapple, as well as a hardy family of shrubs from Siberia and northern China named caragana. A number of different species of the caragana family were identified and tested, but it was the *Caragana arborescens*, also known as Siberian peahedge that emerged as the most promising to agricultural scientists.

To sight, *Caragana arborescens* was not an obviously impressive specimen. It is a perennial shrub or small tree that grows 3 to 5 meters in height when fully mature. A single caragana plant can stand alone, or they can be cultivated in large caragana stands, allowing its use as a hedge. It is in the legume family, with small peapods that ripen from June to August. From May to June the plant produces a fragrant yellow flower. Where caragana is most impressive, as the agricultural experiments of the late nineteenth century determined, was its incredible ability to flourish and adapt to highly adverse climatic conditions and poor soils (Dietz and Slabaugh 1973). The extensive root system of the caragana makes it resistant to high winds and tolerant of drought; it also makes the shrub useful for preventing erosion, and very difficult to remove (George 1953). Along with the extensive root system, caragana foliage was very dense, providing exceptional protection from wind. Caragana seedlings grow fast and thrive in a wide range of soil types, including highly alkaline soils, dry soils and polluted soils (Watson 2013). Part of what made caragana so attractive, however, was not just its ability to survive in different soil types, but to actively transform the soils around it. Caragana, along with most other members of the legume family, fixes nitrogen in the soil through a symbiotic relationship with bacteria called rhizobia. Through this symbiotic relationship, caragana actively fertilizes the soil it grows in by producing fixed nitrogen compounds that are available to other species of plant. Unlike other legumes, in caragana this nitrogen fixation can take place at significantly lower temperatures, meaning the fertilizing aspects of caragana still work in the cold Prairies (Shortt and Vamosi 2012). While with fixing nitrogen in the soil, caragana also secretes toxic phenolic compounds into the soil, inhibiting the growth and germination of surrounding plants and seeds (Shortt and Vamosi 2012; Zolotukin 1980). Caragana also concentrates the toxic amino acid canovanine in its seeds and leaves. Canovanine is a metabolic inhibitor in bacteria, fungi, and insects as well as herbivores (Bell 1958). The toxic distribution of canavanine and phenolic compounds, is part of an allelopathic defensive mechanism that inhibits the growth competing plants, the limiting of potentially harmful bacteria and fungi as well as limiting herbivorous grazing.

While the specific biochemical properties of caragana were unknown to the agricultural scientists of the 1890s, caragana's utility as a hardy and multipurpose plant was well noted. A booklet published in 1895 by the Brandon Experimental farm identified over a "hundred varieties of trees and shrub" that were being tested by the farm and "found hardy" (George 1895). Of these one hundred varieties, caragana was singled out as one of the "most promising plants" being researched, specifically for the purpose of hedges. For Saunders, writing in a 1904 Department of Agriculture publication for farmers, caragana was hardiest and most versatile of all species they had tested: "[o]f all the shrubs which have been brought from other countries to the Canadian North-West none have been so uniformly hardy under all circumstances as the species of Caragana" (Saunders 1904).



Free Distribution of Trees

Applications for trees for planting this spring are still being received by the Dominion Experimental Farm, Lacombe, Alta.

The varieties available are the Box Elder or Manitoba Maple and the Caragana or Siberian Pea Tree. Either of these are sent by mail in lots of 100 to each applicant free of charge. Either variety may be used to form a windbreak, but the later may if desired be kept as a hedge. It is hoped that advantage will be taken of this opportunity to secure trees which, when grown will increase the value of every holding where planted.

Image 3.1 Newspaper advertisement for free caragana seeds from the newly established Experimental Farm in Lacombe Alberta. Image courtesy of Peels Prairies Province online collection (PPP April 7th, 1909 *Didsbury Pioneer*).

Given this ringing endorsement, caragana was "widely distributed from the experimental farms among the thousands of settlers and is proving very useful". Based on the early research by the experimental farming network, by 1901, the Canadian Ministry of Interior inaugurated a plan to forest the prairies, using their network of experimental farms and nursery stations to facilitate the distribution and planting of trees and tall shrubs across the plains. Selling large tree saplings at a low cost, and giving a significant amount number of broadleaf trees and shrubs away in sapling and seed form for free (with an application before March 1 and the cost of postage), the system sent out 133 million cuttings and saplings between 1901 and1933, along with countless numbers of seeds (*Western Globe*, Sept 21, 1933).

With the Brandon and Indian Head experimental farms promoting the singular viability of caragana, it became the preferred shrub for hedges and windbreaks across the whole North-west. Given its promise, caragana was one of the few species that the experimental farms would send out by post for free. It was also one of the few species of non-cereal plant that was ubiquitous across the whole network of research, media, and private vendors that defined early settlement and farming in the North-west. Seed nurseries and seed merchants took their ques the experimental farms, selling and distributing saplings and seeds and advertising the results of the farm's research.

The Hedge: Bringing Order and Property to the Prairies

By assuaging wind speeds, fixing nitrogen, and securing moisture in the soils, caragana facilitated the planting of crops, primarily wheat. By 1930 over 80% of Canada's prairie grassland had been transformed into cropland (Bailey et al, 2010). However, for the experimental farm system, the value of caragana was not just in its utility, but in its aesthetically pleasing appearance. As Saunders put it, caragana was "free from catkins, produce[d] no suckers", ha[d] no gummy ooze with which to attract insects" and "produced yellow flowers in the summer" (1886). This aesthetic side of caragana made it attractive as an ornamental plant, useful not just to withstand the elements, but to symbolize the order and beauty of settlement as a civilizing project. The aesthetics of caragana were central to the settling project, linking the legal appropriation, survey, and commodification of land with the civilizing narratives of progress that attempted to entice prospective settlers into the North-West. The dissemination of caragana in the form of hedgerows and windbreaks was meant to produce both a productive and a beautiful landscape, a landscape that would serve as an advertisement for prospective settlers.

Beyond the material benefits of transforming the Prairies into an agriculturally productive and aesthetically pleasing landscape, the experimental farming system was central to the project of the symbolic appropriation and transformation of the prairies. That is, the planting of trees and shrubs, and the production of a well treed environment on the Prairies was deeply interconnected with the 'legal' rituals of land appropriation that took place under the sign of treaties between Indigenous groups and the Canadian government. In the eyes of Euro-Canadians of the 1890s, and 1900s, the Prairies represented more than just the challenge of a harsh environment, but also the challenge of an unnatural landscape with an 'undifferentiated' flatness and vastness. Not only did this perspective deny the presence and rights of the Indigenous population that lived in the landscape, it defined the landscape as beyond the pale of nature. While written almost a decade later, a widely re-published 1918 op-ed article in the *Toronto Globe*, entitled "The Treeless Plains are an Abomination to Nature", represents this view explicitly (*Alderson News,* Jan 29 1918). Rather than seeing the plains as part of nature, the author deemed them unnatural, quoting the maxim "nature abhors a void" as the true "eternal plan" of nature. The filling in of the Prairies through the introduction of non-indigenous trees and shrubs was in accordance to a higher natural law than that of local ecology. Filling in the void, and breaking the tedium of the "unbroken plain", with "maple, ash, Russian poplar, [and] caragana" the settlers follow nature's "infallible teaching" even while they drastically transformed one of her "vast domains" (*Alderson News,* Jan 29 1918). Both appropriation and experimentation were necessary components of Euro-Canadian man's duty to the caretaking of the natural world.

Beyond serving as a tool in the naturalization of an unnatural environment, caragana specifically embodied the bringing of order, private property, and ultimately civilization. A 1913 seed nursery advertisement for caragana argued that "a hedge marks the beginning of a new home", and "no land owner, either of farming land or suburban property can afford to be without a windbreak" (*Grain Growers Guide*, Feb 26 1913). As this ad outlines, the environmental benefits of caragana for settlement are deeply intertwined with its symbolic importance of caragana as the prototypical hedge, with the hedge as the necessary first step of settlement. As the scientifically identified prototypical hedge of settlement, caragana became an indexical icon of colonial settlement, and played a central role in the legal, material, and symbolic appropriation and commodification of Indigenous land as Euro-Canadian private property. Even after the signing of the numbered treaties with the Indigenous occupants of the North-west, Euro-Canadian title to the area was incomplete. Based on long standing traditions in English common law and the political theory of private property espoused by John Locke, the Euro-Canadian settler colonization project of the North-West was founded upon the presumption that the building of permanent improvements upon 'un-improved land' produced legal land ownership and private property (Arneil, 1992). Specifically, British colonial settlement asserted and performed the appropriation of new lands through the construction of domestic space (Seed, 1995). The production of private property was exemplified through the building of a home, the planting of a garden, and the enclosing of the area with a fence. From the fourteenth century onwards, communal property in England was legally and physically enclosed by fences and hedges to facilitate private ownership and prevent communal use (Seed 1995). Through the Enclosure acts of the 17^{th} and 18^{th} centuries, fences and hedges became the material manifestation of laws that transformed commonly held property into privately held land. During the colonization of British North America, similar strategies of appropriation were used. More than any other improvement, the building of hedges or fences represented the *sine qua non* of private property ownership, materializing the exclusive right of the settler to a visibly defined portion of land.

Image 3.2 Caragana as a windbreak/property line. Photo courtesy of *USDA-NRCS PLANTS Database*.

Legally drawn out of the British system of common law and the long tradition of British settler colonialism, the fledgling nation of Canada followed the same logical connection between labor, ownership, order, and settlement in their appropriation of the North-west. According to the 1871 Dominion Land Act, which legalized homesteading in the North-west, every male over 21 could apply for 160 acres of land, conditional upon the improvement of that land within five years. Institutionalizing how vital hedges and fences were to appropriation of land, in 1914, the Dominion Land Act was specifically amended to require all homesteaders to "enclose the whole quarter section…by a substantial fence" (Dominion Land Act, 1914). As one of the most important land improvements for settlers, caragana hedges stood as legally recognized, physical proof of private ownership. While the numbered treaties with the Indigenous populations of the Prairies may have provided the tenuous legal foundation for Canadian governance over the massive North-West, and the Dominion Land Survey of 1871 may have provided the conditions of possibility for dividing up the region into potential parcels to be bought and sold, it was the caragana hedges that manifested these parcels as private property.

Caragana in Edmonton

Following the first successful experimental tests concerning the viability of Caragana, seeds, cuttings, and shrubs spread west quickly. Caragana first arrives in Edmonton in 1901, when it was advertised for sale as a shrub in the *Edmonton Bulletin,* listed alongside only three other shrubs or trees that were deemed vital to life in the North-West (May 6, 1901). By 1906 caragana was advertised in Edmonton as not merely vital to farming life, but to urban life as well, having the rare ability to provide exceptional practical benefits as well as its ability to "Beautify Your Lawns" (*Edmonton Bulletin,* Sept. 15 1906). As a city in the grips of a massive boom in the decade between 1904-1914, this beautifying of the lawns and the urban landscape more generally was not merely for its own sake, but served a vital role in land speculation. The local economy was based upon the promise of masses of incoming settlers, causing speculative flipping where plots of land were purchased, subdivided and resold in a matter of months. Caragana and other ornamental plants were in high demand as species that could be advantageously planted to beautify, civilize, and in so doing, increase the value of the property for resale. The boom was so promising, and the agricultural needs of the incoming settlers were so high that by 1907, the Canadian government founded a new experimental farm in Lacombe, just south of Edmonton. In order to help facilitate the land boom, the new farm gave out free samples of caragana and box elder saplings to incoming settlers: 100 samples free of charge with each application. As the Lacombe farm advertised in regional papers across Alberta, planting these saplings would "raise the value of every holding where planted" (*Western Globe* April 13, 1909). Due to its extremely low cost (15c postal charge for 100 saplings) caragana was affordable to newcomers. Even settlers who camped and squatted throughout the river valley and the ravines could afford to apply for caragana saplings. Indeed, as squatters they had even more of an impetus to do so, with the hope that at some point the city would recognize their improvements and their rights to the land. In an impoverished community like Ross Acreage, where no official plots were surveyed, caragana was the sole feature that differentiated the boundaries of shanty plots.

When the land speculation boom collapsed in 1914, the city was left with an excess of empty land and no buyers. The boom had led the city to expand across a massive area, with some city planners expecting an incoming population larger than that of Toronto (population 370,000 in 1911) or Montreal (population 470,000) (*Edmonton Bulletin* May 3, 1918). When the boom ended at the beginning of the First World War, 50,000 people lived in an area of fifty-six square miles hectares, meant for a population of hundreds of thousands. Rather than a 'New Chicago' Edmonton was a shell of a massive city, pockmarked by gaps, waste and weeds. The city population was scattered over this large area and vacant spaces stood throughout the city. Practically, the wide distribution of the population and the patchwork of abandoned spaces were an extreme detriment to the efficiency and business of the city, causing a challenge for city infrastructure and local mobility.

The concern over the abandoned spaces was also a concern over the progress and prosperity that the growth of Edmonton embodied. During the boom, Edmonton was the realization of the fantasy of colonization, a flourishing urban industrial center that brought the Western Prairies into prosperous civilization. When the boom ended, and the long recession began, the solution to fix these abandoned spaces, these voids, was similar to the solution of the experimental farms concerning the Prairies: the imposition of new kinds of ordered nature. In 1918, the Edmonton Bulletin argued that to make these vacant spaces productive and attractive, Edmonton should turn them into gardens. By planting potatoes, berries, and flowers, the city could turn its vacant spaces into productive local gardens, providing employment for the many Edmontonians currently out of work, and attracting incoming settlers with an overpowering civic beauty. These gardens would turn an "eyesore, and detriment to investment" into the city's "greatest attraction", an "inducement to permanent residents and the foundation of civic success and prosperity"(*Edmonton Bulletin* May 3, 1918). To emphasize the order and beauty of these gardens over the "eyesore" of vacant land, lilacs and caragana would line the gardens due to their "abundant foliage and beautiful bloom" (Edmonton Bulletin May 3rd, 1918). Even in the urban setting caragana was an indispensable buffer against the threat of disorder, adept at filling in all of the problematic gaps.

The Absent Presence of Mill Creek

By the 1920s and 1930s in Mill Creek, the caragana hedges that crisscrossed Ross Acreage, and that grew on top of the old industrial waste were one of the few examples of standing greenery left in Mill Creek Ravine. Thirty years of industrial activity had stripped the

Ravine bare and denuded its banks of trees. Prior to industrialization Mill Creek was a heavily wooded area. The first record of Mill Creek comes from July 21, 1862 when a group of "Overlander" settlers attempted to cross into the Cariboo Gold Russ in British Columbia overland (Leduc 2011). Looking for Fort Edmonton, the group was perilously slowed down by having to cut through a steep and heavily wooded ravine that ran into the North Saskatchewan River. Too steep to be accessed by bison, ravines like Mill Creek were centrally important to the Prairie ecosystem, supporting riparian and deciduous forest biomes in contrast to the grasslands that surrounded them. The slopes within the ravine consisted of white spruce forests as well as a mix of aspen poplar, balsam poplar, and birch. The understory would have been thick with wild rose, highbush cranberry, and Saskatoon berries.

In 1902, when the railroad was built through Mill Creek, the area was still thick with trees. Twenty years later, most of the ravine north of 88^{th} Ave was almost completely bare. Used for winter fuel, and removed to make way for construction projects, the trees of Mill Creek were almost entirely cleared from the northern section of the Ravine. A late spring aerial photo from 1920 shows the extent of this removal, revealing the empty denuded ravine banks stretching from the site of Vogel's Meats all the way down to Ross Acreage. As industry collapsed, the city of Edmonton began buying up most of the land in Mill Creek Ravine. In 1933 the first bylaw was passed, zoning Mill Creek Ravine as parkland, limiting the cutting down of trees and the dumping of waste in the ravine. However, due to the continued presence of Ross Acreage, as well as the continued use of the Ravine by the EY&P Railroad, the bylaw was largely unenforceable. An aerial photo from 1950, just before the railroad was shut down and Ross Acreage dismantled, shows the limited effect that the bylaw had in restoring the forest of Mill Creek Ravine. While some trees had grown, large patches of the landscape remain completed denuded, and the majority of the ravine was covered with a thick growing understory. This understory, growing out of the old tracks, the concrete foundations, and the piles of coal overburden consisted of thick bushes and shrubs, marked most notably by the virulent and aggressive caragana.

The end of World War II heralded new economic growth for Edmonton. On February 13th, 1947, oil was discovered in Leduc, a small community 33 km south of Edmonton. Between 1946-1951 the city grew over forty percent, from a population of just over 110,000 to 160,000. By 1956 it was almost 230,000. Working class families flooded Edmonton, drawn by the high wages of working in the oil industry. More than just growing, the city was expanding outward, along with the development of suburbs on the city outskirts, most heavy industry was moved out of the city center and into the peripheries. Large industrial parks were moved to South Edmonton, in close proximity to both workers and to the source of the oil.

The discovery of oil deposits in Leduc heralded the complete transformation of the city's economy and its geography. Rather than concentrating the new population in the city center, highways facilitated the growth of suburbs, and the massive industrial parks that were set up in the south. The river valley and the ravines, once the primary location of Edmonton's heavy industry were now left completely abandoned as industry likewise moved to the city outskirts. After both industry and shantytowns left Mill Creek Ravine, the city ignored the ravine. While the city owned the majority of the land throughout the ravine, it refused to either manage the area as an official park or effectively police the bylaws that ostensibly governed the area.

The ravine, already abandoned by industry and capital, was also abandoned and neglected by the city, refusing to uphold its' own bylaws to protect it. This was due to Mill Creek's appearance as a quintessentially abandoned and unkempt space. Mill Creek took on the appearance of an abandoned space through the industrial detritus in the ravine. The combination of Ross Acreage garbage and industrial waste overgrown with caragana represented what Victor Buchli and Gavin Lucas would call a present absence/absent presence (2001). That is, objects that symbolized both a tangible absence through their presence as well as evoked a gripping presence through what they lacked. These objects represented abandonment precisely in the same breath that they indexed a history of occupation. The industrial waste was seen as ruins, the embodiments of failure and the abandonment of the creek by industry, the unkempt and overgrown caragana marked dissolution of old plots of land and gardens. The unkempt growth of the caragana specifically, as an ornamental plant, a foundational symbol of 'natural' order and private property, represented a breakdown of human presence itself. The absent presence of these ruins defined Mill Creek Ravine as an abandoned space, a landscape that was marked not by what it did, but by what it lacked.

However, it was precisely this appearance of abandonment that made it productive as a landscape of waste for the city of Edmonton and its residents. Neither deemed a natural space, nor an ordered human space, Mill Creek Ravine was a disordered space, a space of absence where new waste could be dumped without issue. Unlike a garbage dump or a tailings pond, ordered and organized sites where waste is concentrated, Mill Creek was a sink, an absent space where waste was diffused, spread out: a place where waste disappeared.

Marked as an abandoned space, the Ravine was very busy. On one hand, it increasingly became popular site for recreation. While unkempt and filled with old and new trash, Mill Creek became an ad hoc green space, a pleasant site for picnics for working class families. On the other hand, as the population doubled and spread out across South Edmonton, by the 1950s Mill Creek became a vital component of the city's rapidly expanding urban waste infrastructure. In an awkward location, out of sight, and already filled with industrial waste and disorderly plants, Mill Creek was the perfect location to serve as the outlet for the city's waste. In 1956 a state of the art incinerator was built in the Cloverdale flats by the mouth of the Ravine. Burning 290 tonnes of garbage a day, the incinerator promised to solve a severe garbage crisis (Cobb 2015). Five stories high the incinerator smokestack belched out black smoke and fly ash. Forty garbage trucks a day emptied their load into a massive pit dug just north of the newly built Connor's Road. Most days, the incinerator could not keep up with the amount of garbage, piling garbage upon garbage further up the hill towards Mill Creek Ravine. When the incinerator would not work, the city would use the open ravine as its dumping grounds. As one 1971 study noted, the city would often dump left-over winter refuse (sand, paper, old clothes) directly into the ravine, in direct "defiance of its own by-laws regarding dumping" (Mill Creek Ravine Park Committee, 1971).

Along with waste disposal, the city turned to Mill Creek as the solution to increased pressure on their drainage system. To deal with the expanding urban area in the 1950s and 60s, and increasing amounts of storm run-off, 21 storm drains were connected to Mill Creek Ravine. These drained an area of over 12 square miles of urban space, more than six times what it had done prior to the 1950s (Hawrelak 1974). More than just an increase in area of urban drainage, during this period 30-40% of permeable soil in South Edmonton was covered over by impermeable concrete. Subsequently, flooding in Mill Creek became a serious problem. Rainstorms would cause flash floods, causing damage to local fauna as well serious erosion problems. The majority of storm drains (75% according to one study (Hawrelak 1974)) were linked to the city sanitary sewage system. During peak water levels, sanitary sewage system overflowed directly into the storm drains spreading sewage directly into Mill Creek. Like the public storm drain and sewage system, industrial waste followed a similar trajectory, with the massive city-block-sized Gainer's Packing Plant still pumping animal effluent in the creek daily. One particularly outspoken study in identified the water quality of Mill Creek as an "open sewer" (Mill Creek Ravine Parks Committee 1971). A less vitriolic study in 1974 argued that the water quality of the creek exceeded both the Alberta Water Quality Act and the Canadian Drinking Standards Act (Hawrelak 1974).

Along with the governmental transformation of Mill Creek Ravine into an extension of their waste infrastructure, local residents themselves turned to the Ravine to throw out their trash. One study notes the piles of litter left by motorists illegally driving along the path where the old EY&P railroad used to run (Mill Creek Ravine Parks Committee 1971). An *Edmonton Journal* article from 1975 noted that "throwing shopping carts into the ravine seems to be a popular pastime" (May 17, 1975). Archaeological survey of the Northern section of Mill Creek identified a thick 20-50cm deposit of domestic trash running over 100m north-south along a 30m wide ledge. Rusted pots, butter knives, and glass bottles spill over the ledge lip and down into the ravine valley. This layer of trash was deposited by residents of the Bonnie Doone neighborhood, which runs along the top of the ravine. These residents disposed of trash by throwing it into the ravine up until the 1960s. On one survey I came across a ceramic doll's eyes, bright blue, rolling out of an eroding bike path. In one shovel test I found a brightly colored cartoonish ceramic figurine shaped like a fireplace log. Most garbage was food related, with some nails and wire mixed in. Large chunks of completely carbonized potatoes were mixed in with eggshells, bottle caps, and glass bottles. A chewing tobacco wrapper was mixed in with thin sherds of lightbulb glass, and massive cut cow bones. The presence of stippling on the bottoms of the glass bottles means the deposits date after 1940, and strongly suggest a date in the second half of the twentieth century. A twist-off crown cap suggests some of the deposit did not occur until after 1965.

An Ecology of Abandonment

In the description of shovel test #19—a dense 30cm thick layer of domestic trash—my field notes read "in the trees, a dense copse of Siberian Pea-hedge". Despite the flooding, the pileups of trash, and the toxic creek, caragana managed to flourish in this polluted landscape. It managed to successfully spread into Mill Creek, not in spite of the industrial waste, trash, and flooding, but *because* of them. While native plants struggled in the alkali soils and the heavy metals left behind by coal mining, caragana thrived, actively transforming the soil chemistry in the Ravine to better suit its needs. Its ability to allelopathically limit the growth of adjacent shrubs, as well as its ability to protect itself against insects, microbes and fungi, helped it out-compete native species of shrubs, as well as withstand the wide array of bacteria and microbes that were introduced in the Ravine via human trash.

By 1970, despite the rampant dumping of trash and flooding, Mill Creek was heavily forested and quite lush. While still suffused with early industrial waste, most of the areas that had been cleared by early industrial activity had managed to regrow, although with different species. While the pre-industrial Mill Creek forest was originally dominated by white spruce, in 1970 it was dominated by balsam poplar, an indigenous species of hardwood that, like caragana, had an aptitude for surviving disturbed soils, air pollution, and road salt. A 1973 botanical study of indigenous species left in Mill Creek identifies balsam poplar as the dominant tree in over half of Mill Creek Ravine. It also notes the prevalent combination of the indigenous balsam poplar with the thick shrub understory of "Acer, Caragana, and Prunus sp[1]…all likely escaped from local gardens" (Watson 1973: 8). Caragana and balsam poplar worked well together. Unlike white spruce, which blocks sunlight from reaching the forest floor, the thin branches and leaves of the balsam poplar fostered the growth of a caragana and a thick shrub understory. Better adaptive to the disturbed landscape caragana had outcompeted a significant amount of the native species shrub: the wild roses, the high bush cranberries, and the Saskatoon berries.

While caragana had caused damage by outcompeting native species, it had also been centrally important in the growth of a lush forest. As a fast-growing shrub that could withstand industrial toxins, caragana managed to spread across the denuded banks and eroded paths. Its roots secured topsoil that facilitated the growth of other larger plants, like those of the balsam poplars that gradually took over the park. The increasing flood levels of Mill Creek through the 1950s and 60s caused severe erosion throughout the ravine, undercutting and destabilizing the creek banks, washing away topsoil and leaving exposed banks of pure clay. In locations where caragana was located, the banks stayed intact, held in place by the same root system that colonial agricultural scientists had lauded as the solution to prairie wind and drought. Even more importantly, its deep root system stopped the washing away of the Ravine's topsoil down into the creek. Instead, in the face of increased flooding, illegal dumping, and illegal use of the ravine by cars, caragana managed to hold erosion to a minimum. Not only did caragana preserve topsoil, it enriched it, fixing nitrogen and aiding in the growth of other surrounding plants.

The presence of caragana in the Ravine tempered the worst environmental degradations: its ability to thrive in degraded and polluted landscapes, paradoxically aided in production of a

[1] Acer refers to an indentified species of introduced small maple, while prunus sp. refers to an unknown species of cherry tree.

landscape that did not appear to be exceptionally degraded or polluted. In other words, caragana aided in the production of a landscape that, despite extreme mistreatment, was increasingly enjoyed by local residents and increasingly seen as a recreational landscape rather than as a wasted and sacrificed landscape. By the 1960s this ecology of abandonment, the combination of early industrial waste, garbage and the plants and animals that thrived amidst the rubble, was not detested by locals as a corrupted landscape that had no value, but instead became seen as valuable landscape that had been corrupted. While once a disorderly jumble of ruins, trash, and caragana, Mill Creek was increasingly seen as a bit of precious urban wilderness blighted with pollution.

While the city had ostensibly abandoned the Ravine and stopped upholding city bylaws, they had not forgotten about the space. Throughout the 1960s, city council fantasized about building a large highway through the ravine. In 1966, in preparation for the highway, city engineers redirected the last kilometer of Mill Creek's flow into a large underground culvert. While an impressive engineering project, the project had the opposite effect of what was intended. Rather than setting the stage for the paving of Mill Creek, it started a brutal community fight to transform the ravine into a park (Barr, 1975). The fantasy of the highway to suburbia, combined with the burying of Mill Creek, began to harm the appearance of the landscape as merely an abandoned landscape, an ungoverned gap that needed to be filled in by concrete. Despite the years of active neglect and degradation, a flourishing ecology had managed to develop in Mill Creek, a lush wildness that local community members were not willing to give up.

Instead, the appearance of Mill Creek as an abandoned wild landscape, a sink for waste, began to break down. Community concern over the building of a highway through Mill Creek led to a rash of local studies that identified Mill Creek as a composite of two parts that were in tension, on one hand a valuable wilderness, on the other, corrupting pollution. One study by a local community group argued that Mill Creek was "accidentally" a "wilderness", an ecology that had grown up without anyone noticing "since the second world war" (The Mill Creek Ravine Park Committee 1971). Rather than being seen as an abject space, Mill Creek was seen as a present and valuable space. This identification of the ravine as a valuable source of wilderness, and a potential city park directly coincided with the rise in concern over the ravine as highly polluted. As one *Edmonton Journal* article argued, there were "Two sides of Mill Creek" (May 17, 1975), on one side the "sylvan" nature, and on the other the piles of industrial and domestic waste. The very entanglement of industrial waste and plants that had defined the appearance of the Ravine following the abandonment of the ravine was replaced with an appearance of 'nature' as fundamentally distinct from industrial waste.

Between 1970-1975 three different environmental studies looked at the environmental health of Mill Creek Ravine. Along with concerns over the external influence of human pollutants in the park, these studies were concerned with exotic non-humans living in the park. As Lynn Watson writes in a botanical study of the Ravine, the "vegetation reflects both natural and human influences…many of the species are exotic, or alien or unnatural" (1973). Another study by the engineering firm Butler Krebes Associates also identified the presence of alien species as a problem for the future park (1971). Seeking an authentic and natural space, non-native species like caragana were viewed as tainting the purity of the park and potentially impeding the health of its ecology. In this study, a significant numbers of native species were highlighted as one of the solutions to Mill Creek's problem. These native species should be transplanted in the ravine to combat erosion; "ornamental or exotic plants" should not be used.

Instead, they should be slowly removed and replaced with native species (Butler Krebes Assoc. Ltd. 1971).

In other words, as the Ravine began to appear as an attractive natural space, caragana was designated as unnatural, as part of the problem of industrial waste, rather than belonging to the category of wilderness. The ornamentality of caragana was its central problem, with the aesthetic aspects of caragana proof of its unnatural history and human entanglements. The very aspects that made it appear so natural and useful to the early settlers were precisely what defined it as unnatural and problematic in the park setting. Caragana had become an invasive species, a species of plant that not only was alien, but that had a kind of malevolent agency that made it dangerous.

Conclusion

The focus on Mill Creek Ravine as a space for nature drew directly on the up-swell in scientific and public interest in ecology and particularly pollution that arose during the 1960s and 1970s. As the Mill Creek Park Committee wrote "There is everywhere an immense awakening of interest in ecology and all its implications" (1971: 2). Specifically, the identification of caragana as an alien and invasive species in the 1970s followed the birth of invasion ecology as a separate subdiscipline within ecology in the 1960s, and the general interest in identifying conflicts between native and invasive species. Presuming the sanctity and balance of native ecologies, the disturbing foreignness of caragana became its overdetermining feature. The ecological logic of invasive species, affectively drawing on the same logic that drew the nativist fear of foreigners (Pauly 1996), identified caragana as a threat precisely because it did not belong. The identification of caragana as invasive focused its critique on caragana's history as an introduced species, specifically targeting its ornamental characteristics as proof it did not belong in wilderness. From this perspective, caragana was a kind of biological pollution, an environmental impurity to be removed and a mistake to be fixed, a legacy of a long past and poorly remembered colonial settlement. Rather than attending to the actual history congealed within caragana in Mill Creek, the concept of invasiveness located the degrading legacies of colonialism in the species itself.

The designation of caragana as simply an invasive species in Mill Creek veiled the history of Mill Creek and in doing so it veiled the history of Mill Creek itself. Specifically, this designation identified Mill Creek Ravine as an urban wilderness that was polluted by garbage, industrial ruins, and invasive species. What it failed to take into account was how the appearance of wilderness, as well as its appearance as an abandoned space were defined and produced by the long-term articulating effects of industrialization and colonial experimentation. The ecology of abandonment in Mill Creek managed to flourish, to take on the appearance of a lush wilderness, not because it was a return to pre-industrial Mill Creek, but because it was derived from a colonial agricultural experiment that valorized plants which were hardy, resisted erosion, and could survive in harsh soil conditions. The monstrousness of caragana allowed it to thrive, facilitating the appearance of the ravine as both a landscape of waste, and subsequently a corrupted natural landscape. Or more specifically, the monstrousness of caragana constantly disturbed the Mill Creek Ravine landscape as it grew, it emerged out of the lively decay of industrial waste to remake the area as an abandoned place, only to remake it once more as a natural place.

Unpacking caragana as a monstrous disturbance instead of an invasive species reveals the historical conditions of possibility of the ecology of abandonment of Mill Creek Ravine. First it reveals how the prairies served as an object of colonial transformation via a symbiotic entanglement of caragana, humans, and other introduced species. Second, it shows how the spread of caragana that resulted from this environmental transformation, defined the ecology, use, and appearance of Mill Creek Ravine. Third, it undermines the progressive narratives of order and civilization that caragana once embodied. Attending to caragana as a monstrous disturbance precisely critiques the history that calling caragana invasive tells. As a monstrous disturbance, these caragana stands are a reminder that the project they stood at the heart of—the transformation of the environment, the appropriation and privatization of Indigenous land, and the industrialization of the prairies—is still in force today. Just as the industrial waste of Mill Creek Ravine point to the abandonment and devastation that accompany industrial capitalism, revealing the gaps in the lie of progress, the presence of caragana stands in Mill Creek Ravine point to the fraudulence of the claim that colonialism is a mistake of Canada's past.

Through the disturbing figure of the monstrous, attention to the ecologies of abandonment opens up the two-sided nature of decay. On one hand, decay reveals the limitations of power from the perspective of time. From the side of the debris, decay is the allegorical representation of the bounded nature of the colonial and capitalist projects to determine a human and non-human world. The neat linear form of the caragana hedgerows that once crisscrossed Mill Creek Ravine have long since dissolved into a monstrous tangle. The promised order of caragana has been lost. On the other hand, decay also represents how the dynamics of power cause ripples through time precisely through the monstrous thriving of a plant like caragana. The processes of decay and growth were subsumed into the experimental farm system, where transforming the ongoing life cycles of native ecosystems was not incidental, but the primary goal. Instead of attempting to merely produce a different Prairie, the experimental farms transformed how the Prairies reproduced themselves. From the side of the symbiotic material cycles that decompose this debris, decay is the very compost of new life, subsumed but not determined by the logics of colonial appropriation, industrialization, and private property. Instead of revealing the limits of human power, or colonial effects, or capital, decay reveals how these logics rearranged how the landscape reproduced itself. Instead of a form of ruin or negation, decay serves as the compost for the ongoing effects of colonization on the ecologies of the present and the future.

This is not to suggest that the ecology of abandonment of Mill Creek was simply determined by the entangled dynamics of settler colonization and industrial capital. While ostensibly an abandoned landscape, filled with abandoned waste and disorderly plants, the ecology of abandonment did not represent a gap, a landscape external to these dynamics. Caragana flourishing in Mill Creek is not just the result of a colonial project trying to privatize, industrialize and remake the prairies, it is the monstrous disturbance this project caused. It is both the culmination of this project and an example of the rampant excess and disturbance that the project could not foresee. Caragana helped to create an ordered and commoditized landscape, but it also helped to produce wild and abandoned landscapes, it helped to harm native plant life, but it was also essential to the protection and growth of the Mill Creek ecosystem in the midst of severe pollution and destruction. This is the paradox of monstrous disturbance, a figure historically intended for one purpose, but grows (monstrously) beyond these limits. A figure that thrives in abandoned and polluted spaces, defines the appearances of abandonment itself, which not only invades, harms and destroys local ecosystems, but also may protect them. The landscapes of the Capitalocene are full of monstrous-disturbances, dense entanglements of biological symbiosis that become tied up in homogenizing narratives that they support/transform/disprove/disrupt. They are the ruins of colonialism and capitalism, experimentation and privatization, proof of the destructive potential these forces, as well as holders of secrets, hope, and tactics of living amidst destruction.

Chapter 4:
'Save Tomorrow, Oppose Pollution'—
The Restoration of Mill Creek Ravine

Today, eight archival boxes line the City of Edmonton Archives. Titled *MS-348*, or the *Mill Creek Ravine Project* fonds, these 8 boxes hold the records of seven years (1973-1980) of environmental and community activism that transformed Mill Creek Ravine from an abandoned ravine marked by overgrown industrial ruins and illegal waste into a popular municipal park. In one of these boxes, a manila folder is full of cut outs from newspaper cartoons. The cartoons, from a range of well-known syndicated cartoonists, all gather around a single theme: human pollution and its ecological effects. Hidden in the midst of these pages is a cartoon cutout that combines this ecological focus with an archaeological twist. This photocopied cartoon cutout (Fig 1), drawn for an unnamed cartoon strip depicts an archaeological expedition from April 21, 2237, excavating the remains of a twentieth-century society. As the first archaeologist emerges out of the unit, he yells to the other archaeologist who waits expectantly for important artifacts "All we can see are junked autos and beer cans" (CEA MS-348 File 35). In other words, the twentieth century has stopped producing artifacts, instead it produces junk and pollution. As this cartoon suggests, modern waste is not like other forms of historic waste. The fluorescence of modern waste, and the dumping of this waste throughout the globe has not just transformed humanity's relationship with the environment, it disrupted humanity's relationship with history.

This cartoon, channeling ecological environmental thought that was prevalent during the 1970s, suggests that 'modern' garbage and pollution is incapable of becoming valued as heritage, and that it retains its identity as polluting waste long after it is deposited. Archaeology is premised upon the assumption that with the passing of time the remains of human activities become human heritage, providing insight into human culture and serving as touchstones for historical narratives and group identity. In this framework, archaeology sites and heritage sites are solely linked to societies that live with an appropriate balance of nature. Their ability to become heritage is defined by their ability to decompose naturally and indexes the balance of nature of the society they were produced by. As pollution resists natural decomposition, it resists historicization. Modern society, and the extreme levels of post-World War Two war pollution that define it, identifies a historical era that is outside of normal human history.

Image 4.1 Photocopied Archaeology Newspaper Comic from City of Edmonton Archive (CEA MS-348 File 35). Photo of Comic by Author.

Produced in the 1970s, this cartoon, and its location in this collection of pollution-centric archives represents the arrival of a specific kind of ecological consciousness in the city. This consciousness, part of an international ecological environmental movement that emerged in the late 1960s, fueled the activism that transformed Mill Creek Ravine from an ignored landscape of waste into a city park and a valued and protected space of nature. Mill Creek Ravine did not merely emerge as a space of nature through the growth of new plants, coordinated community activism actively produced the ravine as a space of nature under threat. This activist movement, organized by the group Save Tomorrow Oppose Pollution (S.T.O.P.) promoted Mill Creek Ravine as a vital community resource under a direct threat from modern day pollution.

As the name of the S.T.O.P. organization makes clear, pollution served as the founding concern for the activism that transformed Mill Creek. Fears of pollution served as the organizing logic of the community activism that successfully garnered political will for the creation of Mill Creek Ravine Park, a space to be protected and curated for the benefit of nature as well as the education of all Edmonton. This chapter argues that the production of Mill Creek Ravine as a space of nature hinged upon the reimagining of the sedimented material legacies of the seventy years of industrial waste, municipal garbage, and ruins that lined its banks. Viewing this waste through the ecological prism of pollution served as the impetus to not just clean up Mill Creek Ravine but served as the basis for the reimagining of the ravine as a landscape that required intervention, protection, restoration. The logic of pollution, and the reimagining of the material legacies of the past that this logic required, did not just facilitate a clean-up of the landscape and a re-thinking of the role of Mill Creek Ravine in Edmonton, but also a re-thinking of Mill Creek Ravine's relationship with its history.

The success of the community activism of S.T.O.P., and the restoration of Mill Creek Ravine as a space of nature, history, and education also elided other histories, other activisms and other politics. Over the same period that S.T.O.P. was organizing public support to redefine Mill Creek Ravine as a place of nature under threat, descendants of the Papaschase Cree were beginning to organize a legal fight to reclaim Mill Creek Ravine as part of their illegally appropriated reserve. Rather than reimagining Mill Creek Ravine as a place of nature, Papaschase activism sought to identify Mill Creek Ravine as a site for historical restitution. While these two histories of activism involved different sets of communities and governing agencies the successful political activism of Mill Creek Ravine environmentalism prefigured the ultimately unsuccessful political activism of the Papaschase Cree. Specifically, the governing fear of pollution that organized S.T.O.P. activism mobilized the history of Mill Creek Ravine in a way that completely elided Indigenous history, Indigenous claims to the area, and Indigenous politics. The specific historicity of the logic of pollution made the industrial history of Mill Creek Ravine legible as a pressing contemporary issue while simultaneously helping to keep the history and contemporary activism of the Papaschase illegible. Despite its appearance as a progressive movement, in its activism over Mill Creek Ravine, S.T.O.P. doubled down on the legitimacy of settler-colonial history, and the illegibility of Indigenous history and politics. Eliding this history, S.T.O.P. failed to account for the colonial assumptions at the heart of its activism, and the longer historical connections between colonialism and environmentalism.

Environmental Colonialism

The values of environmental conservation, and environmental restoration are often seen as the basis for a progressive and potentially radical politics, pushing for changes to how governments and industry approach and exploit the non-human world. At the same time, the management of nature, and the policing of what counts as nature have historically served as the very foundation of colonial governance (Escobar 2008). In the history of Euro-American colonialization of the 19th and 20th centuries, the justification of environmental conservation, intervention and protection has more often than not served as the justification for the expansion of colonial governance, and the silencing of Indigenous rights (Cronon 1995; Guha 1999; Hutton and Connors 1999; Braun 2002; Gombay 2014; van Holstein and Head 2018). This entanglement of the management of nature and colonization is especially notable in the contexts of settler-colonialism, where the management of land, and the imposition of new political orders supersede the exploitation of indigenous labor (Veracini, 2013: 315).

In North America during the late nineteenth century, nature emerged as not just a domain to know or manage, but as a domain at risk (Spence 1999; Cronon 2005; Brockington and Igoe 2006; Kline 2000). Concerned over the rapid spread of industry across Western North America, and the end of the western frontier as a source of untouched wilderness, politicians and intellectuals began pushing for new approaches towards the management of the vast western territories. During the Progressive era (1890s-1920s), the logic of environmental protection became an important legal mechanism for the government's appropriation of Indigenous land and the forced resettlement of Indigenous communities. concerns over the protection of nature coalesced into two distinct advocacy groups: the conservationists and the preservationists. The conservationist movement, which coalesced around figures like President Theodore Roosevelt and his Boone and Crockett Club (formed in 1887), sought to promote the careful use and conservation of natural resources for future generations. By the 1880s, the *laissez-faire* economic model was increasingly seen as wasteful and inefficient in terms of its use and abuse of natural resources. In the face of uncontrollable expansion, the nature and natural resources of the 'West' were doomed to overuse and exploitation by unchecked logging, mining and agriculture. Figures like Roosevelt argued for the intervention of the federal government to manage land and resources in a manner that was less wasteful than private industry, and concerned with the conservation of natural resources for the future (Meine 2001; Tyrell 2015). A more radical vision of this movement emerged with John Muir and his Sierra Club (formed 1892), who sought not only to conserve nature for future generations, but to preserve wilderness for its moral and aesthetic value. While conservationism was premised upon a vision of nature as a limited storehouse for human resources, the preservationism of Muir and the Sierra Club was tied to a vision of untouched wilderness as a fount of immeasurable beauty and spirituality.

Driven by the efforts of both conservationists and preservationists, laws were established across the US and Canada to protect large swathes of culturally and aesthetically important landscapes as nationally protected parks, as well as the development of federal agencies to manage those landscapes. In the US, this was marked by the creation of preservationist organizations like the Sierra Club (1892), the designation of legally protected national parks (sixteen were established by 1920) as well as conservationist governmental institutions like the US Forest Service (1905) and US National Park Service (1916). In Canada, the institutionalization of environmentalism was marked with the designation of legally protected national park and national wilderness reserves (ten had been established by 1920), the development of the Parks Canada federal agency (1911) as well as the National Parks Act (1930). Through the production of parks, and the passing of laws limiting the exploitation of the environment, these federal agencies managed the environment as a national resource, one that needed rational scientific conservation strategies to preserve it for future generations (Worster 1994).

While the frontier had closed, and the colonization of the West had ostensibly concluded, these early environmental ideals and practices developed out of colonial presumptions about Indigenous peoples and their relation to the land and to history (Cronon 1995). For a figure like Muir, the necessity of preserving national parks superseded the rights of Indigenous communities to their territories (Stevens 2014). When Muir found a community of Miwok Natives living in the Yosemite Valley, an area set aside for Yosemite National Park, he lobbied for their removal, citing the need for parks to be an 'uninhabited wilderness' to foster the appropriate 'balance of nature' (Kantor 2007). Despite their historical connection to the landscape, Muir argued that Indigenous communities had "no right place in the landscape" (Muir 1997: 372). The destruction and disappearance of Indigenous communities was deemed inevitable; there was "no longer a place for American Indians in America" (Kantor 2007: 48). Indigenous communities were simultaneously too human to be allowed to live in the National Parks but too natural to survive the introduction of modernity.

The balance of nature theory, which became a primary theory organizing the design of the National Park system in the United States, identified nature as a homeostatic system (Kricher 2009). This was contrasted against humanity, which was dynamic and historical. Since humanity was by nature disruptive, human activity was deemed unacceptable within the balance of nature. To protect the balance of nature national parks were organized on what anthropologist Dan Brockington calls the paradigm of 'fortress conservation' (2002). In order to protect the 'natural balance' of ahistoric wilderness, National Parks in the US were designed as a kind of fortress: human habitation was forbidden, the government had complete authority, and coercive force was acceptable (Stevens 2014). The necessity of an uninhabited wilderness, and the production of fortress conservation, led to the forced removal of Indigenous communities at Yellowstone, Mesa Verde, and Glacier National Park (Kantor 2007).

The establishment of the Canadian National Park system strongly mirrored the logic of their neighbours to the south. Indeed, J.B. Harkin, first commissioner of the Dominion Parks branch and the father of the Canadian National Park system, was a devotee of Muir and his philosophy, frequently cited Muir in his policy initiatives. Harkin strove to produce the National Park system as both a place of conserved resources, and as a place of scenic beauty and spiritual renewal (Foster 1998). Beyond Harkin, one of the most influential figures behind the construction of the park system was none other than Frank Oliver, the Minister of the Interior and former journalist most responsible for agitating the removal of the Papaschase from their reserve. As Minister, Oliver was central to the creation of Banff as the first Canadian National Park (Brennan 2017). Starting with the removal of the Stoney Band from Banff, the Canadian National Park system also mirrored the US in its strict policy of Indigenous removal (Binema and Niemi 2006). As part of this fortress conservation paradigm, Indigenous communities were forcibly removed from their homes in National, Provincial, and municipal parks. In Saskatchewan, Metis and Cree communities were forcibly resettled to facilitate the creation of Prince Albert National Park (1927) (McCall 2015). In Vancouver, Squamish families were forcibly displaced to foster the creation of Stanley Park (1886). In Ontario, an Ojibwe village was forcibly displaced to create Lake Superior Provincial Park (1944) (Lemelin et al. 2014).

Ecological Environmentalism

Throughout the first half of the twentieth century, the colonial logic at the heart of conservation movement, and the sharp distinction between nature/culture continued to persist as central to the governmental management of its natural resources (Worster 1994). Over the same period, other scientific approaches to the environment were developed in the Euro-American academy. Most prominent among these disciplines was that of ecology. Unlike the goal of resource management that served as the foundation for conservationism, ecology stressed the interrelated nature of all life. Modern ecology emerged out of biology and natural history at the end of the nineteenth century, highlighting how individual organisms were defined by their relations with large super-organic multispecies communities through food chains and food cycles (MacIntosh 1995). Rather than focusing on discrete landscapes, or the distinction between human and natural environments, ecologists saw the environment as an unendingly complex web of ecologies: living relations between multiple different species (Elton 1927; Elton 1958; Murdoch 1971; MacIntosh 1995; Real and Brown 1991).

Throughout the first half of the twentieth century, however, ecology was primarily a theoretical discipline. Occasionally, ecological science was called on for practical applications in moments of environmental crisis, such as the use of ecological science during the American Dust Bowl crisis in the 1930s (Worster 1994). However, ecology did not fully emerge as an applied science until the end of the Second World War. As environmental historian Donald Worster argues, "[the] age of ecology opened on the New Mexico desert…on July 16th 1945" (1994: 342). The first test of the nuclear bomb caused a drastic reorganization of conceivable environmental dangers. The dominant paradigm that had organized conservationist and preservationist ideals—human vs. natural landscapes—was increasingly insufficient to deal with the environmental degradation of the post-war boom and the Cold War. After the advent of the nuclear bomb, the very future of life itself was at stake. Western Science, once deemed an arbiter and protector of the balance of nature, was now seen as its gravest threat. Ecological insights were drawn on to better understand the threats posed by modern science and technology to the future of human and non-human life on the planet (Worster 1994). As ecology made clear, these threats were not limited to those posed by nuclear war and nuclear radiation, but by the rapid post-war rise of industrial science and technology. The fluorescence of plastics and the rise of synthetic pesticides, combined with the spread of widespread fears over nuclear fallout to produce increasing attention to the ways in which the byproducts of human activity had long-term unintentional effects. These unintentional effects caused widely spread harms across broad biotic communities, including human and non-human populations. Industrial capitalism, once seen as a threat to nature, was now seen as a threat to humanity and life itself.

As new fears concerning the environment, and humanities' place within the environment, became increasingly ubiquitous following World War II, ecological concepts were mobilized to understand the effects of industrial waste and other human activities, in what became known as ecological environmentalism. In his book *Reclaiming Paradise*, political scientist John McCormick identifies substantial differences between the early progressive era environmentalists and the ecological environmentalists of the 1960s and 70s:

> "If [preservationism] had been a moral crusade centered on the nonhuman environment, and conservation a utilitarian movement centered on the rational management of natural resources, [ecological] environmentalism centered on humanity and its surroundings…There was [in the ecological movement] a broader conceptualization of the place of man in the biosphere…and a note of crisis that was greater and broader than it had been in the earlier conservation movement." (1991:47)

Ecological environmentalists believed in a different model for how the environment worked. In this view, the environment was a vast interconnected set of ecosystems; every species interconnected with myriad other species, and landscapes interconnected with other landscapes. Humanity was intertwined in these relations, and human activities had rippling effects far beyond their intentions. Any understanding of nature, and any vision of a balance of nature, had to take into account humanity, rather than attempting to preserve wilderness without humans. This view of interconnected ecosystems raised the stakes as to what kind of crisis the environment could undergo. While Theodore Roosevelt was concerned about conserving natural resources and wild landscapes for future generations, ecologist Rachel Carson was concerned with whether or not civilization could continue "without destroying itself" (1962: 99).

Pollution

The single coalescing fear that raised the stakes of the environmental crisis, and the greatest distinguishing feature that defined ecological environmentalism vs other forms of environmentalism was the historical emergence of industrial pollution as an eschatological problem. As it became clear that the lives and bodies of different species across different landscapes were deeply interrelated to one another through social, biological, and chemical processes, it became clear that the post-war boom of human-produced industrial pollution was having negative effects across these relations (Robertson 2012). The post-war boom of new synthetic compounds, plastics, and pesticides caused widely distributed increasingly visible harms across human and non-human populations.

Prior to the rise of ecology, pollution was seen as discrete problem, largely distinct from environmental concerns. Pollution was a way to discuss how the introduction of foreign substances could materially impinge upon the practical usefulness of certain natural resources, most commonly rivers (Rome 1996). The conservationists' goal was to conserve the resources of nature before they had the chance to be exploited. For individuals like Roosevelt, the primary fight was against the unchecked expansion of industry, and the extraction of resources from nature. Pollution only became a problem when industry was so unchecked that it actively disrupted the functional utility of the landscape. As Teddy Roosevelt exclaimed "what will happen when our forests are gone, when the coal, the iron, the oil, and the gas are exhausted, when the soils shall have been still further impoverished and washed into the streams, polluting the rivers, denuding the fields, and obstructing navigation" (*Conservation as National Duty* 1908). Pollution in this strictly material sense was not a primary concern of the preservationists either. Concerns over health and harm in urban landscapes were subsumed by concerns over aesthetic and spiritual depletion of wild landscapes, the destruction of the sacred experience that nature provided. By the time a river was polluted in the Rooseveltian sense of the word, it had long ceased to be a focus of the preservationists' attention.

Throughout the early twentieth century, pollution developed from a problem of discrete landscapes, to a problem of the atmosphere itself. By the beginning of the twentieth century coal smoke became a concern in North American cities. As environmental historian Adam Rome argues, between 1915 and 1930, coal smoke stopped being referred to as a dirty nuisance, and started being referred to as a form of air pollution (Rome 1996). Rather than perceiving coal smoke as a discrete irritation or public health nuisance, air itself became the problem. As Peter

Sloteridjk notes in the context of global warfare, 1915 was the year when breathable air stopped being a taken for granted and emerged as a medium that could be poisoned and polluted (2002). Air was inescapable, a constant backdrop of all human life. Air pollution, even more than river pollution, highlighted industrial waste as an atmospheric problem, a crisis that suffused the environment in which humans lived.

In the years after World War II, pollution took on its own distinct ecological and atmospheric meaning. With the advent of the nuclear age, and the pervasive fear of radiation that could suffuse any medium and the biological bodies that lived in it, pollution stopped being seen as medium specific (air pollution, river pollution, soil pollution etc.). As Worster argues, the fear of nuclear radiation dovetailed with the emergence of the production of synthetic chemicals, pesticides, and plastics (1994). Radiation became the model for pollution thinking. Pollution, like radiation, could be everywhere, it could suffuse anything, it could damage and reorganize bodies without anyone realizing it. Synthetic chemicals like PCBs or DDT could mimic the functioning of life at the microscopic level, but did so in a manner that was warped, harmful, and would never decompose. Pollution was a threat to life itself, and the possibility of a future. For ecological environmental activists, pollution was more than just a way of defining ecological relations. Pollution was a way of describing an acute, life threatening crisis that was uniquely historically situated. Pollution became a way of thinking about the post-World War II period as unique in human history, distinct from other eras precisely due to the levels of pollution and the threats they posed.

Rachel Carson and the Settler Balance of Nature

The understanding of modern industrial pollution as marking a historic break with the past also suggested that environmentalism was marking a historic break with its own intellectual past. Despite representing itself as a clean break from the conservationist movement, the environmental movement of the 1960s and 1970s continued to draw on the settler colonial ideas to silence Indigenous history and Indigenous political activism (Langton 2013).

The genesis of environmental ecology as an activist movement in the US and Canada is commonly linked to the public furor that accompanied the publication of Rachel Carson's *Silent Spring* (1962). Carson's book, which outlined her research on the effects of DDT on the destruction of bird populations became a *cause célèbre* throughout the mid-1960s. Carson emphasized how pesticides like DDT were unintentionally distributed throughout the environment, from the air into the soil and into the ground water. DDT also distributed across food chains, destroying bird populations when they were meant to control insect populations. Not only did Carson emphasize the harmful effects of DDT, she used DDT to make a broader critique about the harmful, and hidden effects of industrial toxins, the utilitarian view of science towards nature, and the shortsighted goals of industry and profit. Channeling the insights of ecology Carson argued, "in nature, nothing exists alone" (1962: 51).

While the theoretical understanding of humanity's place within the environment differed sharply from prior environmentalist doctrine, Carson shared a basic historical concern over the lack of 'natural balance' that was associated with the spread of modern industry, tying back to Muir's philosophy. Rather than premised upon a strict geographic division between the human and the natural world that could be maintained through parks Carson highlighted the distinction between post-war industrial society and traditional pre-war society. Instead of identifying the 'balance of nature' beyond humanity, Carson saw the balance of nature within the history of pre-industrial human society. For Carson, pre-industrial societies lived in harmony with the environment: "[t]here was once a town in the heart of America where all life seemed to live in harmony with its surroundings…So it had been from the days many years ago when the first settlers raised their houses, sank their wells, and built their barns" (1962:1). In contrast to pioneer era America, the toxins of post-war industrial science were "a strange blight that crept over the area", accompanied by "mysterious maladies", and the "shadow of death" (1962: 2). In comparison to the idyllic fantasy of the traditional settler town, post-1945 industrial society was defined by a breakdown in functional human/non-human relations, marked by the vast materials it consumed and the mountains of toxic waste it spewed.

For Carson, "[t]he history of Life on earth has been a history of interaction between living things and their surroundings" (1962: 5). However, since World War II, this interaction had fundamentally changed in character. Carson's distinction between the post-1945 ecological crisis, and the pre-war ecological paradise was founded in the materiality of pollution itself. New synthetic chemicals, new pesticides, new forms of radiation had completely reorganized both the environment and disrupted humanity's relation to its environment "[f]or the first time in the history of the world" (Carson 1962: 15). In other words, the long-term material effects of these pollutants, on both humans and non-humans, had not only changed the environment, it had reorganized the relations that defined history itself. The toxic materiality of pollution had irrevocably transformed the present, as well as "projecting a menacing shadow into the future" (Carson 1962: 26) at time-scales far greater than human lifespans.

In the face of this menacing future, the idyllic image of small-town America not only served as a fantasy of the past, but at the core of Carson's ecological politics. The pleasant fantasy of balanced settler colonial nature would help educate her readers down the "other road" towards a future of ecological health. Using settler society as the paradigm of balanced nature enabled a moral critique of post-war society as well as a political lesson for the revitalization of human/environment relations. Carson's use of settlers as the paradigm of pre-industrial ecological harmony represented a continuation of the silencing of Indigenous life, and Indigenous political life in particular, within the concept of the balance of nature.

This is not to argue that Carson was not aware of Indigenous history, or that the ecological environmentalist movement did not draw on the stereotype of Indigenous life as ecologically harmonious. Indigenous symbols were widely appropriated by the environmental movement, and Indigenous communities were often invoked as the environmental conscience of the nation. At the same time, this invocation of Indigeneity as a symbol of environmentalism also worked to erase actual Indigenous historical grievances, actual Indigenous communities, and actual Indigenous politics. Nowhere is this more evident than in the 'Crying Indian' ad (1971), one of the most famous ads in American history and one of the most widely promoted and indelible images from the ecological movement (Dunaway 2015). Produced by the anti-litter group Keep America Beautiful, the ad is a public service announcement that follows an actor (Iron Eyes Cody), dressed in stereotypical 'Indian' garb (buckskin and moccasins with a feather in his hair), as he canoes up a polluted river and is confronted with an increasingly polluted landscape. As he surveys the destruction produced by pollution, the camera zooms in on his face to reveal a single tear falling down his face.

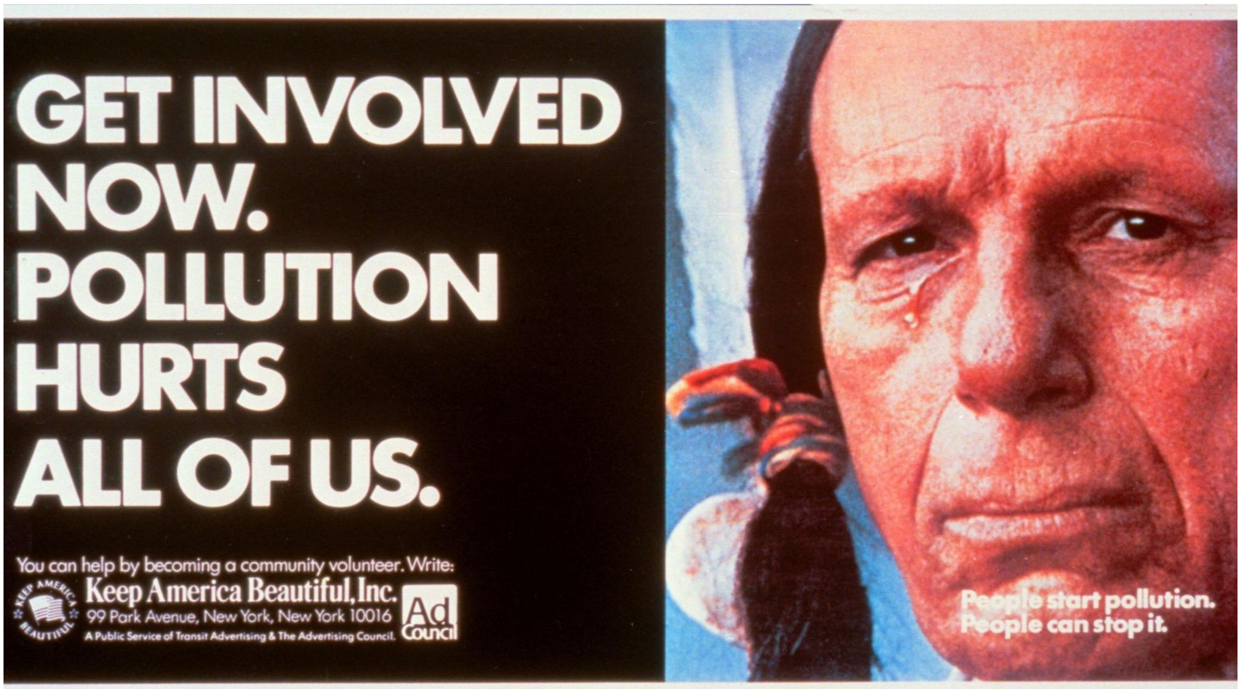


Image 4.2 Keep America Beautiful's famous 1971 Ad Campaign, "People Start Pollution, People Can Stop It", featuring Iron Eyes Cody, the "Crying Indian". Image courtesy of Keep America Beautiful, Inc.

Rather than a real representative of Indigenous realities, the Cody character serves merely as a symbolic time traveler, a haunting memory of a mythic past that returns to remind white settlers of their duty to the land. As Finis Dunaway argues "the Crying Indian evoked national guilt for the environmental crisis but also worked to erase the presence of actual Indians from the landscape" (2015: 82). In identifying this ghost from the past as representative of the Indigenous experience, and mapping Indigenous identity onto environmental concern, the ad masked the ongoing realities and political fights that real Indigenous communities were going through in the early 1970s. Rather than dealing with actual Indigenous individuals or politics, Keep America Beautiful drew on an Italian American actor to portray a spectral Indian conscience, a figure who "mobilized guilt but masked ongoing colonialism, whose troubling visitation encouraged viewers to feel responsible but to forget history" (Dunaway 2015: 82). Just as conservationists saw Indigenous communities as too unnatural to fit within their fantasy of a state of wilderness, the ecological movement viewed Indigenous communities as belonging to a distant ahistoric past that made them illegible as political actors. This required turning a blind eye towards the actual Indigenous community who would not be consigned to the past, and would not merely serve as symbols of an environmental conscience.

The Green Decade

While the singular influence of Carson's work has often been overemphasized in the history of the environmental movement, *Silent Spring* was transformative in that it crystallized ecological concerns and made them accessible to people outside of the fields of science. Carson's critique of mainstream science's technocratic presumption to 'control nature' for the benefit of humanity presented ecology and its focus on interrelated ecosystems as an essentially critical and subversive subject. As Gary Kroll argues, Carson successfully portrayed ecology as a counter-cultural critique, a discipline that was socially and politically invested in fighting the intrenched power dynamics of science, government, and industry (2002). The ecological critique was not just invested in limiting pollution, but saw the need for "very different economic structures, social relations, forms of politics, attitudes towards nature and facilitating, overall, a much more self-determined and fulfilling way of life" (Bluhdorn 2013: 19). Inspired by Carson's argument, new radical environmental advocacy groups were formed that identified themselves as connected to broader counter-cultural movements (feminist, racial justice, anti-war, anti-nuclear etc.) that sought to produce a "manifestly different society (and modernity)" (Bluhdorn 2013: 19).

While some of the radicalism of the ecological movement were institutionalized in a number of prominent advocacy groups (namely Friends of the Earth and Greenpeace), most of these radical goals were tempered as ecological values spread to broader and broader audiences. While still ostensibly a counter-cultural movement, ecological concerns were increasingly taken up by federal politicians and large corporations, interested in shifting the politics of ecological environmentalism from radical change to incremental regulation. Senator Gaylord Wilson, the driving force behind the first 'Earth Day', emphasized the political importance of distancing the rising environmental agenda away from countercultural politics (Gottlieb 2005). Following the success of Earth Day in April 1970, Nixon founded the EPA (Environmental Protection Agency) and attempted to tie his presidency to the view that environmental concerns could be addressed through regulation and technological innovation (Stoner 2015: 66). Broadly echoing the fears and moral framework that Carson outlined, fears over toxic industrial pollutants and environmental degradation moved into the mainstream. However, instead of an emphasis on a transformative radical politics, the emphasis was on collective moral responsibility towards the earth. Instead of emphasizing the interconnections between consumer capitalism, racial injustice, and environmental degradation, mainstream environmental advocates emphasized the importance of educating the public as to their environmental responsibilities.

This de-radicalization of environmental politics is perfectly encapsulated in ads like Keep America Beautiful's (KAB) 'Crying Indian'. This ad, produced as a public service announcement by KAB, was secretly an explicit part of a public relations campaign by the National Soft Drink Association (Dunaway 2015). Despite its appearance as an independent environmental organization, KAB was founded by a conglomeration of massive American companies (e.g., Coca Cola, Anheuser-Busch, Philip Morris, and PepsiCo) and had a long history of producing moralizing advertisements to counter public littering. Concerned over the emotional power of the growing environmental movement, and fearful of a backlash on their products, KAB coordinated with designed an advertisement that shifted the blame for pollution away from industry and onto everyday consumers. As an NSDA memo, published in the weeks prior to Earth Day explained, “An industry whose product sales are based on enjoyment of life must be concerned about ecological problems” (Baker 1970 quoted in Dunaway 2015:85). Soft drink brands could not appear as anti-ecological even while they could not accept responsibility for ecological degradation. The resulting ‘Crying Indian’ ad campaign was perfectly calibrated to acknowledge the dangers caused by pollution, while at the same time shifting the blame of this pollution from industry to the consumers themselves. As the voice over in the ad argues “people start pollution, only people can stop it”. The villain of the advertisement is not the polluting corporations, but the littering consumers who thoughtlessly pumps waste into the environment. In adopting the ‘Crying Indian’, the stereotypical Indian from the past, the ad both played on the longstanding trope of the Ecological Indian, as well as identifying its values with the broader counter-cultural movement, even while rejecting the politics of the counter-cultural movement (Dunaway 2015). Rather than making any drastic changes to the status quo, the ad campaign suggested personal responsibility and changing attitudes towards nature: as one of the numerous ‘Crying Indian’ billboards argued “Get involved now. Pollution hurts all of us”. In other words, the ‘Crying Indian’ ad was incredibly effective at activating environmentalist concern in the public, but was equally effective at directing this anger away from blaming industry and away from radical environmental politics. Rather than serving as a fundamental critique of modern society that connected with other radical activist movements, ecology and ecological values became incorporated into the values of consumer capitalism (Stoner 2015). Instead of allying with other counter-cultural movements like those of the American Indian Movement, this mainstream ecological movement drew on historical stereotypes of Indian to highlight pollution as a serious and a historical unique crisis.

Build a Park in Mill Creek Ravine

Due to a widespread availability of American media in Canada, as well as considerable movement of draft dodgers from the US into Canada, the Canadian environmental movement emerged at the same time as its southern neighbor, broadly sharing the same ecological assumptions, as well as its ostensible counter-cultural commitments (O'Connor 2015). The arrival of the ecological movement into Edmonton occurred in 1970, when Save Tomorrow, Oppose Pollution (S.T.O.P), an anti-pollution organization, was founded at the University of Alberta in Edmonton in 1970 by a mix of students and recent American émigrés. As its name suggests, S.T.O.P. was founded upon the assumption that the recent emergence of new forms and new concentrations of industrial pollutants was an existential threat to humanity and life on earth in general. S.T.O.P.'s goal was to unearth environmental degradation, raise public awareness in Edmonton of the dangers of industrial pollution, and to organize community activism to oppose it. In the face of what they viewed as industrial abuses, and a general environmental apathy among the populace, S.T.O.P.'s mandate was to "to expose serious environmental problems to those responsible and to the public at large" (CEA MS-348 file 1). Eager to connect the broader dangers of pollution with local community activism, S.T.O.P. performed sustained community outreach across Edmonton to connect local community grievances with the issue of pollution. In

1973, S.T.O.P. began a collaboration with a grassroots community movement in southern Edmonton known as The Mill Creek Ravine Park Committee.

Founded in 1970, The Mill Creek Ravine Park Committee was the latest instantiation of a decade of community activism concerning the protection of Mill Creek Ravine. During the 1950s and 1960s, Mill Creek Ravine was, in the words of S.T.O.P. an "unused ravine", an area largely ignored by the local community except to use as a "refuse dump" (CEA MS-348 File 71). Local attitudes toward the Ravine began to change when, in 1964, the Metropolitan Edmonton Transportation Study proposed that the Mill Creek area would be viable as the site for a freeway to connect downtown Edmonton with the southeastern suburbs. Once ignored, the local community began to realize how much this unused and overgrown area meant to them once it was under threat. Concerned over lack of access to the ravine, and the adjacency of a major highway running through their community, 1188 locals signed a petition to force the city to drop the highway plans and protect the Ravine (MS-348 File 78). Six months later, local community activists formed a committee to lobby the city government to legally protect Mill Creek Ravine against the threat of development by making it a municipal park. In response to intense community lobbying, by 1971 the city council finally abandoned plans to build a freeway through Mill Creek. At the same time, the failure of the freeway did not directly lead to the designation of Mill Creek Ravine as a park, and The Mill Creek Ravine Park Committee continued to lobby the city for its protection.

This activism began to change perceptions of Mill Creek, from a landscape of waste to a valued space of nature in need of protecting. In 1973, S.T.O.P. joined with The Mill Creek Ravine Park Committee to create Mill Creek Build A Park (MCBAP), the official activist organization for the promotion of Mill Creek Ravine as a park. Under the influence of S.T.O.P., MCBAP identified another side to the debate over Mill Creek Ravine: pollution. For S.T.O.P., Mill Creek Ravine was not an unused post-industrial ravine covered in refuse and under threat from development, it was a natural environment that was under threat from the waste that lined its banks. MCBAP began identifying the history of pollution in Mill Creek as proof that it needed saving promoting the face that for years the creek had been “used as a ditch for wastes, a collection basin for any type of industrial spill, or simply a convenient dump” (*The Creek Itself,* CEA MS-348 File 71). Not only was the creek severely polluted, one resident pointed out that the creek was disgusting, “a dark green colour, and… stinks” (CEA MS-348 File 2). MCBAP’s first goal was to highlight the environmental degradation of Mill Creek Ravine due to industrial pollution. To help educate both its members and the public as to this degradation, MCBAP sponsored an extensive set of environmental studies and scientific tests that tracked the changing vegetation of the ravine, surveyed the areas most effected by garbage dumping and waste, and mapped how urbanization transformed the hydrology of the creek (CEA MS-348 File 17; Hawrelak 1974; Watson 1973). Water quality tests of the Creek and surrounding storm drains showed high pH levels, along with exceedingly high concentrations of phosphates, ammonia, nitrates, and calcium (CEA MS-348 File 16). The high concentration of these chemicals, along with tests that showed elevated levels of fecal coliform in the creek, were a direct result of human and industrial waste being directly dumped into the ravine through storm drains.

To publicize these results, MCBAP performed a massive door-to-door campaign, distributing leaflets, and bringing attention to their studies by holding public meetings concerning Mill Creek. Drumming up public attention, they managed to get over 1000 people to attend a public meeting on the future of the ravine (CEA MS-348 File 30). Following the publicity of MCBAP’s results, newspapers began picking up stories about Mill Creek Ravine as a polluted space of nature. As one *Edmonton Journal* article argued, there were “two sides to Mill Creek” on one side there was “sylvan” greenery, and on the other side it was “debris-filled”, littered with “garbage”, old industrial debris, and “shopping carts” (PPP May 17, 1975). Fueled by the activism of S.T.O.P., local residents began to identifying Mill Creek Ravine as a natural landscape that was in need of protection from industrial pollution, arguing that ¨a cleanup and an upgrading were in order¨ (PPP *Edmonton Journal* May 17, 1975). MCBAP combined environmental testing with interviews with local residents to show public support for cleaning up Mill Creek. One survey showed that 92% of local residents wanted industry and industrial waste removed from the areas around Mill Creek (CEA MS-348 File 2). By 1977, this combination of scientific data and public pressure helped fund a municipal effort to clean up Mill Creek and transform it into a municipal park. The city began a concerted effort to preserve and protect Mill Creek Ravine as a valuable place of urban nature. The city began buying up private land in and around the creek, enforcing anti-dumping bylaws, building bridges across the creek, and restoring picnic areas. A stretch of over 3 km in Mill Creek Ravine, from 63rd Avenue to 95th Avenue, was incorporated into the North Saskatchewan River Valley Park system, making it the largest urban park in Canada.

The Build a Park Philosophy

The studies, tests, and documents that MCBAP recorded, disseminated, and later stored at the MCBAP archive provide insight not only into what they did, but also why they did it. Unlike the prior community movements that sought to protect Mill Creek Ravine, MCBAP saw Mill Creek Ravine through the lens of the broader ecological movement, and the broader fears of pollution. As one of MCBAP’s founding documents argues:

> "There is everywhere an immense awakening of interest in ecology and in the alienation of humanity from the natural environment. There is more and more intense awareness of the grave dangers of pollution. This is a time of crisis, and the very question of continuing life on this planet has to be raised" (*The Integration of Mill Creek into the Extended Park System,* CEA MS-348 File 41).

Following the values of the ecological movement, the goal of MCBAP was not simply to build a park but to restore Mill Creek as a place of nature that could be used as a site for community engagement and education. MCBAP wanted to as turn Mill Creek into a "people's park" through "the permanent elimination of all pollutants" (*The Creek Itself,* CEA MS-348 File 71) and the restoration of it as "a place of beauty once more" (CEA MS-348 File 31). This project was not just aesthetic, it was political. MCBAP reimagined Mill Creek Ravine as a place for environmental education and engagement, where the restoration of nature in the park could help the community to revalorize their relationship to the environment and fight against human alienation from nature.

Specifically, MCBAP wanted to use the restored nature of Mill Creek to raise the ecological consciousness of children, and train them in personal practices of environmental activism and care. At the same time, MCBAP also drew on children's testimonials of their positive experiences in Mill Creek Ravine as proof of the importance of natural spaces for the community in their lobbying work with the municipal government. To reach children, MCBAP spent considerable time working in local elementary schools, using Mill Creek Ravine as a field trip destination to show children the costs of environmental degradation. Working in schools, MCBAP handed out child friendly ecological literature, specifically environmental pamphlets emphasizing the personal practices necessary to help the environment ("*You are an environment*" CEA MS-348 File 20; "*Save the Earth! An Ecology Handbook for Kids*" CEA MS-348 File 20).

To reach out to children outside of schools, MCBAP shot a documentary called “The Mill Creek Story”, a TV short called “Till Death Do Us Part”, and performed a puppet show in Mill Creek (CEA MS-348 File 83). Like in the Keep America Beautiful public service announcement, MCBAP emphasized a politics of personal responsibility, arguing that ecologically informed daily practices (recycling, not-littering, reducing consumption) combined with community activism to pressure government regulation of industrial waste was the solution to the pollution crisis.

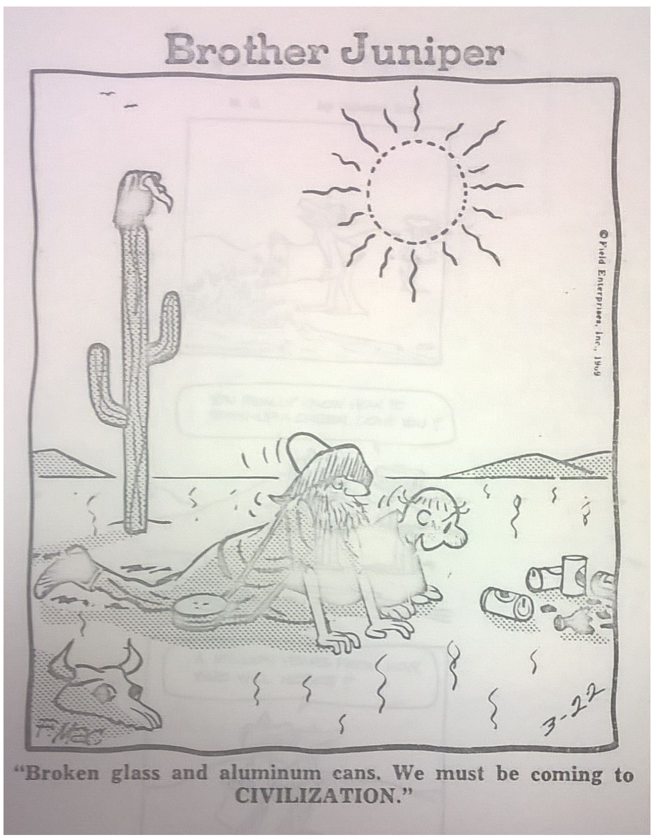


Image 4.3 Brother Juniper Comic Strip located in the MCBAP Archive of the City of Edmonton Archive (CEA MS-348 File 35). Photo of comic by author.

A major part of MCBAP’s public outreach was focused on educating locals on the problem of pollution, linking the everyday waste that lined Mill Creek Ravine to a global crisis.

Beyond publicly disseminating information on concentrations of pollutants in the creek, this education also took the form of emphasizing the transformative stakes of pollution. Cutting out newspaper syndicated cartoons with ecological themes and dispersing these cartoons to locals, MCBAP re-iterated the logic of Rachel Carson, arguing that the rise of post-war pollution had remade the relationship of humanity with the natural environment. Many of these cartoons emphasized the dire future of humanity in the face of pollution. In one cartoon (Fig. 4), a man and a woman look over a densely polluted city, only to muse, “some day we may look back at this as the good old days” (CEA MS-348 File 35). Other cartoons emphasized the ubiquity of pollution and its role in destroying traditional human engagements with the natural world. In another cartoon, a father and son are out fishing in a river filled with garbage and pollution, the father yells to the son, “Grab the Geiger counter Joey, maybe I’ll be able to keep this one” (CEA MS-348 File 35). Fishing, an iconic moment of male bonding with nature, was now tainted by the unknown toxic harms of the polluted landscape. Toxic harms, and the fears associated with them, now mediated human relations with nature.

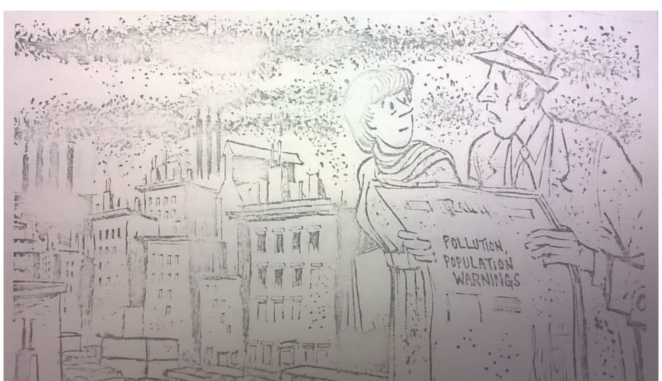
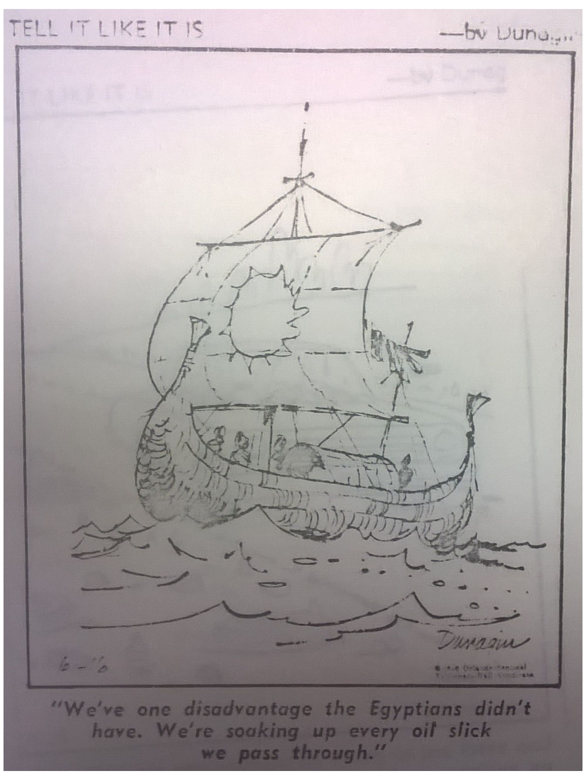


Image 4.4 Pollution Themed Comic Strip from MCBAP Archive of the City of Edmonton Archive (CEA MS-348 File 35). Photo of comic strip by author.

Other cartoons emphasized pollution's unique relationship to modern society, and identified pollution as marking a distinct break in human history. In one *Brother Juniper* cartoon (Fig 3), two dehydrated men are depicted as crawling across the desert when they encounter a pile of garbage (Fig. 4). They exclaim, "Broken glass and aluminum cans, we must be coming to CIVILIZATION" (CEA MS-348 File 35). In the modern world, pollution was so ubiquitous it had become the index of human civilization. Another cartoon shows two tourists visiting the monuments of Ancient Greece only to have the statue begin to cough due to the heavily polluted smog in the air (Fig. 6). In the same vein, a different cartoon shows Thor Heyerdahl's reconstructed papyrus boat sailing on the ocean with the caption: "We've one disadvantage the Egyptians didn't have. We're soaking up every oil slick we are passing through" (Fig 5.).



"We've one disadvantage the Egyptians didn't have. We're soaking up every oil slick we pass through."

Image 4.5 Pollution themed Comic Strip located in the MCBAP Archive, City of Edmonton Archives (CEA MS-348 File 35). Photo of comic strip by author.

Like the archaeology themed cartoon that opened this chapter, each of these cartoons emphasizes how the materiality of contemporary pollution has manifested a historical break with the past. As these cartoons make clear, post-war society, and the extreme levels of post-World War Two war pollution that define it, identify a historical era that is outside of normal human history. As these cartoons argue the materiality of post-war pollution was unique, its presence in the environment and its decay were out of sync with nature and would have a long-term harmful legacy.

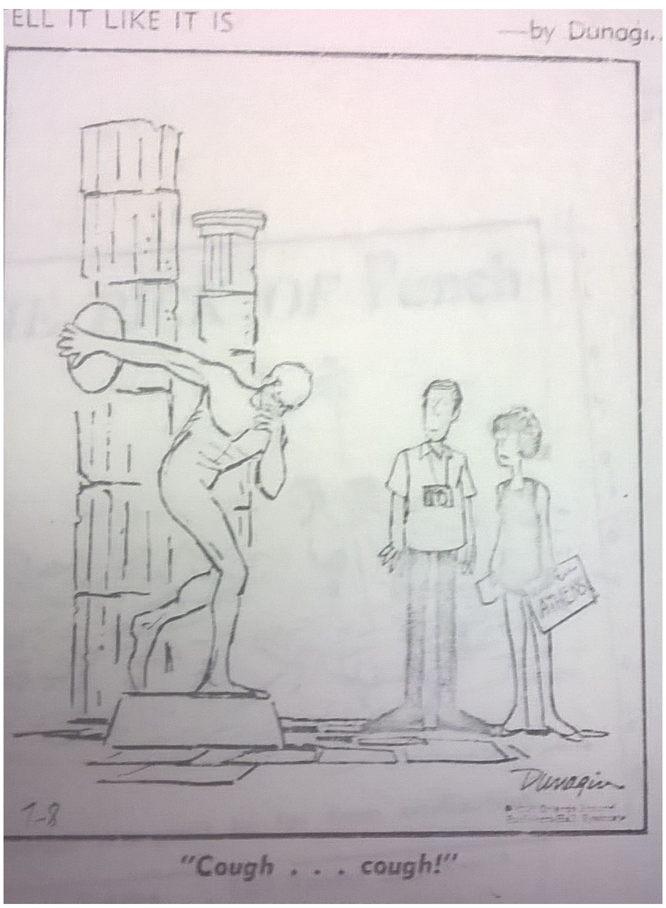


Image 4.6 Brother Juniper Comic Strip located in the MCBAP Archive, City of Edmonton Archive (CEA MS-348 File 35). Photo of comic strip by author.

As these cartoons suggest, the crisis of pollution was historically situated. For MCBAP, pollution was a recent problem for Mill Creek Ravine, directly connected to the fluorescence of industrial pollutants following World War II. MCBAP's goal of eliminating all pollution in the creek was not to restore Mill Creek Ravine as an ahistoric wilderness, it was to re-make it according to a better, more balanced, history. MCBAP saw "history as a tool for environmental protection" (MS-348 File 41) and argued that environmental history and social history were integrally linked, asking "history in environmental studies? Yes, history is the invisible environment of each of us" (*History* MS-348 File 67). Like Rachel Carson's fantasy of the settler balance of nature, MCBAP looked to the pre-war history of Mill Creek Ravine as the source of its political fantasy. In order to restore Mill Creek Ravine outside of the degradation of pollution, the history of the period prior to the introduction of pollution had to be understood, and MCBAP spent a significant amount of time and money on historical research of Mill Creek Ravine (*Social Action* MS-348 File 67).

For MCBAP, post-World War II pollution represented a fundamental shift in humanity's relation to the world. Instead of identifying the historical connection between contemporary levels of pollution and the historic uses of Mill Creek Ravine, historical research into Mill Creek's pre-war past was meant to elucidate the settler past as the history when human needs and environmental needs were in balance. This historical research served as the basis for MCBAP's politics. One of the main recommendations MCBAP provided the city was that "Mill Creek will Develop with a Historical Theme" (*Mill Creek Ravine Development Recommendations* MS-348 File 3), suggesting the memorialization of the period of early settlement and the early development of industry in the region (1871-1910) along with plaques to note the historic locations of the grist mill, the brickyard, the railroad, and the coal mines. Through this combination of nature and settler history, MCBAP sought to develop a park that would educate locals as to an idealized and balanced way of living with nature. This perspective was widely accepted by the local community. A letter from the local historical society argued that the MCBAP plan to memorialize history in Mill Creek was "consistent with [their] objective to encourage the rejuvenation of Old Strathcona" (MS-348 File 2). Furthermore, the high level of pollution in Mill Creek "symbolizes the neglect which much of old Strathcona has suffered for many years" (MS-348 File 2).

Rather than seeing the build-up of recent pollution as connected to the early industrialization of the ravine, S.T.O.P. marked a clear distinction between recent history and early settler history. This distinction was represented in how S.T.O.P. approached the different materialities of the waste that lined the creek. Channeling the ecological belief that the post-war pollution was historically unique, the design of the park was defined by two different approaches to two kinds of waste. The park was premised upon the fight against post-war industrial pollution, and necessitated the cleanup of the Mill Creek environment through the removal of all traces of post-war pollution. At the same time, the park also identified the industrial remnants of the settler period (Vogel's Meats, coal mining, railway) as remnants of an idealized historic past, and an essential component of the development of the park as a historic ecological space (MS-348 File 37). One of the clearest examples of this attitude is a large stylized map that depicts historical Mill Creek 1890-1900 (Fig. 7). The map is itself anachronistic and historically inaccurate, but depicts the idyllic settler landscape of the late nineteenth century. The creek is marked with drawings of farmers plowing fields, depictions of the first school house, and an image of the local swimming hole. Around the creek are artistic renderings of a number of different birds and a beaver. Interspersed alongside these quaint images of frontier life are those of a steamship, the grist mill, and Vogel's meatpacking plant. It is a fantastical representation of Mill Creek as a balance of the environment and settler industry (MS-348 File 37).

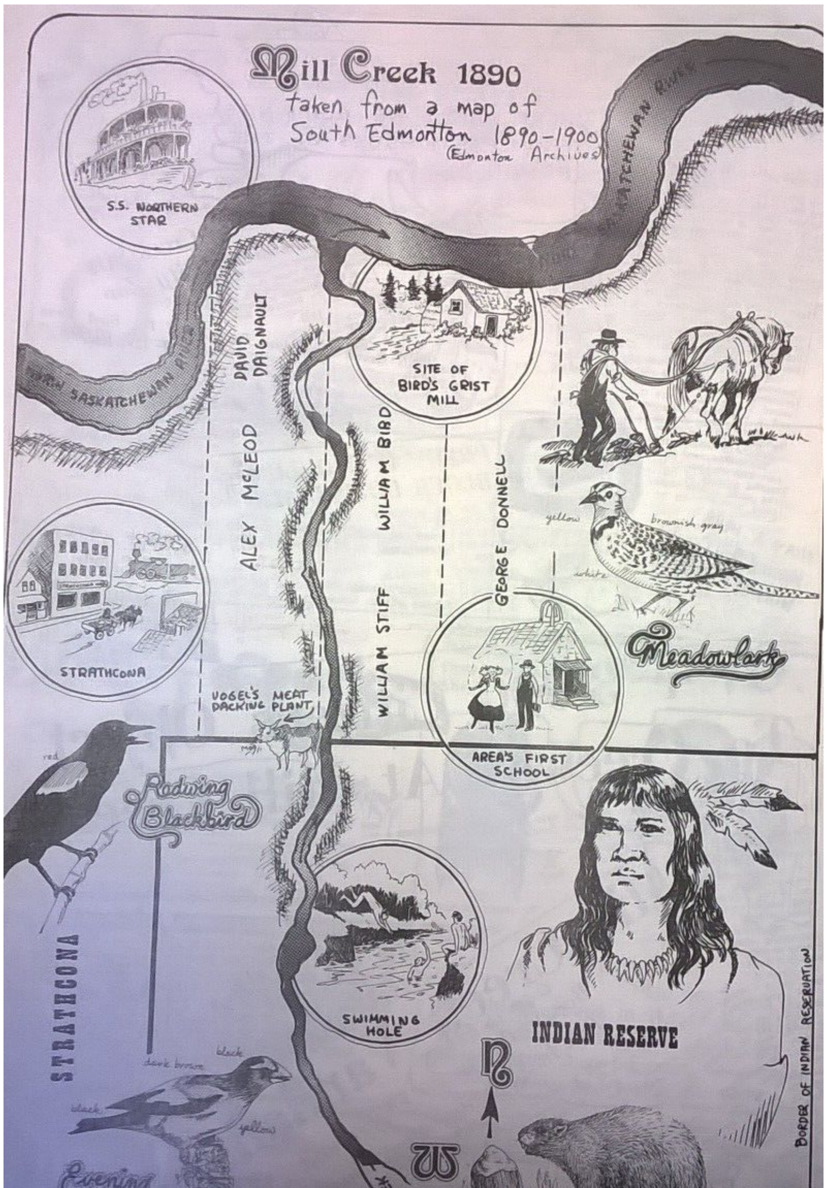


Image 4.7 Anachronistic Map of Settler History in Mill Creek. Located in MCBAP Archive, City of Edmonton Archive (CEA MS-348 File 37). Photo of Map by author.

In distinguishing between two different kinds of industrial waste, heritage on one hand, and pollution on the other, S.T.O.P. ignored the historical connection between the two. Furthermore, this approach (channeling Rachel Carson) identifies nostalgia for the settler past as the well-spring for political action and historical memorialization. Finally, it also identified the settler past and, by extension, the colonial past as historically distinct from the present. The social and ecological traumas of the past were not just overshadowed by the fears of post-war pollution, they were not viewed as relevant to the present. Indigenous history and the history of the Papaschase reserve are never mentioned as relevant to the MCBAP project. Their long historical connection to the Edmonton area and to the fur trade is completely ignored. Instead, like the 'Crying Indian,' the map draws on the fantasy of a stereotypical stoic Indigenous man in the corner of the map. Unlike the farmers, or the animals, the Indigenous figure is decontextualized and motionless, merely standing in as a vague gesture to the Indigenous history of the area. Beyond this single image in this single map, the history of the Papaschase reserve and the fight over its appropriation are almost completely absent. Tellingly, in a document titled "*Political History of Mill Creek*" the first entry is dated to 1907 (MS-348 File 78). The only notable mention of the Papaschase occurs in a short line discussing the history of industrial development in Mill Creek: "As commerce settled in the Indians moved out" (MS-348 File 68). Outside of these banal and offhand comments, MCBAP completely ignored Indigenous history in their historical research of Mill Creek.

Silencing Activism

This erasure of Papaschase history in the public campaign to remake Mill Creek Ravine is all the more notable because it took place during the same period that the Papaschase were beginning to politically organize and fight for the restitution of their appropriated reserve. In

1971, Eighty-five years after the forced surrender of the reserve in 1886 (and the same year the city ended the plan to build a freeway through Mill Creek) descendants of the Papaschase band began to organize in an attempt to gain restitution for the lost reserve. Not only had the surrender of the reserve denied the Papaschase band rights to land, it resulted in the dissolution of the band itself, and a denial of the members of the band as having official Indian status. The disintegration of the band left ongoing silences, disenfranchisements and traumas: "the members of the original Band, and their descendants, lost their Treaty right to Band status. They have been removed from their rightful place in Canadian society: denied their position as a signatory to Treaty 6; denied their identity" (Lameman vs the Queen, 2008). Some of the descendants had joined other reserves and were officially recognized as status Indians through their relationship to other bands. Many other descendants of the Papaschase were scattered throughout Alberta, denied Indian status due to their lack of affiliation with an officially recognized band, and therefore denied the benefits of treaty.

In 1971, a number of Papaschase descendants living on the Enoch Cree Reserve funded research on the history of the surrender of the Papaschase reserve (IR 136) in southern Edmonton (Bruneau n.d.). The goal of this research was to identify the invalid history of the surrender of IR 136 (the Papaschase Reserve), to help identify appropriate levels of restitution for the descendants, and to locate other descendants of the Papaschase band. Ken Tyler, a law student at the University of Alberta, spent two years doing oral interviews and archival research on the history of the Papaschase surrender. Tyler found a community of Papaschase descendants that were scattered throughout Central Alberta, some of whom were granted official treaty status as part of other reserves (mainly the Enoch Reservation) as well as many who had not. In 1973, based on this research, some descendants of the Papaschase band filed a claim through the Enoch

First Nation to the Indian Claims Commission (ICC) declaring that the 1888 surrender of the Papaschase was invalid (Tyler 1979). However, the scattered nature of the band undercut the viability of the claim. This claim was rejected in 1975 because the ICC argued that the plaintiffs did not officially represent the interests of the Papaschase (Bruneau n.d.). In 1974, another group of Papaschase descendants, unaffiliated with any specific existing band, began to organize a petition to make a land claim through a local Edmonton lawyer. Like the claim through the Enoch band, this claim did not move forward.

Throughout the 1980s and early 1990s two official groups developed out of this scattered community of Papaschase descendants. The first of these groups was the Papastayo First Nation Association of Alberta (this group consisted mainly consisted of the descendants who were not officially recognized as having Indian status and belonging to an official band). The second group was an Interim Papaschase Committee (this group mainly consisted of descendants of the Papaschase band who still maintained official status relationships through other Nations). The Chiefs of the Confederacy of Treaty Six facilitated the joining of these two groups into a representative council for the descendants of the Papaschase Band with a newly written council code. On August 21, 1999, an officially sanctioned election was held, electing the first chief of the Papaschase band since Papaschase himself, along with nine councilors.

In 2001, this governing body filed a class action lawsuit against the Crown to determine whether the Papaschase reserve was surrendered illegally, and therefore whether the Papaschase could be acknowledged as an official First Nation and deserved financial restitution. After numerous opinions and repeals, in 2008 the lawsuit was dismissed unanimously by the Supreme Court of Canada. The court determined that most of the historic facts were “shrouded in the mists of time” and that there was “no genuine issue” for trial for two reasons (Lameman vs

Canada 2008). First, the court "found the plaintiffs lacked standing to bring the representative action; they were claiming collective rights of a Band that had ceased to exist" (Canada vs Lameman 2008). Since the Papaschase were not an officially recognized Band they did not have the standing to sue the court as a Band and argue for the reinstating of their official status. Second, the Papaschase claims were barred by the *Limitations of Actions Act,* commonly known as the statute of limitations. Since research on the illegality of the surrender of the reserve had begun in 1971, the Crown argued, and the Supreme Court agreed, the statute of limitations had run out in 1977, making any contemporary legal claims frivolous. Despite this setback, the Papaschase band continues to fight for restitution through recognition from other First Nations and the government of Edmonton.

Even if one acknowledges the compelling argument about the heavily flawed and colonial nature of the recognition discourse (Coulthard 2014; Povinelli 2001), the case of the Papaschase represents a perfect example of how ongoing colonial violence makes Indigenous rights illegible to settler colonial governance. The very absence of band status that evidenced the history of violence the Papaschase had experienced was used as proof they lacked standing to represent themselves. The history of research and political reforming that served as the conditions of possibility of the re-emergence of the Papaschase as a political community was likewise identified as proof that they had failed to act in time.

Conclusion

The long history of dislocation of the Papaschase Band, and subsequent silencing of Papaschase history represents what Ann Stoler would call the persistent "durabilities of duress that imperial formations produce" (2008: 192). Or, in other words, an example of "the longevity of structures of dominance, and the uneven pace with which people can extricate themselves from the colonial order of things" (Stoler 2008: 193). The material legacies of early industrial activity in Mill Creek Ravine, along with the decades long pile-up of new waste, represents another example of the persistent durabilities of colonialism. Once produced as a space for industrial waste as part of the appropriation of the Papaschase Reserve and the industrialization of Edmonton, the landscape had sedimented decades of new waste due to its appearance as a wasted space. Both represent examples of the ways that 'imperial formations of force' that colonialism engenders, are not simply disintegrating legacies of the past, but continue to structure the present.

In eliding Papaschase history, the ecological activists of MCBAP were continuing a long historical legacy at the heart of the Indigenous movement of erasing Indigenous communities and Indigenous history. From Roosevelt's National Parks to Carson's idyllic settler fantasy, Indigenous communities have been removed and erased (sometimes forcibly) under excuse of protecting nature. In his book *Seeing Green*, environmental historian Finis Dunaway notes that at the same time as KAB were filming their 'Crying Indian' PSA in San Francisco Bay, real Indigenous activists were protesting colonial injustices on Alcatraz Island (2015). Despite this, there is no reference to contemporary Indigenous activism in the PSA. Instead, the reference to Indigeneity in the PSA is the stereotypical specter of the 'Crying Indian, a moralizing ghost from the past. The 'Crying Indian' purported a banal environmental politics of personal responsibility instead of broader critical stance that acknowledged the connections between environmental degradation and the historic inequalities of industrial capitalism.

Similarly, in the activism to save Mill Creek Ravine from pollution and to restore it as a place of nature, the elision of Papaschase history points to the broader erasure of the colonial history of Mill Creek Ravine.

Through the logic of pollution, MCBAP rendered the post-world war II history of Mill Creek Ravine as fundamentally distinct from its pre-World War II history. The detritus from early industry was defined as heritage while post-war litter was defined as pollution. In the process, the persistence of industrial waste in Mill Creek Ravine was disconnected from its historical connection to the colonial appropriation of the Papaschase reserve and the industrialization of Edmonton. While MCBAP identified pollution as a problem completely disconnected from its colonial roots, it also promoted a politics to combat pollution that was entirely disconnected from its broader historical context. Instead of the politics of pollution as interconnected with the anti-colonial politics of the Papaschase, or the anti-capitalist politics of other environmentalists, MCBAP proposed an environmental politics based on consumer choice and individual responsibility. In eliding Indigenous history and Indigenous activism, the activism of MCBAP not only continued the erasure of Indigenous communities in the contemporary, it also proposed a form of politics that explicitly ignored the historical interconnections between pollution, industrial capitalism, and settler colonialism.

Chapter 5

Daylighting Decay: Mill Creek Ravine's Present Past

On a late summer day in 2017, while shopping at the local Italian grocery store in Edmonton, a woman approached me. While I had never met her before, she introduced herself as a member of the Archaeological Survey of Alberta, the governmental agency that oversees all archaeological activity in the province. After introducing herself as a member of the Archaeology Survey, she explained that she recognized me as the archaeologist who had been excavating in Mill Creek Ravine. As we got to talking it became clear that she was very familiar with my project, noting that she was in charge of reading the site report I had recently submitted for my 2016 excavation at the Ross Acreage site in the ravine. After a few minutes of conversation about my ongoing excavations at Vogel's Meats, her face and her tone turned more serious, asking "Why did you designate your site as an HRV 5?"

In Alberta, all archaeological sites are classified by one of six official heritage designations. If an area has remnants of human activity "that is of value for its prehistoric, historic, cultural or scientific significance" (Historic Resources Act 2016) it is deemed a historic resource, added to the list of roughly 40,000 sites of historic value in the province, and given a ranking between 1-5 suggesting the level of its significance. Any area without this value is deemed a zero, and not counted in the list. HRV 5, or Historic Resource Value 5, is the lowest level in the Province of Alberta's *Historic Resource Act.* While HRV 1-4 note differing levels of avoidance and protection for the historic resource, an HRV 5 designation does is not accompanied by any legal restrictions or guidelines about how the space might be used in the future, merely identifying it a space that has a "high potential to contain a historic resource" (Historic Resources Act, 2016). Notably, HRV 5 makes no recommendation of legal protection for the purpose of conservation. In other words, HRV 5 is an acknowledgement of a place's history, without the imperative to conserve it. While noting the unconventional nature of the Ross Acreage site (FjPi-170) as a historic resource due to its recent nature, this agent of the ASA thought that the wealth of the materials I had uncovered could easily justify a higher designation (HRV 3 or 4). An HRV-4, for instance, "contains a historic resource that may require avoidance" (Historic Resources Act 2016). She argued that the material remains of Ross Acreage were an important enough remnant of Alberta's past that they deserved legal protection to facilitate their conservation.

In many ways I agreed with this analysis: the material remnants I found from Ross Acreage and Vogel's Meats were substantial, and the industrial history they told is an important and oft-silenced part of Alberta's heritage. Impoverished and informal communities like that of Ross Acreage and early industrial factories like Vogel's Meats are poorly represented in the list of Alberta's historic resources. All the same, I was not sure that the conservation of these sites was the best course of action. In general, I was not sure how the usual practices of conservation could be mobilized to memorialize the longer history of Mill Creek Ravine's early industrial waste. On one hand, I saw the necessity of telling the silenced histories of the residents of Ross Acreage, and reframing the overly positive historical narrative surrounding Edmonton's history of industrialization. On the other hand, I also saw the logic of conservation as eliding and impeding the very history I was trying to tell. The logic and ethic of conserving the early industrial remains of Ross Acreage and Vogel's Meats as historic recourses did not reveal what I thought was the most essential aspects of the history of industry in Mill Creek Ravine. That is, the ongoing social and ecological effects of the early industrial waste and the origin of Mill Creek Ravine's industrial history in the appropriation of the Papaschase Reserve. I feared that conservation would elide rather than reveal these histories.

Today, Mill Creek Ravine is viewed as one of Edmonton's few 'wild' urban parks. Besides being a popular destination for nature walks and bike rides, the park is also one of the most popular parks in Edmonton's from the perspective of the significant homeless population that camps within its bounds. This use of Mill Creek Ravine takes place despite the fact that it is the most polluted urban creek in the province of Alberta, an issue both materially and historically tied to the industrial remains of sites like Vogel's and Ross Acreage. Since its transformation into a municipal park in the late 1970s, Mill Creek has been at the heart of a number of different projects that use the logic of conservation to curate and memorialize the material legacies of the past. This chapter tracks how these projects purify the natural and cultural history of Mill Creek Ravine, and elide the multiple ways that the early industrial history of Mill Creek Ravine continues to effect the present. Drawing from my excavations of Vogel's Meats I argue that the decaying remains of early industrial waste in Mill Creek Ravine resists the ethic of conservation. Instead of a practice of memorialization that highlights the necessity of conservation, in this chapter I suggest a form of memorialization that highlights the long-term entanglements of a landscape and its industrial remains. Drawing on the German concept of *Industrienatur,* this chapter argues for a memorialization of Mill Creek Ravine that collaborates with the lively decay of early industrial waste rather than attempting to arrest it.

Conserving Nature and Culture

The ethic of conservation has long been the bedrock upon which the institutions and practices of heritage management have been formed. It is also the ethic and legally enforced framework under which most archaeology is practiced. In Alberta, this ethic is legally enforced through the Archaeological Survey Section (henceforth: Archaeological Survey), the official governing body of all archaeological activity in the province. To practice archaeology in Alberta one must follow laws and practices set up for the explicit goal of conserving and interpreting the material legacy of the province's past (Albers 2014). For Eric Damkjar, the Head Archaeologist for the Provincial government, the value of these material remains and the importance of this conservation is self-evident: these are historical resources that serve as a direct link to the past, they provide invaluable knowledge about the past, and are "nonrenewable—once they are destroyed, they are gone forever" (Albers 2014). This last quotation crystalizes an essential aspect of the ethical impetus behind conservation: material remains of the past are constantly at risk of being lost, and as a valuable connection to history these remains require vigilant conservation efforts to help preserve them.

This ethic of conservation is not only foundational to how states identify historic resources, but how states govern and interpret heritage, both cultural and natural. Following the international norms of the heritage community, the conservation ethic organizes how historic resources like archaeological sites are managed as well as how parks and the province's ecosystems are governed. From this perspective, conservation is at the heart of what heritage is and how it must be treated. According to UNESCO, heritage is "our legacy from the past, what we live with today, and what we pass on to future generations" (http://whc.unesco.org/en/about/). These shared natural and historic resources serve as a vital inheritance and legacy of the past that we must conserve for the future. The logics underlying the value of natural and cultural heritage are interrelated even while the content of these two forms of heritage are often in direct tension with one another (Lowenthal 2005). Both forms of heritage value the material legacies of the past as vestiges of a vanished world, vestiges that purport to provide value and knowledge due to this connection to something gone. Cultural heritage draws on a static fantasy of the past as a foreign and distant place, while natural heritage relies on the ahistorical fantasy of pure, pre-human nature. These vestiges are relied upon as valuable resources due to their mnemonic and metonymic connection to these vanished worlds. Despite their asynchronous appearance, cultural and natural heritage exists in the here and now, a tension which underlines both forms of heritage as unstable, valuable, and under threat of disappearing (Harrison 2013). Neither natural nor cultural heritage belongs 'naturally' in the modern world. Staving off the threats of the contemporary world and maintaining the link between these remnants and their vanished world requires the ongoing conservation. Both natural and cultural heritage have to be protected against the degradation of the modern world. As idealized icons of now vanished worlds these sources of heritage are purified of the contaminations of the present. At the same time, the conservation of spaces of natural and cultural heritage are often in tension with one another. Human activity is seen as the primary potential harm from which natural heritage must be protected. Decay, on the other hand, is seen as a natural harm from which cultural heritage must be protected.

Drawing on this tension, the practices of conservation actively police the divide between nature and culture, purifying heritage sites as belonging to one or the other. The policing of nature/culture line in the production of heritage is not innocent. As Chapter Four points out, arguments for the purity of ahistorical nature have long been used to remove Indigenous populations and to erase Indigenous history from 'natural' landscapes. Furthermore, as Rodney Harrison argues: a myopic focus on human artifacts has elided the acknowledgement and protection of vital spiritual and cultural landscapes of non-Western societies precisely due to their inability to fit easily within the rubric of nature or culture (2015). More generally the destructive impulses of the Capitalocene are founded upon the appearance of nature as both distinct from human society, as well as a ready-made resource for human society (Moore 2015). The conservation of nature as heritage doubles down on both assumptions about nature. Conservation identifies nature as both a resource for humanity, as well as a resource under threat by humanity. The practice of conservation also purifies the distinction between past and present, identifying the material legacies of the past as distinct and out of place in the modern world. Conservation purifies the palimpsestic nature of a historic landscape to fit within a single progressive temporality. Certain histories are highlighted, while other histories are ignored and silenced. In stripping the material legacies of the past of their social and material connections with the present, conservation practices imagine the past as a vanished place with a history that is finished—cut off and distinct from the present. By identifying vestiges of the past as valuable resources, and by policing and promoting these resources through the binaries of past/present and nature/culture, the practices of conservation promote the foundational ideologies of the Capitalocene. If, as Donna Haraway argues, the "arrow of time" is one of the lies of modern progress at the heart of capitalism and colonial violence (2016: 45), and, as Jason Moore argues, the appearance of "Cheap Nature" is at the core of the ecological and social destruction wrought by the Capitalocene (2016: 78), then the ethic of conservation is imbricated in this devastation. While devastated industrial landscapes like Bhopal, Chernobyl, or Chemical Alley serve as the face of the Capitalocene, this devastation is facilitated by the ideology of progress and nature/culture that is promoted in the manicured lawns of Stonehenge and the timely geysers of Yellowstone.

Conserving Mill Creek Ravine's Historic Legacy

Since the designation of Mill Creek Ravine as a municipal park in 1976 the ethic of conservation has defined how local governments and local community members have curated the area as a resource to be protected and purified. On the one hand, various governmental and community groups have attended to the material legacies of early twentieth-century industrialization as important historical resources. On the other hand, the ecosystem of plants, animals, and other micro-organisms that have grown up on top of these industrial remains have been identified and conserved as essential natural resources by the municipal government and by local community groups like the Keepers of Mill Creek and Edmonton Native Plant Group.

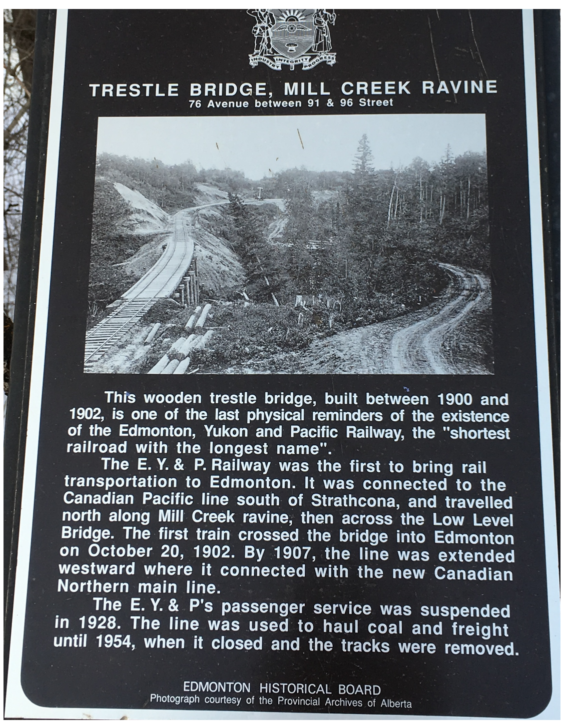


Image 5.1 Photo of the plaque memorializing the trestle bridges as a municipal historic resource. Photo of plaque by author.

South of the Vogel's Meats site, three old trestle bridges spanning Mill Creek—once used by the Edmonton, Yukon and Pacific Railway—are still used as part of the biking path. As the last remaining structures associated with the first railroad to connect Edmonton to Canada these bridges are now officially conserved as irreplaceable vestiges of a vital moment in Edmonton's history. The trestle bridges have been designated a historic resource by the city of Edmonton and have also been memorialized with a public plaque to commemorate the bridges and their role in a seminal moment in Edmonton's history. According to the plaque the trestle bridges are "the last physical reminder" of the first railroad to "bring rail transportation to Edmonton." The result of this public memorialization has been not just legal protection for the trestle bridges, but widespread public support. In 2016, when the city began to work on a major rehabilitation of the trestle bridges, locals actively promoted the conservation of as much of the old structure and old wood as possible. After the city performed community outreach "a large majority of respondents felt the Mill Creek Ravine trestle bridges had historic value" (*Global News,* June 24, 2018). Public pressure to preserve the bridges as much as possible lead to the city "reusing wood from the original structures" while also improving "the safety and functionality of the bridges", and "ensuring the longevity of this piece of Edmonton's history" (*Global News,* June 24, 2018). By the time they were finished in 2017 the renovation had successfully preserved their original design and reused a considerable amount of old wood in their final construction.

The trestle bridges are also viewed as a historic resource by the provincial government. In the provincial inventory of historic resources, the gravity of the historical value of the trestle bridges is emphasized, arguing that the trestle bridges serve "as a symbol of Edmonton's industrial development" (Alberta Register of Historic Places, Object #4664:0600). In other words, as material remainder of Edmonton's first railroad, the trestle bridges serves as a memorial to the technological and economic progress that industrialization ushered in. These trestle bridges, in other words, memorialize the idealized history of progress itself, the arrival of industrial modernity to transform Edmonton into a modern city. The only point of public memorialization of history in the creek, the city and the province emphasize the seminal act of Edmonton's industrialization. Subsequently, outside the history of the train, the local public has little understanding of Mill Creek Ravine as having an industrial history. Defined by this single plaque, the public history of Mill Creek Ravine is framed by the narrative of technological progress. The narratives of Ross Acreage, the Papaschase Reserve, and the decades of environmental and social degradation are completely ignored.

Marked by only a single historical plaque throughout the whole ravine, the communal memory associated with Mill Creek Ravine is comparatively lacking. While the plaque speaks to the broader industrial development that the EY&P railroad was a part of, the communal understanding of Mill Creek Ravine is that it is a place of nature not history. As one of our field school students noted during the excavation of Vogel's Meats, "People have this idea of this being a really natural area and that it's always been this way, but it hasn't" (*Global News* July 30, 2017). As we unearthed the remains of Vogel's Meats, local residents and media became fascinated over the disjuncture between Mill Creek's contemporary image and its hidden industrial past. As one local exclaimed, "we walk over this place all the time" but were "oblivious" to the history of the meatpacking plant and the history industrialization of the creek (*Global News* July 30, 2017). For most of the residents of the surrounding communities, the history of the area is unknown.

This obliviousness does not reach all residents. Many locals are interested in the history of the creek, and a few provided local stories of the history of Mill Creek Ravine during and after the Great Depression. Others emphasized their experiences encountering old unidentifiable historical artifacts in Mill Creek Ravine, bricks poking out of the soil, bones eroding out of the bank. For most residents the presence of these objects were mysterious, tied to an unknown and distant past. At the same time, some locals were deeply invested in recovering and conserving the material residue of Mill Creek Ravine's industrial history. In Edmonton there is a motivated local community of amateur collectors and historians who are dedicated to recovering this historic material and conserving it for posterity. Metal detecting and antique collecting are popular pastimes in Edmonton, with a large informal community of metal detectors and amateur historians who commonly explore both the river valley and Mill Creek Ravine. While most locals consider Mill Creek Ravine natural, these detectorists are well acquainted with Mill Creek Ravine's historic past and use their knowledge of it to hunt for 19^{th} century and 20^{th} century artifacts.

To the Archaeological Survey metal detectorists were seen as destructive treasure hunters and the bane of conservation efforts. Given the tensions between detectorists and archaeologists, I was surprised in the summer of 2016, when, three weeks before my excavations were scheduled to start, members of the group Metal Detecting Edmonton began to contact me. Normally at odds with archaeologists who they see as focusing on Indigenous history and the furtrade, these collectors saw my interest in early twentieth century history as mirroring their own. That week, I drove out to the suburbs to visit one of these amateur historians, a man named Michael who had spent most of his life collecting and writing about glass bottles. Showing me his bottle collection, he identified those he had found in and around the Mill Creek Ravine area and the various diagnostic markings that identified their history of production. Like most collectors, Michael's main focus was on the bottles themselves and the history of technology that produced them, rather than on the archaeological context of the find. At the same time, he was adamant about his role as a conservator. As Michael pointed out, "archaeologists are not able to be everywhere", and that collectors like him had the ability to fill in the gaps and find a lot of things that otherwise "would be lost forever". While working outside the official frame of the Historic Resources Act, the legal framework that legislates how historic resources in the province should be conserved, he saw what he did as conservation. Moreover, the history Michael was interested in, glass bottle technologies of the late nineteenth and early twentieth century, were drastically under studied by local archaeologists and historians. In his mind, the glass bottles he was recovering would otherwise be left to break, and the history of their production forgotten.

The next weekend I was invited out to Mill Creek Ravine by a group of metal detectorists. This group, a collection of amateur historians and collectors, wanted to show me what they perceived as some of the best spots for early industrial remains in Mill Creek Ravine. Due to our shared interest in the material culture of the late nineteenth and early twentieth century, they hoped to facilitate. Some detectorists brought their equipment, while others laid out some of the best finds they had collected in the ravine. One showed me a collection of military hat badges from the First World War that he had found mostly up the hill on the east side of the ravine. Another collector showed me part of a collection of coins that he had found nearby. One, having heard of my interest in meatpacking in Mill Creek, gave me two mid twentieth-century meat hooks she had found around 76th Avenue, likely from the old Gainer's Packing plant. Compared to the local community, these metal detectors were much more aware of the industrial past in Mill Creek and were attuned to the presence of this past in the degraded historic waste that lined the ravine. Over the course of five hours they showed me some of their prime detecting locations as well as any remnants of early industry they could think of:

overgrown piles of industrial rubble, old building foundations, and bricks coming out of tree falls.

As we walked, they tried to push against their reputation as treasure-hunters and instead suggested their role as caretakers of the history of Mill Creek. To them, governmental indifference to the less 'sexy' remains of history (everyday items, coins, and more recent twentieth-century history), required their intervention for the sake of historical memory. Furthermore, when archaeologists did find material culture, most governmental institutions did not "have the resources or space to showcase everything they have", leading them to be completely inaccessible to the public. These detectorists on the other hand, saw it as their pride and responsibility to share their collections and the histories they recovered. Like Michael, most of the detectorists were amateur historians and collectors, with specific types of objects they focused on recovering, analyzing and collecting. Some were interested in collecting coins, others on buttons, others on hat badges. In my work, these collectors saw a project with aligned goals, an investigation into the history of Mill Creek that the province and the city had ignored. At the same time, there interest in collecting historic artifacts was largely removed from the specific history of Mill Creek Ravine. They were more interested in the broader histories of technological progress, settlement and industrial production that these artifacts materialized.

Mill Creek as a Natural Resource

One of the defining justifications that the detectorists used for their work as conservation was the general lack of official archaeological interest in the historical remains of a place like Mill Creek Ravine. Outside the single memorialization of the EY&P train there were no acknowledgement of the ravine as having what the detectorists considered historic resources.

Instead, there were significant resources and community investment in the conservation of Mill Creek Ravine as a natural resource for the city.

Like the conservation of historical resources like the trestle bridges, the conservation of Mill Creek Ravine as a natural resource occurs at multiple levels, from the municipal government, to the community leagues[1], to private community organizations. Within the municipal government, the Department of City Operations is responsible for the functioning of Edmonton's infrastructure (waste, roads, and transit) as well as serving as the environmental steward of Edmonton's land and parks. The conservation of parks as natural spaces is a high priority to the municipal government, and the wealth of parks and green space in Edmonton is significant to how the city views and brands itself as having a high quality of life and an environmental conscience. Specifically, the city views the uninterrupted band of parks running through the North Saskatchewan River Valley and ravines (known as the River Valley Park System) as its crowning jewel: "As the largest urban park in Canada, with more than 160 kilometers of maintained pathways and 20 major parks, the River Valley is a natural wonder for all Edmontonians to be proud of" ("River Valley Parks, Edmonton.ca). According to two recent strategic plans for development, the city identified its primary responsibilities as "preserv[ing] natural resources" in the city and "protect[ing], preserv[ing], and enhance[ing] the north Saskatchewan River Valley and ravine system as Edmonton's greatest natural asset" (*City of Edmonton Strategic Plan* 2014).

Mill Creek, one of the largest individual parks within the River Valley park system, is also one of its most vital, an integral part of this 'natural wonder'. Mill Creek Ravine is often

[1] In Edmonton, neighborhood councils known as community leagues hold considerable power to influence the city governments activities in their neighborhood.

distinguished from the other parks in the system due to its perceived wildness. One resident who frequented the park echoed a common sentiment, arguing that the wild and overgrown feeling of the ravine “makes you forget you are in the middle of the city”.

Image 5.2 Image of the plaque memorializing the role of the Nutters in the fight to preserve Mill Creek Ravine. Photo of plaque by author.

South of the trestle bridges, and a couple of blocks west of Mill Creek Ravine, a slightly larger memorial is located in a place known as Nutter’s Corner. This area, which has a few benches, a tree, and a small communal area on the corner of 99th Street and 86th avenue and commemorates Butch and Caroline Nutter, two residents of the Strathcona neighborhood who were instrumental in fighting to transform Mill Creek Ravine into a city park. A plaque, installed by the Strathcona Center community league, honors Butch and Caroline Nutter “for protecting Mill Creek Ravine as one of our last urban wild spaces.” While an integral part of the broader natural resource of the North Saskatchewan River Park system, Mill Creek Ravine is upheld by the local community as a uniquely natural space, one of the “last urban wild spaces” in the city.

As the plaque references, the conservation of Mill Creek Ravine has its own, frequently invoked, historic narrative about the local community banding together in the 1970s to preserve Mill Creek. As this local narrative goes, prior to the 1960s Mill Creek was a "peaceful oasis" of nature under threat (Strathcona Community League 2014), an ahistoric natural refuge that was saved by community activism led by the Nutters. In contrast to the actual community activism of the 1960s and 70s, which strongly connected the nature of Mill Creek Ravine with an idealized vision of its early pioneer industrial history (See Chapter 4), contemporary locals simply memorialize this history of conservation and elide Mill Creek as a historic landscape.

The memorialization of the history of conserving Mill Creek Ravine is maintained not just as a piece of history, but as a warning that Mill Creek is still under threat. In the face of this threat, the conservation of Mill Creek as a space of nature is maintained by a variety of community groups. The main group that advocates for Mill Creek Ravine as a natural space is called Keepers of Mill Creek Ravine (KOMCR), founded 2007. This group organizes annual events to get volunteers to pick up litter and trash in the ravine, with the aim to "preserve the ravine in its natural state" (*CBC News*, May 6, 2018). Beyond this annual clean-up, KOMCR are dedicated to raising community awareness about any dangers to the Mill Creek ecosystem (erosion, waste, and storm drains) and lobbying the municipal government to address these dangers. Closely linked to the KOMCR, and another community group that was specifically founded in the context of purifying the nature of the ravine, is the Edmonton Native Plant Society. Both groups function according to a mandate of purifying nature of Mill Creek Ravine. While the KOMCR curate the ravine by cleaning up the 'degrading' effects of the city and human activity, the Edmonton Native Plant Society purify the plants themselves. As their name suggests, this group attempts to aid the spread of native botanical species and to remove non-native invasive plant species from Edmonton's city parks. While officially a pan-Edmonton group, the society was founded in 1997 due to concerns over the invasive species in Mill Creek Ravine. The membership of this society maintains strong connections to Mill Creek Ravine area. The society even has a sub-group called the Thistle Patrol which is dedicated to routinely weeding non-native species just in Mill Creek Ravine.

Over the past ten years, these smaller scale community organized projects concerned with the natural purity of Mill Creek Ravine have been joined by larger projects backed by the City of Edmonton Government. Starting in 2015, a non-profit group, known as CreekWatch, began an annual project to test the water quality of Mill Creek as part of province-wide analysis of urban water quality. Since CreekWatch started taking measurements, Mill Creek has been measured as the most polluted or the second most polluted urban waterway in the province, with unhealthy levels of nitrates, E.coli, and chloride, and a very high Ph (a mean Ph of 8.5 in 2016) (Froklage 2016). In response to these studies, and rising concern over increasing erosion, the city began to develop strategies to mitigate flooding, erosion, and pollution in Mill Creek and the ravine park. From rerouting the storm drains into the North Saskatchewan River, to building a wetland area that would help to catch and filter out water pollutants before they flow into the creek, the city proposed a variety of different options at local community meetings.

While these more prosaic solutions to ecological health were being shopped by the city, a second proposal began to gain widespread local and governmental support. In 2015, ecological city planners and the Keepers of Mill Creek began pushing the feasibility of restoring the "connectivity between Mill Creek and the North Saskatchewan River" (*Mill Creek Daylighting Report* 2017). In the late 1960s, as part of the ultimately unsuccessful plan to build a road through Mill Creek Ravine (the same plan that initiated the community activism that created Mill

Creek Ravine as a park) the last kilometer of Mill Creek was diverted into an underground culvert and the dry creek bed was filled in. In 2015, bolstered by widespread community support, the city commissioned a technical feasibility study to 'daylight' Mill Creek—to dig up the old creek bed and let the creek flow down its historic route. The goals of this daylighting were to "undo the damage of the past" and "improve water quality, provide flood mitigation, and support biodiversity" (*Mill Creek Daylighting Report* 2017). The project quickly gained widespread support among local community groups and is still being considered by the municipal government. The Keepers of Mill Creek in particular spent significant resources on gathering public support and putting pressure on city councilors.

According to one of the leading Edmonton based environmentalist activists I interviewed, 'daylighting' was not the most important ecological fix that Mill Creek required, nor would it achieve the ecological benefits that were being promised. While other more feasible and less expensive proposals to help Mill Creek deal with pollution and erosion were floated, 'daylighting' has taken on a life of its own, gathering significant amounts of media and local attention. Daylighting success in gaining public support can be connected closely to the historic narrative about community activism that defines how most locals view Mill Creek. The culvert remains the most prominent reminder of early attempts in the 1960s to transform Mill Creek into a highway. For most of the locals devoted to the upkeep of Mill Creek Ravine as a natural space, the history of the ravine begins in the 1960s with the Nutters, as a "peaceful oasis" under threat. Removing the culvert and daylighting the creek serves as a way to undo this historic damage and restore this imagined purity. Daylighting fits perfectly into the conservationist mandates of groups like KOMCR and the Edmonton Native Plant Society, who seek to purify Mill Creek Ravine according to a historical understanding of the creek that begins in the 1960s with community-led activism. Within this narrative there is little public acknowledgement that prior to the 1960s, Mill Creek Ravine was an abandoned industrial dumping ground, and prior to that a major industrial manufacturing area. Nor is there any public acknowledgement that the problem of pollution is not just tied to contemporary pollution from the city, but from the persistence of early industrial waste. The polluted history of Mill Creek does not stretch back to the 1960s but to the 1890s, when Mill Creek's ecological health was originally sacrificed, along with Papaschase rights, for profit and progress.

Policing Mill Creek

The conservation of Mill Creek Ravine Park as a space of nature is not just used as a rationale to remove invasive weeds. It is also used as a rational to harass and remove homeless people. Under the name of conservation, the nature of Mill Creek Ravine is quite literally policed. Besides the yearly clean-up of litter by the Keepers of Mill Creek, the vast majority of 'litter' clean-up projects in a place like Mill Creek Ravine are combined efforts by the Department of City Operations and the Edmonton Police Service (EPS) to clear homeless camps from the River Valley Park system. Under the justification of "no waste on public land" and the importance of "preserv[ing] the natural areas around Edmonton" (*A New Way Home: Homelessness on Public Land* 2016) the EPS searches for homeless encampments throughout the city park system, removes individuals from their camps, and calls in the Department of City Operations to clean up the material they have left behind.

While the coordinated plan to police homeless camps in the River Valley Park system largely began in 2016, the issue of homelessness in Edmonton has a long history. By the late 1980s in Canada, a number of social conditions, most notably the rapid selling off and dismantlement of a number of governmental services including subsidized housing, combined to lead to the emergence of homelessness as a significant and highly visible social issue (Layton 2000; Hulchanski 2009). More specifically, in Prairie cities like Edmonton, homelessness did not just emerge as an endemic feature of the neoliberal dismantling of the welfare state, but emerged as part of the legacy of colonialism. Historically vulnerable populations like the Indigenous were particularly hit hard by this privatization. Edmonton's homeless population is characterized by a disproportionate number of Indigenous individuals compared to the total urban population (Hanselmann 2001). Today about 40% of the homeless population in Edmonton is Indigenous, while Indigenous individuals constitute only 6.5% of the overall population (Patrick 2014). Between 1999 and 2008, due to the combination of a booming economy and a spike in housing costs, homelessness in Edmonton tripled to over 3,000 people (Freistadt 2014). Drawn by adjacency to shelters, and opportunities to panhandle, most of this population congregated around the major commercial centers of the city, downtown Edmonton and Whyte Avenue.

The trend towards privatization of public resources did not simply strip marginalized populations of social assistance and render them impoverished and homeless. As Donald Mitchell argues, the trend toward privatization has also begun to privatize those public spaces that homeless people required to survive. While homeless individuals are defined by having no space to legally *be* except for public space, various anti-homeless laws make homelessness increasingly illegal in public (Mitchell 2001: 34). In 2009, arguing that pan-handling had gotten out of control, the EPS and local business bureaus successfully lobbied the city to pass an anti-panhandling bylaw. The bylaw, while ostensibly only in force to stop 'harassment' gave wide latitude to police to ticket and arrest homeless individuals for panhandling in busy public spaces.

Edmonton, eager to conform to the image of itself as the perfect place for business, tried to curtail the publicness of its public downtown spaces, relying on the police to produce semi-public space which segregates and criminalizes homeless activity.

After 2009, under pressure to stop panhandling, most of the homeless population began to leave the high traffic commercial areas of the city. Instead, they resettled throughout the River Valley Park system, setting up camps in the wooded areas to avoid the intrusion of police (Freistadt 2014). As one of the most overgrown of the River Valley Parks system, and within walking distance of both downtown and Whyte Avenue, Mill Creek Ravine proved particularly popular as a site for homeless camps. However, as the parks became popular for homeless encampments, locals begin complaining about the appearance of those homeless camps in their local parks, and the garbage these camps left behind. In response, the city began cracking down. In 2016, the city developed a Committee of Homelessness on Public Lands that organized strategies and communication between the EPS the Department of City Services and the Department of City Operations. Using the city bylaws that outlawed littering and camping on public property, this committee has formally developed strategies to streamline the process of clearing and cleaning the camps. In 2018 alone, over 1,800 homeless camps were cleaned up. A map of these 1,800 camps (Figure 3) shows the high number of homeless encampments in the river valley, and specifically in Mill Creek Ravine. Publicly, this removal is justified based on the necessity of "responsible environmental stewardship" (*A New Way Home: Homelessness on Public Land* 2016: 19). The presence of homeless people, and the material culture associated with homeless life is viewed as a threat to the natural health of the parks. The identity of a park like Mill Creek Ravine as a natural resource in need of conservation is an essential element in the increasing crackdown of homeless people using the space, and the increasing privatization of public space.

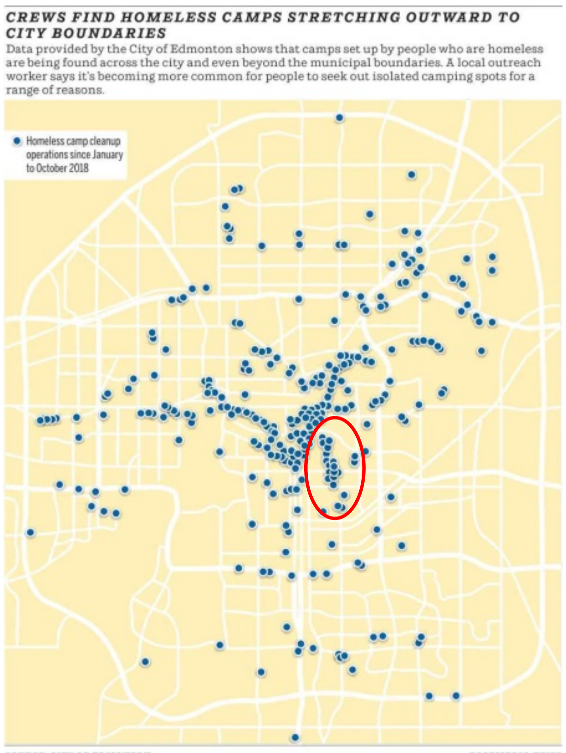


Image 5.3 A Map the areas where the city has found and removed homeless camps. Note the dense concentration of camps in Mill Creek Ravine, as well as the concentrations following the North Saskatchewan River. Map courtesy of the City of Edmonton.

Excavating Mill Creek

By law, conservation also organized my excavations of both Ross Acreage and Vogel's Meats. Since excavations took place in the River Valley Park system, my project underwent multiple reviews in order to assess potential environmental impacts. From the perspective of the environmental review, my excavations were potentially destabilizing, and ran counter to the governmental responsibility to conserve the ravine as a natural resource. Under the conditions of this review, I was mandated to not cause any lasting damage to the local environment or the landscape and to return the area to state in which I had found it. The city government put constraints on how large and deep my units could be. I was required to fill in my excavation holes with the same soil I had dug out and to replant the exact same plants I had removed or that had died as a result of excavation. All of these conditions were policed by city officials.

Excavations at Ross Acreage and Vogel's Meats were also officially sanctioned and policed by the provincial government, via the Archaeology Survey of Alberta. Officially, the goal of the project was to help uncover the industrial history of the ravine and help locate and recover any valuable historical resources from this period (Stewart 2017). Under the conditions of my archaeological permit I was required to identify, map and recover any material culture I deemed of historic value. All material culture that I determined was archaeological was to be cleaned, analyzed and conserved for posterity in the Provincial Museum. Any material culture that could not be recovered was to be left *in situ* and added to the register of provincial historic resources. If these cultural materials were deemed valuable enough to count as a historic resource, then they would be provided with legal protections that would help their conservation in the ground.

On its face, the conservation of Vogel's Meats as an important historic resource made a lot of sense. The public has largely forgotten the industrial history of Mill Creek Ravine. Instead the government uses the presumed wildness of the park as justification to crack down on the homeless population. In the face of a taken-for-granted assumption that the park is a natural place, the conservation and memorialization of Vogel's Meats could serve as a useful point of public education, providing a corrective to the purifying projects that currently dominate the use of the park. By emphasizing the industrial history of the ravine, the conservation of Vogel's Meats, could undermine the purified understanding of the landscape as an ahistoric natural space.

However, as I excavated the site of Vogel's Meat's it became clear that the logic of conservation was insufficient for understanding the material culture left behind and the landscape that had grown up around it. The logic of conservation views the material residue of the past as valuable due to its ability to embody an idealized moment from the past. In other words, this approach presumes that material remnants of the past are valuable and worth conserving if their production or use is associated with a seminal historic moment. In emphasizing the material remnants of the past as embodying the past, this approach fails to account for lively and often harmful effects these material remnants maintain in the present. In the case of excavating Vogel's Meats, instead of a collection of artifacts ready to be conserved, I found an entangled ecology where the decaying remains of early industry were intertwined with the lives of plants, worms, and humans. Rather than distinguishing between the natural and historical sides to Mill Creek Ravine, this ecology was an important part of the history of industry, an extension of this history into the present. Instead of a historic resource of the past, the early industrial waste of Mill Creek Ravine might be better understood by what Bjørnar Olsen and Þóra Pétursdóttir would call unruly heritage: material legacies of the past that persist in ways that exceed any traditional delineation "of historical succession and even chronology" and resist any purified binary of nature/culture (2016: 41). Unruly heritage exceeds the temporal expectations of pastness that conservation requires.

Decaying Industrial Remains

While still following the legal requirements of my permits, I attended to the early industrial waste of Vogel's Meats as not just artifacts from the past, but also as unruly heritage in the present. Excavations revealed these artifacts as objects slowly decaying in the soil, caught up in the “long process[es] of pulverizing, dissolving and rotting” (Douglas 2003: 160). At the Vogel’s Meats site we uncovered the foundations of two of meatpacking buildings and the meatpacking garbage pile. The concrete foundations of the main packing building, having sat in wet clay soil for over a century had turned friable, disintegrating under our trowels. In the garbage pile, a century of decay had left fragile skull bones with eye sockets run through by bundles of small white roots. Whole glass bottles shone brightly amidst the loosely packed greyish soil, as functional as the day they were produced, while fragments of thin rusted metal were completely unidentifiable. Clumps of animal hair and dirt stuck out of the unit walls, while wooden fragments of pipe stems and corroded buttons emerged intermingled with the thick carpet of bones.

Image 5.4 Unit 3 Level 5 Mid. Note the high concentration of lower limb bones and mandibles. Photo by author.

This decay had left thick stratigraphic layers of mixed soils extending all across the site. In the garbage pile, dust from long disintegrated iron permeates a number of loosely packed soils, staining them bright orange. Spread across the northern section of the site, layers of pulverized concrete and brick lie ten to fifteen centimeters thick. Immediately to the east of the main building foundations, a thick black stratum of charcoal, burnt and fragmented bone, and clinker rests on top of thick grey clay. Carpeting the whole site, piles of vitrified clinker slowly fragment beneath the grass. These mixed soils, the byproduct of a century of decay, have been transformed by the presence of industrial artifacts. Decaying bones oozed phosphorus into the soil, while disintegrating concrete alkalinizes the surrounding soil. Vast quantities of clinker fragmented in the soil, leached heavy metals into the soil and altering its Ph.

The large quantity of clinker we recovered speaks to the ways that unruly heritage resist conservation and challenges the assumption that the material legacies of important historical moments are necessarily beneficial for the present. The persistence of clinker and other early industrial residue has transformed the bio-chemistry of the soil, often in potentially harmful and toxic ways. As a byproduct of burning coal, clinker often contains high concentrations of calcium oxide, which is highly reactive and produces alkaline solutions when in contact with water (Im-Erb et al 2004). Similarly, as concrete disintegrates in a wet environment, the lime in the cement turns the water highly alkaline. The effects of the decaying clinker and concrete are measurable in the soil. In those areas surrounding the main plant structure, the soil is dense with concrete and clinker rubble, and the average Ph level exceeds 8. A third of all soils in the vicinity of the main packing plant building had a Ph of 8.5+, definitive of highly alkaline soils. Alkaline soils have a poor structure, impede water infiltration into the soil and nutrient solubility (Peverill et al. 1999). The lack of water infiltration limits the amount of available water for plants, as well as the bioavailability of soil nutrients such as magnesium, iron, copper, zinc, and manganese.

Clinker also contains high concentrations of elements and metals found alongside coal deposits (most commonly arsenic, lead, mercury and cadmium) (Montague 2008). Three soil layers were identified with significant concentrations of clinker. These soils had notably elevated levels of heavy metal concentration in them. The concentration of cadmium in these levels was measured to 1.1ppm, over three times the average concentration of cadmium found in Alberta soils (Millenium Solutions 2016). One of soil sample, recovered directly adjacent to the packing plant floor, measured 1.85ppm of cadmium, well above the 1.4ppm legal limit for acceptable remediation levels in Alberta. The average concentration of antinomy in these dense clinker levels was 1.9ppm, over six times the mean background concentration of 0.3ppm. Beryllium was detected at an average concentration of 1.8ppm, almost four times the mean background level of 0.5ppm. Lead was detected at an average concentration of 108 ppm, over ten times the mean background level of 9.0ppm, and well above the legal limit for acceptable remediation of 70ppm (Millennium Solutions 2016).

Even in low concentrations, these elevated levels of heavy metals can have direct effects on the local ecology. Lead in the soil can stunt growth and photosynthesis in plants, effect population genetics, and harm the nervous systems of animals (Greene 1993). Some studies also suggest that elevated levels of lead can harm the life cycles of microorganisms, slowing the breakdown of organic material and the production of new soils (Greene 1993). Similarly, low levels of cadmium in the soil can be deadly for worms, limiting worm populations and, therefore, soil health (Hirano and Timae 2011). This combination of heavy metals limiting the number of worms and other microbes, alongside high soil Ph, broadly effects what kind of plants and animals can live in it. A lack of worms and microbes also effects decomposition processes, slowing down the decay of artifacts. A high soil Ph causes similar problems, limiting water availability, and the oxygenation of the soil—limiting the growth of plants but helping to preserve artifacts.

The persistence of this early industrial in the soil, and the uneven harms it spreads through the leaching of heavy metals, reflects the extension of early industrial history into the present. These harmful and uneven effects across the landscape represent the ongoing effects of Mill Creek Ravine's early industrial history. These ongoing harms of early industrial waste represent an extension of not just early industrial production, but the ongoing effects of the colonial fantasies of nature and the frontier that facilitated the sacrifice of Mill Creek Ravine's ecological health and the appropriation of the Papaschase reserve.

Growing Decay

The harms that are embodied in the toxic concentrations of heavy metals at Vogel's Meats represent one of the challenges of unruly heritage represents to the assumptions of conservation. What is the value in conserving the material legacies of the past if these materials are serving as a medium for ongoing toxic harms? How do we deal with material legacies that should be remembered, but not necessarily conserved? As geographer Caitlyn DeSilvey argues, the practice of conservation needs to be disentangled from the memory work of heritage. The current logic of conservation presumes 'historical value' (the worthiness of a material past to have its history memorialized) to be synonymous with 'worthy of conservation' (the necessity to conserve this material past for posterity). Material stability is linked with meaning and memory, while decay is linked with absence and forgetting. Rather than presuming conservation as the only appropriate way to attend to the material remains of the past, DeSilvey points out the potential of decay as an important practice of memorialization in itself:

> [T]he disintegration of structural integrity does not necessarily lead to the evacuation of meaning; processes of decay and disintegration can be culturally (as well as ecologically) productive…it is possible to look beyond loss to conceive other ways of understanding and acknowledging material change. (DeSilvey 2017: 5)

As a process of both disintegration and growth, decay should not be viewed as the erasure of history, but can be attended to in its own right as a revelation of the ongoing effects of history on the present. Instead of defining historic materials by their moment of production or use, attending to the decay of these historical materials requires a double-sided ability to track "the form of the structure and the substance that it was made of" as well as to "learn how to trace the web of relations that extended out from the substance" itself (DeSilvey 2017: 19). Instead of presuming a historic past decomposed by a natural present, the double-sided processes of decay points to the "entanglement of natural and cultural histories" that tie the present and the past together. (DeSilvey 2006:318). Attending to this decay as itself part of the history of the material culture, instead of trying to arrest decay and preserve the traces of the past as past, reveals the flaws in the presumption that 'historical resources' can be purified and extricated from their contemporary 'natural' context and defined solely by their past identity.

While the lively decay of industrial waste of Vogel's Meats has caused uneven distribution of harmful heavy metals, it has also mediated the production of new growth. The plant life of Mill Creek Ravine grows through this decay, emerging out of the alkaline soil, the heavy metals, and the ecology of microorganisms that reside in and around the industrial remains. Attention to this decay waste reveals both how the legacies of the past continues to define the present, as well as how the ecologies of the present have learned to thrive within the material legacies of the past.

To capture how this decay mediates the ecology of Mill Creek Ravine, my team mapped all of the plant species present in the areas around Vogel's Meats. The area around Vogel's was separated into four separate microhabitats. The first of these microhabitats (Zone A) is a flattened open field where the central building of Vogel's meat packing plant once stood. Zone A is a large open area that is mowed once a week by the City Parks Department and is marked by patchy grass. Extending over the buried remains of the large packing building, the soil is thick and clayey, filled with rubble and clinker, with an average Ph of 8 and elevated levels of cadmium, beryllium, lead, and antinomy. Along with the grass, the area is covered in dandelion (*Taraxacum*), ribwort plantain (*Plantago lanceolata*), and clover (*Trifolium repens*). Clover is a hardy plant that thrives in high Ph soils, and helps to add nutrients like nitrogen to the soil. Dandelion is a hardy ruderal plant species, meaning it thrives in disturbed or barren landscapes. Furthermore, due to its deep taproot, dandelions help to draw up nutrients from the otherwise nutrient poor soil and make them accessible to other plant species. Common plantain is likewise a standard ruderal species, thriving along highways and areas where the soil has been contaminated with pollutants. Common plantain is especially good at thriving in soils with high levels of heavy metals (Przedpełska and Wierzbicka 2007; Gostin 2009; Szarek-Łukaszewska and Grodzińska 2011). When planted in soils contaminated with heavy metals, plantain can bioaccumulate high concentrations of heavy metals in its leaves, helping to leach heavy metals out of the soil, but also facilitating potential toxic exposure for local animals (Nadgórska-Socha, Ptasiński, Kita 2013).

To the north of this flattened area is a slope covered in small trees and brush where the secondary buildings of Vogel's Meats were located (Zone B). Zone B is a sloped area that rises up from the mowed grassy area to the contemporary biking path. While no excavations or soil tests were done in this area, historic images identify that this was the area where buildings associated with curing, packaging, and transporting meat were located. Today the area is covered in wild flowers and grasses with sporadic tree cover further up the slope. The trees are small and spread out, mostly balsam poplar (*Populus balsamifera*) and aspen poplar (*Populus tremuloides*), with one crab-apple tree (*Malus*). In between the trees are a mix of tall grass and wild flowers including creeping bellflower (*Campanula rapunculoides*), tufted vetch (*Vicia cracca),* Canadian goldenrod (*Solidago canadensis*), and cow parsnip (*Heracleum maximum*). Of these, creeping bellflower, tufted vetch, and Canadian goldenrod are all notable for their ability to colonize cleared areas, spreading quickly and thriving in disturbed soils. Creeping bellflower is particularly noted as an aggressive plant that thrives in poor and polluted soils, and highly persistent. It is particularly hated as a noxious weed and invasive species by the provincial government, the city and the Edmonton Native Plants Group (*CBC News* July 20 2018). The trees in Zone B were young, with an age range of 10-15 years old, suggesting the area has only recently seen tree growth.

To the east of the flat grassy area is a small treed area which is where the garbage pile is located (Zone C). Growing on top of the piles of bone and metal from Vogel's Meats, Zone C is a covered with a well-established tree stand. This covering consists mainly of tall, well-established *caragana arborescens*, balsam poplar, aspen poplar and white spruce (*Picea glauca).* This covering is most dense to the north and to the south. In the middle of the area, where the garbage pile is the densest, the area has few trees but is instead covered in understory, consisting of wild rose (*Rosa acicularis*), dogwood (*Cornus sanguinea*), horsetail (*Equisetum arvense*), and some long grass. Trees in this zone suffer from leaf galls and black knot, a disease caused by a virulent fungus. Both horsetail and dogwood are common riparian plants, their presence suggests soil with good water infiltration. Good water infiltration, especially compared to Zone A, is likely due to lower Ph levels as well as the extensive root systems of caragana, wild rose, and poplars. Root systems like these create well-connected channels underground, facilitating the movement of moisture and making water and nutrients available for more plants. These root systems also reduce soil erosion, and in this area have clearly limited the erosion of the site into the creek.

The soil in Zone C is considerably less alkaline than the soil from Zone A, with an average Ph of 7.2. The difference in Ph is likely due to a lower amount of clinker and cement in Zone C compared to Zone A, as well as the increased presence of plants with deep root systems that have helped to increase water filtration capacity in the soil which has aided acidification. Unsurprisingly, plants growing in Zone C are more suited to acidic soils. Wild rose and horsetail prefer acidic soils; white spruce in particular requires neutral or acidic soil to grow. The presence of white spruce, and the significant size and age of the trees (between 20-30 years old) suggests that the Ph has been neutral for a significant period of time and that the tree stand is of a considerable age.

While Ph differed between Zone A and Zone C, concentrations of heavy metals in the soil were similar, with elevated levels of cadmium, beryllium, and antinomy. Lead concentrations are considerably higher in Zone C than Zone A, and were particularly concentrated in the top thirty centimeters of soil. High concentrations of lead in the soil significantly inhibit root growth, directly limiting the depth and length the roots can go, and the amount of nutrients they can carry (Fahr et al. 2013). Furthermore, high concentrations of lead also can produce high worm mortality (Zaltauskaite and Sodiene, 2010). By limiting root growth and worm activity, high concentrations of lead in the soil can have a retarding effect on nutrient mobility in the soil and subsequently plant growth rates. Also, it would likely retard the decomposition of the bones, metal, clinker, and wood in the garbage pile.

To the west of the main flat grassy area (Zone A) is a heavily treed patch which during the period of Vogel's Meats was used as a holding pen (Zone D). While Zone A is mowed weekly by the Department of City Operations, Zone D has been left to grow 'wild.' While historical photos of Vogel's Meats identified the area as a holding pen for stock, no archaeological materials were located through subsurface testing. Large Manitoba Maple (*Acer negundo*) trees dominate the tree stand in this zone, with a few Balsam and Aspen poplars. The maple trees are estimated to be almost 40 years old, dating back to the development of the ravine as a city park. Due to the size of the trees, the understory is thin, mainly consisting of moss and fungus growing on fallen tree debris. Near the edges of the tree stand rhubarb (*Rheum*), burdock (*Arctium*), and wildflowers like creeping bell and tufted vetch grow.

These plants represent the ongoing ecological life of early industrial waste in the present. The remnants of Vogel's Meats permeates their wood, their leaves, and their roots. This ecological life consists of both invasive species as well as native species, they are for the most part hardy species well suited to disturbed soil. In some areas they thrive in the disturbed soil, in other places they have helped to remake the soil to better suit them. Tenacious and hardy, the spread of some of these ruderal and colonizing plants reflects the way that early industrial waste has disturbed soil health. At the same time, these plants do not just reflect the effects of early industrial decay, they actively transform it. The presence of certain plants has changed the soil chemistry, as well as the rate of decay for the early industrial objects. New possibilities emerge as different plants emerge, new roots spread, and begin to mix up the soil. The growth of these plants, and the decay of associated artifacts cannot be understood simply as nature reclaiming a cultural landscape, and the ongoing presence of industrial remains in the soil cannot be understood simply as the persistence of social memory.

The Social Life of Decay

Conservation requires the active intervention, the purification of the material legacies of the past from their contemporary relations, and the arresting of the processes of decay. Decay, on the other hand, suggests non-intervention, attending to the processes of decay while allowing them to proceed unheeded (DeSilvey 2017). At the same time, a non-interventionist approach to decay cannot underemphasizes the ongoing and uneven traumas that decay is caught up in, as well as the historical forces that mediate the decay itself. An emphasis on the power of decay cannot merge into "an unthinking celebration of 'emergence' without ethical considerations about desirable futures" (Singh 2017: 2). In other words, a focus on the trajectories of decay cannot devolve into an assumption that these decaying processes are inherently beneficial. The trajectories of decay, the potential harms and growth that decay facilitates, are not the result of unmediated natural forces. Decay mediates the production and reproduction of different forms of life, both human and non-human, and does so unevenly across these forms of life. While the uneven impact of decay is not determined, it does articulate with other historical trajectories in non-arbitrary ways. Decay may require non-intervention, it also requires curation.

In mediating the growth of the trees and shrubs of Mill Creek, the lively decay of the material remains of early industry does not just undermine and complicate the purified claims of natural and historic resources, it also articulates with contemporary social uses of Mill Creek

Ravine. On the one hand, the park is frequently used recreationally, with local residents taking advantage of the greenery of the area for walks, bike riding, dog-walking etc. The mowed grass, clover, and dandelion field on top of the packing plant rubble is also the location of a picnic table and a garbage can, affording a space for family picnics. The dense foliage of the ravine also affords privacy, creating spaces within the ravine that are off the trails and hidden from prying eyes. As homeless people in Edmonton have been pushed out of the commercial areas of the city they have turned to places like Mill Creek to live.

Adjacent to the Vogel's Site, the Manitoba maples of Zone D hide the interior of the tree stand from view, while the lack of understory provides a relatively cleared, yet sheltered, area. This cleared area is littered with a few old tent stakes, glass jars and the remnants of a degraded soggy magazine from a long abandoned homeless camp. Only a few traces of this camp remain, likely cleaned up by the Department of City Operations or the Keepers of Mill Creek. In the thick mix of white spruce and caragana in Zone C, survey determined that a camp was once located right on top of the buried bones of the garbage pit. Directly south of the garbage pile, an old shopping cart was left rusting half filled with soggy books and glass bottles. Over the three years I surveyed and excavated in Mill Creek I came across dozens of homeless camps, some abandoned, others occupied. At the site of Ross Acreage, there was evidence of a homeless camp directly on the surface of the first shanty we excavated. On a small ledge hidden by dense caragana bushes, the remains of a tattered tarp and broken tent poles were crumpled next to an old jar of Cheese Whiz. When I visited the site again in 2017, a year after I finished excavating, this collection of recent detritus had been combined with a pair of pants, a soggy magazine, and a condom wrapper.

For groups like KOMCR or the EPS, these objects are trash, garbage that needs to be removed as part of the conservation of Mill Creek Ravine as a space of nature. From the perspective of decay, these objects are evidence of the ongoing social and ecological life of the decaying industrial waste from Vogel's Meats. On one hand these pants, condoms, and wet disintegrating books point to the potential dangers of life lived rough in the ravine on top of a soil that is still filled with toxins. On the other hand, they point to the affordances of the plants that grow out of the remains of early industry. Thriving in toxic soil, this ecology of hardy ruderal plants provides spaces of privacy. Disintegrating, rusting, and breaking, these objects also begin to decay in place, slowly merging into the waiting ecology that surrounds them.

Pushed out of downtown by the increasing privatization of public space in Edmonton, the homeless population now occupies campsites in a 'wild' landscape filled with hidden and decaying industrial waste. Hounded by the EPS these residents are forced to move their campsites routinely. There is a recursive historical logic to these campsites. Over a century after the shanty-town of Ross Acreage was established, the same area is now used as a campsite by marginalized and impoverished individuals. During the Great Depression the boom and bust cycle of capitalism forced the community of Ross Acreage to live rough off of a toxic landscape. Today, the pressures of privatization have forced homeless people, a group disproportionately represented by Indigenous people, to live in the same landscape, a landscape still filled with the same remains. In both cases, the accelerating forces of capital articulate with the uneven harms that emerge out of the lively decay of industrial waste. Just as in the time of Ross Acreage, this decay did not just provide new harms, but also new possibilities. While once the decaying remains of industry served as a place for salvage, now they serve as the compost for new plants that provide privacy and shelter.

Industrienatur

The material remains of Vogel's Meats are not endangered artifacts at risk of being lost, they are vitally active objects that in their decay have defined the landscape, the growth of a new ecology, and an unevenly distributed harms to local residents both human and non-human. Instead of attending to the history congealed in these remains, the various conservation projects that define Mill Creek Ravine only serve to mask the historical connections between the landscape and its industrial history. Locals concerned with the natural purity of the landscape have elided any history of the area prior to the community activism of the 1960s. Locals concerned with the historical value of the landscape have memorialized the area by its ties to technological progress and production.

An end to conservation as the organizing ethic of Mill Creek Ravine does not mean an end of the site as the locus for the memorialization of valuable history. In contrast to these conservationist projects, I suggest that Mill Creek Ravine would be better memorialized as what the Germans would call *Industrienatur*, an ecology of plants and animals that thrive in a landscape of industrial wreckage. In Germany, some industrial landscapes, like the old steel plant of Duisborg Nord, have been curated into parks that encourage the decay of the abandoned industrial buildings and the growth of new plants. Rather than distinguishing between the natural and the historical, these parks highlight the "unfamiliar link between derelict industrial sites and untamed nature" (Lange cited in Desilvey 2017: 111). By encouraging this growth and decay these parks seek to disentangle the memorialization of the material legacies of industry from overdetermined narratives of technological progress or toxic devastation. This approach takes seriously the multiple entangled histories, bodies, and relations that have taken place as part of this broader industrial history. Instead of starting at the moment of industrial production and ending with the moment of abandonment this approach views industrial history more capaciously. *Industrienatur* emphasizes the absences that industrial production created, the denials that facilitated production in the first place, as well as the various forms of growth and devastation that followed its abandonment. In rejecting the idea that industrial residue is defined by its moment of production, and in also rejecting it as a polluting remainder that should be eradicated from a natural place, *Industrienatur* takes seriously the challenges and harms that the industrial legacies of the past asserts onto the present, as well as the forms of growth it engenders and the affordances this growth provides.

Instead of identifying Mill Creek Ravine as a historic landscape, or a natural landscape, reimagining Mill Creek Ravine as a site of *Industrienatur* would be an attempt to collaborate with the lively decay of early industrial remains instead of rejecting it. If conservation is focused on identifying material legacies of the past with their specific moment of production and use, then the identification of Mill Creek Ravine as a site of *Industrienatur* is interested in memorializing the entanglement of this history of use and production with a long social and ecological afterlife, as well as the conditions of possibility that lead to its deposition. This reframing of Mill Creek Ravine as a space of *Industrienatur,* would also reframe the scope and stakes of its industrial history beyond the overdetermined moments of production and abandonment. Instead this approach would emphasize the history of the area following the collapse of industry, the multiple entangled histories, bodies, and relations that have taken place as part of this broader industrial history. It would also highlight the conditions of possibility that facilitated the rise of industry in Mill Creek in the first place, namely the appropriation of the

Papaschase reserve and the production of the landscape as a place for industrial waste. The history of the appropriation of the Papaschase reserve does not end in the 1890s, it continues, both in the ongoing communal struggles of the Papaschase people and in the early industrial waste that lines Mill Creek Ravine.

Making Mill Creek Ravine into a space *Industrianatur* would be a form of memorialization that mirrors the scope of this dissertation, one with situates the beginnings of Mill Creek Ravine as an industrial landscape not with the arrival of the train but with the appropriation of the reserve. Rather than identifying a single past, and marking this past with the conserved remains of industrial ruins, the lively decay of early industrial waste memorializes multiple different pasts and their extension into the present. Rather than emphasizing the plants that flourish in the ravine as invasive or unnatural, this approach tracks the various ruderal and weedy plants and note their history, their disruption, and their resilience to thrive in harsh and unwelcoming soils. This emphasis on decay, as well as the hopeful flourishing of weedy and resilient plants can help critique the silences of conservation, the histories of Ross Acreage and the Papaschase Reserve. At the same time, it can point forward to the ecologies of the future and potentially re-imagine what a post-Capitalocene ecology might look like. This emphasis on decay over conservation at the core of the *Industrianatur* concept reveals how early industrial waste has not just persisted in Mill Creek Ravine, it has actively formed and deformed the landscape as it decayed. It has mediated the production and reproduction of the landscape and its communities. It materially remade its soil chemistry, its ecology, as well as serving as a point of articulation with broader projects that sought to preserve it or remove it. Identifying Mill Creek Ravine as a site of *Industrianatur* reveals not just how the area has been haunted by early industrial waste, but how it has been materially possessed by it and its lively decay. It is not a natural or historical space, it is a place of *Industrinatur*, a landscape possessed by its industrial past.

Conclusion

This dissertation is focused on the ways in which early industrial waste, abandoned by long obsolescent forms of industrial production and social relations, continues to engage with the present, both materially and as an object of knowledge. Based on my research on Mill Creek Ravine, I argue that the persistence of early industrial waste mediates the production and reproduction of the landscape through its decay. The manner in which this decay mediates the landscape is what I term *lively decay*, the active engagement of the congealed histories of this discarded waste with ecologies, communities, and ways of knowing. This lively decay at once extends the history of its production into the present, as well as reflects upon its relations of production in the past. The double-sided nature of the lively decay of early industrial waste at once both materially distributes harms and growth across the landscape, as well as emerges as a visible remnant to be regulated as a historic resource or a polluting contaminant. Identifying the persistence of early industrial waste as an ongoing feature of life in the Capitalocene, my research reveals the haunting persistence of early industrialization and its associated projects, namely colonial settlement and appropriation.

Aftershocks

In 2008, following the Supreme Court ruling against the Papaschase, the Papaschase legal strategy shifted from focusing primarily on restitution for their appropriated reserve, to one that sought recognition from a variety of governing bodies. In 2016 the band was officially recognized by the City of Edmonton, and in 2018 the band was officially recognized as a member of the Assembly of First Nations. This process, combined with the rising consciousness over Indigenous issues across Canada tied to the *Idle No More Movement* and the *Truth and*

Reconciliation commission, has led to increased public exposure for the Papaschase community. Today, the Papaschase are still seeking compensation for their appropriated reserve, asking for restitution monies, as well as a negotiated return of some of the land from IR 136 so that the Papaschase can re-establish an urban reserve and community in Southern Edmonton (Bruneau n.d.). No longer the industrial epicenter it once was, Mill Creek Ravine is largely absent from these discussions of compensation. Instead, the Papaschase are looking further south, closer to the inner suburbs and industrial parts of the south side. The history of the reserve, on the other hand, is still vitally important in this struggle. For Chief Calvin Bruneau, raising awareness of that history is the most important step, since "the government wants it forgotten" (*APTN* May 16, 2016). Through the raising of awareness, the band hopes to eventually pressure the federal Canadian government to grant them official band status, which would potentially allow them to re-open the restitution court case or open new negotiations (*CBC News* Dec 8, 2018).

This ongoing denial of Papaschase rights, and the ongoing legal fight, represents one example of how the practices of colonial dispossession still structure Indigenous life in contemporary Canada. More specifically it presents an example of how a very specific form of colonial dispossession—the appropriation of the Papaschase Reserve—continues to dispossess the Papaschase of their land and resources. For Chief Bruneau, the goal of the Canadian government is to forget this dispossession ever happened, to silence the history of dispossession as a long-faded memory from a distant past. As Glenn Coulthard argues, this temporal distancing is foundational to the ideology of a Canadian state that situates the "abuses of settler colonialism firmly in the past" (2014: 22). For the government, armed with legal statues of limitations, the dispossession is long settled, part of the (static) historical past, not the present.

Through forgetting, through this temporal distancing, the ongoing persistence of colonial abuses are pushed aside as mistakes of the past. This elision of the persistence of colonial forms in the present is not just due to the motivated reasoning of the state but is also due to a fundamental presumption of "the relationship between colonial pasts and postcolonial presents" (Stoler 2013: 7). As Ann Stoler argues, academic scholarship has become complacent with assumptions about what colonialism looks like in the past, and what its persistent legacies look like in the present. Stoler urges attention towards the persistent lives of debris from less obvious remains, to move away from the overt ruins of empire and look towards the residues that remain following the "aftershocks of imperial assault" (2013: 9). The ongoing dispossession of the Papaschase is an overt example of the persistence of imperial violence. However, the aftershocks of the appropriation of the Papaschase Reserve continue to reverberate and persist in other ways.

As my dissertation illustrates, the lively decay of early industrial waste in Mill Creek Ravine represents one of the aftershocks of this appropriation: an extension of early industrial production and a residue of the colonial and capitalist fantasies that produced it. As the waste from this industry decayed over the past century it articulated with different attempts to make and remake Mill Creek Ravine, it re-organized the reproductive capacities of the communities and ecologies of the landscape, and served as a focal point for the silencing and elision of Papaschase history. The same colonial logic that fantasized Mill Creek Ravine as part of a new frontier for profit and progress also facilitated the production of the ravine as an exploitable and degradable landscape filled with industrial waste. As the toxic concentrations of heavy metals leached out of this industrial waste it defined the community of Ross Acreage through its harms. As the boom and bust cycles of capitalism made the families of Ross Acreage poorer in the late

1920s, the harmful effects of decaying waste articulated with growing pressures of social inequality. Increased poverty forced the residents of Ross Acreage to increasingly rely on the toxic landscape of Mill Creek for food, water, and salvageable material. After industry abandoned Mill Creek Ravine, the lively decay of early industrial waste articulated with an experimental colonial project that sought to remake and civilize the ecology of the Prairies. As the industrial waste was abandoned in the ravine, caragana began to spread over it. Originally selected by colonial scientists for its hardiness and its ability to civilize the wild frontier, caragana thrived amidst the decaying industrial waste—monstrously spreading across the contaminated soil and re-'naturing' the ravine. Instead of a civilized landscape, Mill Creek Ravine became a landscape of monstrous abandon, as locals began dumping their trash, and a new ecology began growing up through the accumulation of different waste from different eras. By the 1970s, new ideas about ecology and new views on industrial waste reframed Mill Creek Ravine through the logic of pollution, identifying the monstrous ecology of the ravine as nature under threat.

Due to the length of early industrial waste's persistence, new projects articulated with this waste not as waste, but as markers of history, objects that—in their decay—materialized a certain temporal ideology of past, present, and progress. The re-fashioning of Mill Creek Ravine as a park hinged upon a temporal distinction between early industrial waste and post-war pollution, a distinction that was manifest in decay itself. Despite the ongoing persistence of early industrial pollution in the creek, local community activists rendered the post-World War II history of Mill Creek Ravine as distinct from its prewar history. The detritus from early industry was defined as decaying traces of a historic past while post-war litter was defined as persistent pollution. In the process, the ongoing effects of early industrial waste in Mill Creek Ravine were disconnected from the ravine's material and historical connection to the industrialization of Edmonton and the colonial appropriation of the Papaschase reserve. Today, this temporal disconnect remains in the form of numerous local and governmental projects that attempt to conserve and police Mill Creek Ravine as both historic and natural resource. By focusing on decaying remains, such projects use the logic of conservation and the memorialization of selected parts of Mill Creek Ravine's history to segment and purify Mill Creek Ravine's relation to its past, and aid in the silencing of the Papaschase and their history.

Industrially driven settlement of the western Prairies did not just reorganize land and labor, it did so while polluting bodies and ecologies. Settler colonialism of the late nineteenth century did not just brutalize Indigenous communities and dispossess Indigenous land, it defined this land as degradable, producing landscapes that are still degraded and stripped of their social relations to this day. The violence and long-term harms of colonialism remain, not just in the structures of government, or in the drastic inequalities and generational harms suffered by Indigenous communities; it is distributed in rivers, trees, bloodstreams and historical silences. Frank Oliver's colonial logic of land appropriation is materialized in the heavy metals leaching out of decomposing clinker on the banks of Mill Creek, harming the historic community of Ross Acreage as well as contemporary population of homeless people. At the same time, the decay of this waste does not appear as a continuation of this history, but rather is mobilized as evidence of a temporal break from its moment of production. The very same early industrial waste that persists into the present has been drawn on to silence this connection between the past and the present, and to define this history as part of the distant past.

Lively Decay of the Capitalocene

The lively decay of early industrial waste has defined, deformed, and disrupted the ecologies, communities, and ways of knowing the landscape of Mill Creek ravine over the past one-hundred and twenty years. This decay of early industrial waste in Mill Creek Ravine represents an example of how long-abandoned industry and its attendant logics continue to define space in the Capitalocene. The contemporary world is beset by the ubiquitous and lively remains of seemingly dormant early industry. Through the example of Mill Creek Ravine, I show lively decay as a way though which the early industrial continues to influence space in the Capitalocene long after its deposition. While this waste may be designated as 'early' from the standpoint of industrial production, it is in no sense past, or superseded by the effects of industrial waste from the Great Acceleration. Lively decay serves as a kind of material and visible haunting of the landscape by early industrial waste, a physical haunting, a material possession that rearranges, grows, and disrupts.

Attention to the lively decay of this early industrial waste shows that the logic of industrial capitalism mediates the reproductive capacities of ecologies and landscape through the material processes of decay. Lively decay is not a transhistoric force of nature overcoming the structures of human society, rather, it is a force of history, the aftershocks of capital working its way through the world ecology. The lively decay of industrial waste at Vogel's Meats is tied to the particular histories of the flourishing of plants like caragana and creeping bellflower, the history of eroding banks, the density of worms in the soil, and the high alkalinity of the surrounding area. These trajectories of decay are not unmediated natural forces, but instead are the immanent properties of entangled multi-species relations in Mill Creek Ravine that are themselves historical. Lively decay is the historic entangling of early industrial relations of production with subsequent relations of production and reproduction. This entangling leads to toxic harms unevenly spread to marginalized communities like Ross Acreage and the contemporary homeless people, where increased pressures of poverty articulate with increased exposure to toxic heavy metals. This lively decay also leads to the obfuscation of the history behind these harms. Through the logic of heritage and conservation early industrial waste appears disconnected from contemporary ecologies and communities, while decay appears as a force of nature.

As an eminently historical force, lively decay does not just mediate the present and serve as a medium for the silences, violences, and toxic relations of the past, it also serves as a critical archive of these relations. Attention to the lively decay of this waste provides insight into the material relations and fantasies that produced this waste, as well as the idealized concepts that have been used to tame and comprehend it. Archaeologically tracking the history of multispecies relations that are sedimented in this waste serves as a way to "reliquify" the concepts of heritage, conservation, nature and culture that have "congealed" around this waste (Adorno 1973: 97). Specifically, this attention serves as a critique of the progressive temporality that organizes how the history of Mill Creek Ravine is represented and remembered and troubles the notion that once history is in the ground it is finished. The lively decay of early industrial waste resists the traditional periodizations of history and stratigraphy, it complicates any attempt to conserve or preserve a landscape like Mill Creek Ravine, and it reveals flaws in the identification of the space as natural, post-industrial, or post-colonial.

The Stakes of Waste

As my dissertation shows, the lively decay of early industrial waste does not merely mediate the present, it also projects far into the future. To paraphrase Michelle Murphy, through lively decay, the future is already altered (2013:106). In transforming the reproductive capacity of ecologies and communities, and distributing harms into the future, attention to lively decay shows the flaws of a purifying politics of heritage and conservation that seek to idealize and restore the ecology and history of the past. There is no way to simply conserve Mill Creek Ravine as a vestige of history, or to restore it as a space of nature. In the Capitalocene, every landscape, every relation "carries a history of contamination within it: purity is not an option" (Tsing 2015: 27). This contamination is not just acute and dangerous, it is also old, decayed, and in some cases flourishing, germinating strange new ecologies in long devastated places. Instead of viewing this contamination as a feature of 'the past' to be conserved, or as a pollutant to be removed, the data from Mill Creek Ravine suggest a different turn—a memorialization of the history of contamination itself, as well as a cultivation of the new monstrous ecology that grew out from it.

Instead of trying to simply remove early industrial waste and undo the injuries it has wrought, I argue for the value in revealing the inter-generational and multispecies histories of the uneven distribution of injury, while at the same time fostering the disruptive histories and ecologies that lie latent in the sediment. In these histories and in this new growth, there are seeds of hope for a reimagined future, as well as tactics of entangled survival in a world of accumulating layers of never-past waste. Following Donna Haraway, in order to capture this hope and begin to compose a better "livable world" we must start by telling different stories, better stories, multispecies stories, histories from the earth (2015). We must tell stories that reject the familiar plot lines of progress and the "purifying division of society and nature," reignite attention towards figures and objects that once stood as mere props, and instead emphasize the embeddedness of humans with the non-human (Haraway 2015; Latour 2013). We must tell stories like the appropriation of the Papaschase reserve and its ties to long-term environmental degradation and harm. We must tell stories about colonial dispossession and its ties to caragana. We must tell stories of industrial meatpacking and its ties to the flourishing ecologies of creeping bellflower and disintegrating magazines.

In the sedimented archives of early industrial waste that are distributed globally there are long narratives of unevenness and harm, but there are also relations and tactics of surviving. There are moments of devastation, but there are also moments of unexpected and disrupting growth. The liveliness of decay bound the community of Ross Acreage through its harms, but also drove new strategies of survival and salvage. The harmful persistence of waste fostered the monstrous growth of caragana across industrial ruins. Thriving in toxic soil, the deep roots of caragana protected Mill Creek Ravine against erosion and fostered the growth of a new ecology of hardy and weedy plants. Today, a strange mix of plants grow on top of the old industrial remains, a combination of hardy plants, both invasive and native. These plants both thrive in the toxic soils, as well as doing their own work in transforming the soil chemistry and facilitating water mobility.

Congealed in this sedimented industrial waste, and the plants that flourish on top of it, these are examples of what Haraway would call “wonderful messy tales” that critique the fantasies that uphold the status quo (2015: 116). The sedimented layers of multiple pasts reveal the insidious temporal loops of decay and shows the flaws in the unilinear temporal fantasy of progress. Multispecies entanglements of caragana, cattle, clinker, and cadmium push against the binary thinking that would seek a purified distinction between natural history and human history. These are not stories that are revealed for the sake of telling stories, but are histories that reveal inequalities and injuries, but also the cracks in the master narratives of progress and nature and culture. They are sites of critique as well as seeds of hope for a future where we must foster the "possibilities for getting on" (Haraway 2015: 116) in the age of the Capitalocene.

Bruno Latour calls these kind of stories earthbound stories, stories which emphasize the multispecies embeddedness of humans and the liveliness of objects once ignored as simple props (2013). Already knee deep in dirt, archaeologists can begin to tell these earthbound stories. Instead of viewing the underground as the terrain of the past, archaeologists can reorient themselves to see the entanglements of decay as both extensions and reflections of the histories they are investigating. Heavy metals leaching out of mining overburden and cadmium sedimented in creek beds are not just potential harms that require environmental protection and public awareness, they are the diagnostic artifact of our time. More than just providing a set of methods with which to interrogate the past, archaeology can seek to understand long-term harms, and if need be to help intervene in mitigating these harms. As a discipline that pokes about in the multi-species relations of decay in the ground, with an eye to the material interconnections of the past and the present, archaeology is well positioned to mobilize earth-bound stories in order to manifest different natures, different spaces, and different futures. Archaeologists can write these earthbound stories, if only they begin to see the decay for the artifacts.

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Appendix A: Excavations of Ross Acreage FjPi-170

Shovel Tests:

STP #	Depth (cm)	Result
1	50	Negative
2	50	Negative
3	20	Negative
4	50	Negative
5	50	Negative
6	50	Negative
7	40	Negative
8	50	Negative
9	70	Positive
10	60	Positive
11	60	Negative
12	40	Negative
13	50	Positive
14	50	Negative
15	50	Negative
16	40	Negative
17	50	Negative
18	50	Negative
19	50	Negative
20	40	Negative
21	50	Negative
22	70	Negative
23	50	Negative
24	50	Negative
25	60	Negative
26	45	Negative
27	50	Negative
28	50	Negative
29	50	Negative
30	50	Negative
31	40	Negative
32	45	Negative
33	45	Negative
34	50	Negative
35	50	Negative
36	50	Negative
37	30	Negative
38	50	Negative
39	45	Negative

Table A.1 STP Results

40	50	Negative
41	45	Negative
42	50	Negative
43	30	Negative
44	45	Negative
45	45	Negative
46	45	Negative
47	50	Negative
48	60	Negative
49	50	Negative
50	50	Negative

Table A.1 cont. STP Results

<u>**Artifact Lists by Material**</u>

Material	**LRF**	**Unit**	**Level**	**Area**	**Type**	**Description**	**Count**	**Weight (g)**	**Notes**	**Artifact ID**
Metal	1	1	1	1	wire nails	common nails - small	2	2.8		1
Metal	1	1	1	1	tin can	tin can fragments	1	1.5		2
Metal	2	1	2	1	lead foil	thin fragments of lead foil	3	2.3	cigarettes	3
Metal	2	1	2	1	wire nails	decking nails	7	22.5		4
Metal	2	1	2	1	wire nail	framing nail	1	13.1		5
Metal	2	1	2	1	wire nail	siding nails	1	1		6
Metal	2	1	2	1	spring	clothespin spring	1	4.6		7
Metal	2	1	2	1	tin can	tin can fragments	16	7.2		8
Metal	3	1	3	1	screw	wood screw, slit head- 1 inch long	1	1.8		9
Metal	3	1	3	1	flat metal	fragments of sheet metal	4	1.4		10
Metal	3	1	3	1	wire nail	decking nail	3	12.4		11
Metal	3	1	3	1	wire nail	decking nails- small	5	11.3		12
Metal	3	1	3	1	wire nail	siding nail	3	3.8		13
Metal	3	1	3	1	wire nail	finishing nail	4	3		14
Metal	3	1	3	1	wire nail	small wood nails	4	2.9		15
Metal	4	1	4	1	cut nail	framing nails	1	12.1		16
Metal	4	1	4	1	tin can	fragments	3	1.5		17

Metal Table A.2 Metal Artifacts Recovered from FjPi-170

Metal	4	1	4	1	wire nails	finishing nails	7	4.1		18
Metal	4	1	4	1	screw	slot head- wood screw	1	4.7		19
Metal	4	1	4	1	wire nails	common nails- small	4	7.6		20
Metal	4	1	4	1	wire nail	decking nail	1	5.1		21
Metal	4	1	4	1	flat metal	thick band	2	2.5		22
Metal	4	1	4	1	flat metal	thin circular metal piece with hole in center	1	1.6		23
Metal	4	1	4	1	wire nail	nail for metal - small	1	0.6		24
Metal	5	1	5	1	wire nails	siding nails	3	5.2		25
Metal	5	1	5	1	wire nail	decking nails	1	4.9		26
Metal	5	1	5	1	lead foil	lead foil	2	1.3	cigarettes	27
Metal	5	1	5	1	flat metal	1/2" wide metal band	1	8.7		28
Metal	5	1	5	1	flat metal	1 inch wide metal band	1	9.7	nail hole in end of band	29
Metal	6	1	6	1	wire nails	finishing nails	3	1.6		30
Metal	6	1	6	1	wire	thin wire, 3" long	2	3.1		31
Metal	6	1	6	1	lead band	thin band of lead or tin, 1/8" wide	1	0.4	very soft and pliable band	32
Metal	6	1	6	1	wire nail	decking nails	2	7.1	wood impressions on nails	33
Metal	6	1	6	1	wire nail	framing nail	1	6.4		34
Metal	6	1	6	1	tin can	tin can fragments	13	7.1		35
Metal	6	1	6	1	flat metal	metal bands w/nails	4	7.1		36
Metal	6	1	6	1	copper wire	braided copper wire covered in fabric	2	4.7	Associated with the knob and tube electric grid, in usage between the 1880s to 1930s	37
Metal	7	1	7	1	wire nail	framing nail	1	5.2		38
Metal	7	1	7	1	wire nail	small wire fragments	2	0.6		39
Metal	7	1	7	1	wire nail	thin long nail	1	2.6		40
Metal	7	1	7	1	wire nail	decking nail	1	2.5		41
Metal	8	1	8	1	tin can	tin can fragments	41	18.5		42
Metal	8	1	8	1	wire nails	siding nails	4	4.4		43

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	8	1	8	1	wire nail	roofing nail	1	2.2		44
Metal	8	1	8	1	flat metal	metal bands w/nails	5	22.3		45
Metal	10	1	8	1	wire nail	decking nails	2	7.3		46
Metal	10	1	8	1	flat metal	fragments of sheet metal	3	0.5		47
Metal	10	1	9	1	wire nail	decking nails- small	1	2.7		48
Metal	10	1	9	1	wire nail	uid fragments	3	0.5		49
Metal	14	1	10	1	wire nails	decking nails- small	2	4.3		50
Metal	12	1	11	1	tin can	fragments	2	0.7		51
Metal	15	1	12	1	wire nail	framing nail	1	5.4		52
Metal	15	1	12	1	electric wire	braided copper wire covered in fabric	1	2.5	Associated with the knob and tube electric grid, 1880-1930s	53
Metal	16	1	13	1	wire nails	decking nails	1	23.4		54
Metal	16	1	13	1	wire nail	siding nails	1	0.7		55
Metal	16	1	13	1	flat metal	UID	1	1.3		56
Metal	16	1	13	1	flat metal	bolt hole for chest	1	16.3		57
Metal	25	1	16	1	spring	closepin spring	1	4.9		58
Metal	26	1	17	1	wire nail	small siding nails	1	0.9		59
Metal	26	1	18	1	wire nail	siding nail	1	1		60
Metal	28	1	19	1	flat metal	fragments of sheet metal	12	5.1		61
Metal	29	1	20	1	flat metal	fragments of medium thick metal sheet on concrete	7	43.3		62
Metal	29	1	20	1	wire nail	siding nail	1	0.5		63
Metal	8	1	F1	1	tin can	tin can fragments	2	4.4		64
Metal	9	1	F1	1	tin can	whole tin can with lid	1	83.4		65
Metal	9	1	F1	1	wire nail	framing nail	1	15.1		66
Metal	9	1	F1	1	wire nail	decking nail	1	4.3		67
Metal	9	1	F1	1	tin can	almost complete fragments of a single tin can	57	94.5		68
Metal	13	1	F2A	1	flat metal	metal band with small nails at the ends	1	9.6		69
Metal	13	1	F2C	1	wire nails	decking nails	2	10.2		70

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	18	1	F4A	1	wire nail	decking nails	2	8.8	found in wall, associated with F4A	71
Metal	18	1	F4A	1	wire nail	decking nail	1	5.3		72
Metal	18	1	F4A	1	flat metal	thin metal band	2	1.3		73
Metal	18	1	F4B	1	wire nail	decking nail	1	4.3		74
Metal	22	1	F5	1	wire nail	framing nail	1	16.2	(originally wall cleaning)	75
Metal	22	1	F5	1	wire nail	decking nail - small	1	1	(originally wall cleaning)	76
Metal	25	1	F6	1	wire nail	decking nail	1	4		77
Metal	25	1	F6	1	flat metal	fragments of sheet metal	1	2		78
Metal	17	2	1	1	wire nails	decking nails	1	4.2		79
Metal	17	2	1	1	wire nails	common nails - small	1	1.8		80
Metal	17	2	1	1	wire nails	siding nails	5	5		81
Metal	20	2	2	1	wire nail	framing nail	1	6.7		82
Metal	20	2	2	1	wire nail	decking nail	2	4		83
Metal	20	2	2	1	wire nail	siding nail	2	3.2		84
Metal	20	2	2	1	lead foil	single chunk of lead foil	1	1.5		85
Metal	30	2	3	1	wire nail	framing nail	1	7.9		86
Metal	30	2	3	1	wire nail	finishing nail	1	1.9		87
Metal	30	2	3	1	wire nail	finishing nail-small	2	1.2		88
Metal	30	2	3	1	wire nail	roofing nail-small	1	0.4		89
Metal	32	3	1	2	aluminum can	olympic beer can	1	46.9		90
Metal	33	3	2	2	wire nail	decking nails	2	9.4		91
Metal	33	3	2	2	bottle cap	bottle cap	1	3.4		92
Metal	33	3	2	2	wire nail	uid fragments	3	1		93
Metal	34	3	3	2	aluminum foil	shiny piece-small	1	0.1		94
Metal	34	3	3	2	wire nail	uid fragments	3	3.4		95
Metal	34	3	3	2	flat metal	stainless steel clip	1	42.5		96

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	34	3	3	2	iron knob	heavy duty knob	2	54.6		97
Metal	34	3	3	2	wire nail	framing nail	3	15.2		98
Metal	35	3	4	2	UID iron knob	knob end of pipe that tapers at the end	1	35		99
Metal	35	3	4	2	wire nail	very degraded	1	1.1		100
Metal	36	3	5	2	wire nail	decking nails	1	3.4		101
Metal	37	3	6	2	barbed wire	3 pieces of wire with barbs on it	3	11		102
Metal	37	3	6	2	wire nail	siding nails	2	1.8		103
Metal	38	3	7	2	wire nail	box nail	1	1.2		104
Metal	38	3	7	2	wire nail	common nail	3	12		105
Metal	40	3	9	2	wire nail	finishing nail	1	1.9		106
Metal	40	3	9	2	wire nail	common nail-wood attached	4	12.8		107
Metal	40	3	9	2	wire nail	finishing nail	1	0.1		108
Metal	41	3	10	2	wire nail	framing nail	1	6.1		109
Metal	42	3	11	2	flat metal	fragments of sheet metal	5	1.9		110
Metal	42	3	11	2	wire nail	roofing nail	1	0.4		111
Metal	42	3	11	2	wire nail	decking nail	2	7.5		112
Metal	42	3	11	2	wire nail	small sized common nail	3	3.2		113
Metal	43	3	12	2	wire nail	finishing nails	27	19.3		114
Metal	43	3	12	2	wire nail	siding nail	2	3.2		115
Metal	43	3	12	2	screw	slot head-machine screw	1	2.3		116
Metal	43	3	12	2	wire nail	decking nail	6	15.5		117
Metal	43	3	12	2	flat metal	fragments of sheet metal	1	1		118
Metal	43	3	12	2	bolt	bulky thick bolthead	1	9.1		119
Metal	43	3	12	2	wire nail	uid fragments	17	8		120
Metal	44	3	13	2	wire nail	siding nail	3	2.2		121
Metal	44	3	13	2	wire nail	UID frags	5	1.6		122

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	44	3	13	2	wire nail	framing nail	1	6.1		123
Metal	46	3	14	2	wheel	small metal chair-wheel	1	109.9		124
Metal	46	3	14	2	wire nails	common nails- small	3	3.4		125
Metal	46	3	14	2	wire nail	decking nail	1	2.2		126
Metal	46	3	14	2	bolt	large bolt in two pieces	2	49.5		127
Metal	47	3	15	2	wire	long thick fencing wire 40cm long	1	50.7		128
Metal	47	3	15	2	wire nail	common nails- small	8	7.5		129
Metal	47	3	15	2	wire nail	uid fragments	1	2.3		130
Metal	53	4	1	1	wire	long wire section	1	4.3		131
Metal	53	4	1	1	lead foil	clumps of lead foil	4	9.6	cigarettes	132
Metal	53	4	1	1	razor head	metal head of razor	1	3.6		133
Metal	53	4	1	1	wire handle	wire handle (fly swatter)	1	4.9		134
Metal	53	4	1	1	wire nails	decking nail	2	6.8		135
Metal	53	4	1	1	wire nail	common nails - small	3	2.9		136
Metal	53	4	1	1	wire nails	metal tack - small	1	0.7		137
Metal	54	4	2	1	wire nail	decking nail	5	16.4		138
Metal	54	4	2	1	wire nail	common nails-small	4	3.3		139
Metal	54	4	2	1	wire nail	wire fragments	2	2.1		140
Metal	54	4	2	1	lead foil	crumpled foil	1	0.4	cigarettes	141
Metal	54	4	2	1	tin	tin can fragments	2	0.8		142
Metal	54	4	2	1	wire nail	framing nail - large	1	48.3		143
Metal	54	4	2	1	wire nails	finishing nail - long	2	5.6		144
Metal	55	4	3	1	lead	melted lead lump	1	5		145
Metal	55	4	3	1	lead foil	bunched up foil	3	3.2		146
Metal	55	4	3	1	piping	thin curved piping with external threading on one end	1	4.6		147
Metal	55	4	3	1	washer	washer	1	2.9		148
Metal	55	4	3	1	screw	slit head wood screw	1	2.7		149

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	55	4	3	1	tin can	tin can fragments	3	2.4		150
Metal	55	4	3	1	cut nails	finishing nail - small	1	0.4		151
Metal	55	4	3	1	wire nails	box nail - short	8	10.4		152
Metal	55	4	3	1	wire nails	decking nail	8	29.7		153
Metal	55	4	3	1	wire nails	UID fragments	4	2.5		154
Metal	55	4	3	1	wire nail	framing nail	1	10.4		155
Metal	55	4	3	1	wire nails	decking nail	4	12.1		156
Metal	55	4	3	1	wire nails	finishing nail	2	2.6		157
Metal	55	4	3	1	wire nails	siding nail	7	6.3		158
Metal	55	4	3	1	wire nails	finishing nail	1	0.4		159
Metal	56	4	4	1	wire nail	long siding nails	2	3		160
Metal	56	4	4	1	wire nail	siding nail	5	4.4		161
Metal	56	4	4	1	wire nail	decking nails 2" long	15	33.6		162
Metal	56	4	4	1	wire nail	small 1" common nail	9	7.1		163
Metal	56	4	4	1	rail spike	railroad spike - short	1	249.9		164
Metal	56	4	4	1	wire nail	framing nail-4" long	1	14.8		165
Metal	56	4	4	1	wire nails	framing nails- 2.5" long	16	69.7		166
Metal	56	4	4	1	wire nail	wood nails- small 1 1/4"	33	30.8		167
Metal	56	4	4	1	wire nail	corrogated tin roofing nails	2	5.2		168
Metal	56	4	4	1	screw	slit head wood screw	1	2.8		169
Metal	56	4	4	1	wire nail	short metal tack	1	0.5		170
Metal	56	4	4	1	wire nail	short decking nail	3	4.6		171
Metal	56	4	4	1	wire nails	UID fragments	16	8.2		172
Metal	56	4	4	1	wire nails	finishing nail	1	0.3		173
Metal	56	4	4	1	tin can	tin can fragments	25	9.5		174
Metal	56	4	4	1	flat metal	flat metal fragments folded onto themselves	17	12.8		175
Metal	56	4	4	1	metal clamp	one half of a rounded metal clamp	1	23.4	potentially a wire clamp.	176

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	56	4	4	1	tin can	tin can fragments - 1 MNV	17	15.9		177
Metal	56	4	4	1	cut nails	wood nail, medium sized	1	5.1		178
Metal	56	4	4	1	wire nail	framing nail - large	1	15		179
Metal	56	4	4	1	UID	rusted mechanical device	2	2.3		180
Metal	56	4	4	1	wire nails	siding nails	2	1.7		181
Metal	56	4	4	1	wire nails	finishing nail - small	4	1.3		182
Metal	56	4	4	1	wire nails	finishing nail - large, 3" long	1	4.5		183
Metal	56	4	4	1	wire nail	finishing nail - large, 2.5" long	1	2.6		184
Metal	56	4	4	1	wire nails	roofing nails	1	1.8		185
Metal	56	4	4	1	wire nails	common nails - small	3	1.7		186
Metal	56	4	4	1	wire nails	common nails- small	10	8		187
Metal	56	4	4	1	wire nails	box nail - short	8	6.8		188
Metal	56	4	4	1	wire nails	uid fragments	4	1.3		189
Metal	56	4	4	1	wire nails	decking nails	5	10.2		190
Metal	57	4	4	1	wire nails	siding nails	9	8.6		191
Metal	57	4	4	1	wire nails	siding nails-small	7	6		192
Metal	57	4	4	1	wire nails	decking nail	5	14.6		193
Metal	57	4	4	1	wire nails	uid fragments	10	5.6		194
Metal	57	4	4	1	wire nails	framing nail	1	5.7		195
Metal	57	4	4	1	tin can	tin can fragments	2	1.2		196
Metal	57	4	4	1	UID rusted	UID	1	1.9		197
Metal	57	4	4	1	wire nail	common wood nail-small	5	6		198
Metal	57	4	4	1	wire nail	common nail	3	4.5		199
Metal	59	4	5	1	wire nail	framing nail - large	1	15		200
Metal	59	4	5	1	wire nail	short metal furniture tack	1	0.4		201
Metal	59	4	5	1	wire nail	decking nail	2	6.3		202
Metal	59	4	5	1	wire nail	siding nail	1	1		203

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	59	4	5	1	flat metal	thin metal band	4	15.1		204
Metal	59	4	5	1	tin can	tin can fragments	57	31.7		205
Metal	59	4	5	1	cut nail	wood nail, medium sized	1	4.7		206
Metal	59	4	5	1	wire nails	decking nail - small	6	11		207
Metal	59	4	5	1	screw	wood screw, slit head	1	3.8		208
Metal	59	4	5	1	wire nails	decking nail	9	43		209
Metal	59	4	5	1	wire nails	uid fragments	23	21.2	4 nails curved like fishhooks	210
Metal	59	4	5	1	wire nails	common nails - small	7	3		211
Metal	60	4	6	1	lead foil	lead foil fragments	3	1.3		212
Metal	60	4	6	1	spring	closepin spring	1	4.3		213
Metal	60	4	6	1	tin can	tin can fragments	23	10.4		214
Metal	60	4	6	1	wire nail	framing nail	1	10.6		215
Metal	60	4	6	1	wire nail	decking nail	3	13.1		216
Metal	60	4	6	1	wire nails	siding nail	6	4		217
Metal	60	4	6	1	wire nails	common nails - small	5	4.9		218
Metal	60	4	6	1	wire	nail/wire fragments	3	1.5		219
Metal	60	4	6	1	wire nail	decking nails- small	8	11.3		220
Metal	62	4	8	1	tin can	tin can fragments	3	1.1		221
Metal	62	4	8	1	wire nail	uid fragments	5	2		222
Metal	62	4	8	1	wire nail	siding nail	1	0.8		223
Metal	62	4	8	1	wire nail	finishing nail	1	1.4		224
Metal	62	4	8	1	flat metal	steel roof triangle	1	28.3		225
Metal	62	4	8	1	wire nails	roofing nails	1	2		226
Metal	62	4	8	1	flat metal	thin metal band	7	3.1		227
Metal	62	4	8	1	wire nails	decking nail	5	4		228
Metal	62	4	8	1	wire nails	decking nail - small	5	9		229
Metal	62	4	8	1	wire nails	finishing nail - large	1	2.2		230

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	62	4	8	1	wire nails	siding nails	4	2.6		231
Metal	62	4	8	1	tin can	tin can fragments	78	47.1		232
Metal	62	4	8	1	wire	copper wire- frayed	1	0.7		233
Metal	62	4	8	1	lead foil	crumpled up	4	14.2		234
Metal	63	4	9	1	flat metal	bent metal sheet	1	4.8		235
Metal	63	4	9	1	wire nail	decking nail	5	19.5		236
Metal	63	4	9	1	wire nail	framing nail	1	15.5		237
Metal	63	4	9	1	flat metal	metal band with small nails at the ends	1	1		238
Metal	63	4	9	1	tin can	tin can fragments - 1 MNV	2	1.5		239
Metal	63	4	9	1	wire nails	uid fragments	3	2.8		240
Metal	63	4	9	1	wire nails	decking nail	5	19.6		241
Metal	63	4	9	1	wire nails	siding nail	12	10.4		242
Metal	63	4	9	1	wire nail	siding nails - large	7	6		243
Metal	63	4	9	1	wire nails	decking nail - small	7	14.7		244
Metal	65	4	10	1	wire nail	siding nail	1	0.3		245
Metal	65	4	10	1	tin can	tin can fragments	3	1.7		246
Metal	66	4	11	1	tin can	tin can fragments	15	17.8	1 tin can MNV	247
Metal	66	4	11	1	wire nails	framing nail	1	14.4		248
Metal	66	4	11	1	screw	slit head wood screw	1	2.4		249
Metal	66	4	11	1	wire nails	decking nail	1	3		250
Metal	66	4	11	1	trap	small game leg trap	1	19.3		251
Metal	66	4	11	1	wire nail	framing nail	1	14.4		252
Metal	66	4	11	1	wire	thin short wire	1	1		253
Metal	66	4	11	1	wire nails	decking nail	2	5.9		254
Metal	66	4	11	1	wire nails	siding nail	1	0.7		255
Metal	66	4	11	1	lead foil	crumpled piece of lead foil	1	2.2		256
Metal	67	4	12	1	wire nails	framing nail - large	1	48.2		257

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	67	4	12	1	tin can	tin can fragments	2	1.4		258
Metal	67	4	12	1	cut nail	wood nail, medium sized	1	1.9		259
Metal	67	4	12	1	wire nails	decking nail	1	3.7		260
Metal	67	4	12	1	wire nails	siding nail	3	1.7		261
Metal	69	4	13	1	wire nails	siding nails	3	2.7		262
Metal	69	4	13	1	wire nail	decking nail	1	3.5		263
Metal	70	4	14	1	wire nail	roofing nail	1	2.2		264
Metal	70	4	14	1	wire nail	decking nails- small	3	6		265
Metal	70	4	14	1	wire nail	siding nails	6	5.3		266
Metal	70	4	14	1	wire nail	decking nails	3	13.1		267
Metal	70	4	14	1	wire nail	framing nails-large	1	30.3		268
Metal	70	4	14	1	copper wire	solid copper wire	1	2.3		269
Metal	70	4	14	1	shiny steel	hollow tube	1	0.6		270
Metal	74	4	17	1	wire	thin piece of wire	1	2.3		271
Metal	74	4	17	1	metal bands	folded bands of sheet metal	6	10		272
Metal	74	4	17	1	screw	wood screw, slit head	1	1.3		273
Metal	74	4	17	1	wire nails	common nails - small	1	1.3		274
Metal	80	4	21	1	wire nail	decking nail	1	4.2		275
Metal	80	4	21	1	wire nail	UID frag	2	0.6		276
Metal	82	4	22	1	wire	thin pieces of wire	2	0.6		277
Metal	82	4	22	1	wire nails	decking nails- small	6	8.8		278
Metal	82	4	22	1	wire nails	decking nails- large	4	16		279
Metal	82	4	22	1	wire nails	UID frag	3	2.3		280
Metal	82	4	22	1	wire nails	siding nail	1	0.5		281
Metal	82	4	22	1	wire nails	box nail- small round head	1	1.7		282
Metal	85	4	23	1	wire	short piece of wire	1	1.8		283
Metal	85	4	23	1	wire clip	clip for electrical wiring	1	1.6		284

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	93	4	25	1	wire	short wire	1	1.5		285
Metal	93	4	25	1	lead	small lead rod covered in concrete	1	1.1		286
Metal	100	4	30	1	wire nail	decking nail	1	4.6		287
Metal	103	4	33	1	flat metal	metal sheet folded onto itself for metal bands	4	5.8		288
Metal	103	4	33	1	flat metal	fragments of sheet metal	13	4.6		289
Metal	108	4	36	1	metal rod	uid thick metal rod	1	42.1		290
Metal	108	4	36	1	cut nail	2" long - thin guage	1	1.5		291
Metal	60	4	6I	1	lead foil	lead foil-2 small chunks	2	7	cigarettes	292
Metal	60	4	6I	1	metal cap	bottle cap	1	4.3		293
Metal	60	4	6I	1	wire nails	decking nail	6	23.3		294
Metal	60	4	6I	1	wire nails	siding nails	6	5.5		295
Metal	60	4	6I	1	wire nails	siding nails-small	5	3.7		296
Metal	60	4	6I	1	wire nails	finishing nail	2	0.8		297
Metal	60	4	6I	1	flat metal	sheet metal curves into tube	1	7.5		298
Metal	60	4	6I	1	tin can	tin can fragments	40	23.4		299
Metal	62	4	8I	1	tin can	tin can fragments	17	14.3		300
Metal	62	4	8I	1	cut nail	small 1 1/2" cut nails	1	1.2		301
Metal	57	4	F1	1	wire	6" of thin wire	1	3.7		302
Metal	57	4	F1	1	wire nail	framing nail	1	11.5		303
Metal	57	4	F1	1	wire nails	decking nail	4	15		304
Metal	57	4	F1	1	wire nails	siding nail	3	2.5		305
Metal	57	4	F1	1	wire nails	common nails - small	1	0.7		306
Metal	57	4	F1	1	tin can	tin can fragments	3	0.6		307
Metal	58	4	F2	1	lead foil	small piece	1	0.2	cigarettes	308
Metal	58	4	F2	1	wire nail	decking nail	1	1.9		309
Metal	58	4	F3	1	tin can	tin can fragments	56	62.5		310
Metal	110	4	F4	1	wire nail	siding nail	1	1.3		311

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	wall clean	4	PL9E	1	copper wire	thick unbraided	2	16.6		312
Metal	61	5	1	1	metal pole	triangular solid metal pole	1	43.8		313
Metal	61	5	1	1	wire nails	decking nail	10	42.8		314
Metal	61	5	1	1	wire nails	decking nail	4	10		315
Metal	61	5	1	1	flat metal	flat metal band	5	5.9		316
Metal	61	5	1	1	wire nails	framing nail	2	32.3		317
Metal	61	5	1	1	wire nails	siding nail	2	1.6		318
Metal	61	5	1	1	wire nails	UID nail frags	4	4.3		319
Metal	61	5	1	1	metal sheet	slightly curved	3	4.6		320
Metal	61	5	1	1	wire clip	small wire clip	1	0.5		321
Metal	65	5	2	1	lead foil	crumpled piece of lead foil	1	0.8		322
Metal	65	5	2	1	wire nails	decking nails	4	19.3		323
Metal	65	5	2	1	wire nail	finishing nail	2	3.9		324
Metal	65	5	2	1	wire nails	finishing nail - large	1	4.7		325
Metal	65	5	2	1	wire nails	framing nail	1	14		326
Metal	65	5	2	1	wire nails	uid fragments	4	1.3		327
Metal	65	5	2	1	tin can	tin can fragments	3	1.6		328
Metal	68	5	3	1	wire nail	framing nail - large	1	16.9		329
Metal	68	5	3	1	wire nail	decking nails- large	7	30.8		330
Metal	68	5	3	1	wire nails	decking nails - medium	9	22		331
Metal	68	5	3	1	wire nails	decking nail - small	9	19.9		332
Metal	68	5	3	1	wire nails	siding nail	20	17.6		333
Metal	68	5	3	1	wire nails	finishing nail	6	7.2		334
Metal	68	5	3	1	wire nail	roofing nail	1	2.5		335
Metal	68	5	3	1	flat metal	metal bracket fragments	12	19.2		336
Metal	68	5	3	1	spring	closepin spring	1	4.6		337
Metal	68	5	3	1	wire nails	UID fragments	10	4		338

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	68	5	3	1	wire	very thin wire	2	0.3		339
Metal	71	5	4	1	metal pipe	solid metal pipe - U shape	1	9.8		340
Metal	71	5	4	1	wire nails	decking nail	4	14.8		341
Metal	71	5	4	1	wire nails	common nails - small	2	0.8		342
Metal	78	6	1	1	wire	thick iron wire	1	22.6		343
Metal	81	6	2	1	stake	metal stake - large	1	95.4		344
Metal	81	6	2	1	wire nails	decking nails	2	8		345
Metal	97	6	5	1	wire nail	nail fragments	2	0.8		346
Metal	97	6	5	1	cut nail	nail fragments	1	0.4		347
Metal	99	7	3	2	aluminum foil	crumpled up chunk	1	0.8	TPQ 1920s	348
Metal	99	7	3	2	pipe fitting	short radius threaded elbow	1	97.7		349
Metal	99	7	3	2	wire nail	nails for laminate- very small	1	0.3		350
Metal	99	7	3	2	wire nail	finishing nails	2	1		351
Metal	99	7	3	2	wire nail	framing nail, one large, one medium	2	20.5		352
Metal	99	7	3	2	wire nail	decking nail-small	1	2.9		353
Metal	111	7	4	2	aluminum foil	aluminum foil	1	0.7	TPQ 1920s	354
Metal	111	7	4	2	nut	square nut	1	5		355
Metal	111	7	4	2	wire nails	decking nails	3	9.3		356
Metal	111	7	4	2	wire nails	decking nails	4	7.9		357
Metal	111	7	4	2	wire nail	siding nail	7	42.2		358
Metal	111	7	4	2	wire nails	uid fragments	9	5.1		359
Metal	111	7	4	2	flat metal	uid	1	1.1		360
Metal	111	7	4	2	copper wire	very thin wire, potentially for decorative purpose	1	1.2		361
Metal	112	7	5	2	wire nail	UID frags	6	4.7		362
Metal	112	7	5	2	wire nail	UID-potential framing nail	1	5.4		363
Metal	113	7	6	2	wire nail	framing nail	1	17.7		364
Metal	113	7	6	2	flat metal	metal bands	4	23.5		365

Metal Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Metal	113	7	6	2	wire nail	decking nail	1	4.3		366
Metal	113	7	6	2	wire nail	UID frags	8	6.4		367
Metal	89	7	7	2	wire nail	decking nail	1	1.9		368
Metal	114	7	7	2	pipe fitting	3/4" threaded pipe union male-to-male	1	72		369
Metal	114	7	7	2	wire nail	decking nails	3	16.4		370
Metal	114	7	7	2	wire nail	UID frag	14	25.8		371
Metal	114	7	7	2	wire nail	siding nails	1	0.5		372
Metal	114	7	7	2	wire nail	metal sheet nail- small	1	0.4		373
Metal	117	7	10	2	sheet metal	UID	8	3.7		374
Metal	117	7	10	2	wire nail	UID frag	1	0.9		375
Metal	118	7	11	2	wire nails	siding nails	1	1.8		376
Metal	118	7	11	2	wire nails	decking nails	2	8.2		377
Metal	118	7	11	2	wire nails	UID frags	1	1.7		378
Metal	119	7	12	2	wire nail	UID frag	1	1.4		379
Metal	122	7	15	2	wire nail	framing nail	1	18		380

Table A.2 cont. Metal Artifacts Recovered from FjPi-170

Rubble

Material	**LRF**	**Unit**	**Level**	**Area**	**Type**	**Description**	**Count**	**Weight (g)**	**Notes**	**Artifact ID**
Rubble	1	1	1	1	brick	flakes of brick	3	6.7		409
Rubble	1	1	1	1	burnt clay/coal	single piece: brown to orange	1	2.4		410
Rubble	1	1	1	1	burnt conglomerate	glassy black and bubbly	2	1.9		411
Rubble	1	1	1	1	white blob	4 pieces of crumbly white blobs	4	3.9		412
Rubble	1	1	1	1	wood	four pieces of unburnt wood	4	0.4		413
Rubble	2	1	2	1	burnt clay/coal	3 pieces of orange to black	3	4.8		414
Rubble	2	1	2	1	burnt conglomerate	8 pieces of burnt dirt mixed w/ glassy dirt	8	15.5		415
Rubble	2	1	2	1	burnt rubber/asphalt	large chunk of burnt black rubber on wood	1	5.1		416
Rubble	2	1	2	1	shell	mother of pearl	1	<0.1		417

Table A.3 Rubble recovered from FjPi-170

Rubble	2	1	2	1	snail shell	snail shells	3	<0.1		418
Rubble	2	1	2	1	white blobs	ten small blobs	10	34.2		419
Rubble	3	1	3	1	burnt clay/coal	5 small pieces grey to orange	5	5.6		420
Rubble	3	1	3	1	burnt coal	3 large pieces	3	56.6		421
Rubble	3	1	3	1	burnt wood	one piece burned	1	0.4		422
Rubble	3	1	3	1	shell	snail shell	1	<0.1		423
Rubble	3	1	3	1	shell	mother of pearl	1	<0.1		424
Rubble	3	1	3	1	white blobs	several white blobs	27	92		425
Rubble	4	1	4	1	burnt clay/coal	white coal w/ glassy and bubbly outside	6	30.4		426
Rubble	4	1	4	1	burnt clay/coal	5 pieces of burnt coal clay- orange to grey	5	18.4		427
Rubble	4	1	4	1	burnt coal	slightly burnt pieces of coal	11	48.3		428
Rubble	4	1	4	1	burnt rubber conglomerate	black rubbery conglomerate, melted asphalt/rubber	1	25.9		429
Rubble	4	1	4	1	cloth	a few chunks of layered cloth	4	11.5		430
Rubble	4	1	4	1	plastic	thin yellow soft plastic	1	0.3		431
Rubble	4	1	4	1	quartzite flake	lithic flake	1	0.2		432
Rubble	4	1	4	1	shell	3 pieces of mother of pearl shell	3	0.2		433
Rubble	4	1	4	1	white blob	6 small chunks of white blobs	6	23.8		434
Rubble	4	1	4	1	white blobs	ten pieces of small crumbly blobs	10	34.1		435
Rubble	6	1	6	1	burnt clay/coal	2 pieces	2	1.1		436
Rubble	6	1	6	1	burnt conglomerate	3 large chunks of glassy conglomerate	3	123.6		437
Rubble	6	1	6	1	rubber	thin flat pieces of rubber	5	3.7		438
Rubble	6	1	6	1	white blob	3 small pieces	3	12.9		439
Rubble	7	1	7	1	burnt coal	1 large piece of coal	1	31.1		440
Rubble	7	1	7	1	burnt conglomerate	1 piece of glassy and bubbly	1	14.7		441
Rubble	7	1	7	1	burnt rubber/ asphalt	single piece	1	5.4		442
Rubble	7	1	7	1	white blob	one piece of blob	1	2.2		443
Rubble	8	1	8	1	burnt clay/coal	orange to grey black	8	6.8		444
Rubble	10	1	8	1	burnt conglomerate	4 pieces of blackish brown burnt conglomerate	4	29.2		445

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	10	1	8	1	burnt wood	6 sizeable chunks of burn wood	6	2.3		446
Rubble	8	1	8	1	charcoal	9 pieces of completely burnt wood	9	2.5		447
Rubble	10	1	8	1	coal	2 small pieces of coal	2	0.7		448
Rubble	8	1	8	1	leather	soft leather	1	<0.1		449
Rubble	8	1	8	1	paper	grey clumps of disintegrating paper	5	8.3	paper	450
Rubble	10	1	8	1	paper	small grey piece of disintegrating paper	4	0.3	paper	451
Rubble	8	1	8	1	white blob	single chunk	1	1.8		452
Rubble	10	1	8	1	white blob	20 pieces of small blobs	20	21.8		453
Rubble	11	1	9	1	burnt conglomerate	1 piece of glassy and bubbly	1	7.1		454
Rubble	11	1	9	1	white blob	6 white blobs	6	6.4		455
Rubble	14	1	10	1	white blob	large single chunk	1	18.6		456
Rubble	14	1	10	1	wood	rotting chunks of wood	5	2.6		457
Rubble	15	1	12	1	white blob	one blob	1	1		458
Rubble	15	1	12	1	wood	7 small pieces of unburnt wood	7	1.4		459
Rubble	16	1	13	1	burnt conglomerate	glassy and bubbly reddish to black dirt	8	4		460
Rubble	16	1	13	1	coal	1 large chunk w/ small flakes	1	38.2		461
Rubble	16	1	13	1	rubber	thin flat pieces of rubber	3	2.7		462
Rubble	16	1	13	1	white blobs	five chunks	5	31.1		463
Rubble	16	1	13	1	wood	small thin chunks of wood	4	4.2		464
Rubble	23	1	15	1	coal	one small piece of coal	1	2		465
Rubble	23	1	15	1	paper	a few small chunks of paper	8	2.6	paper	466
Rubble	25	1	16	1	paper	large chunks of disintegrating paper	18	100.8		467
Rubble	25	1	16	1	white blobs	3 white blobs	3	2.1		468
Rubble	26	1	17	1	colorful fabric	white and reddish brown	23	1		469
Rubble	26	1	17	1	white blob	3 small blobs	3	4.7		470
Rubble	26	1	17	1	wood	3 pieces of wood	3	2		471
Rubble	26	1	18	1	colorful fabric	reddish brown on white	8	0.1		472
Rubble	26	1	18	1	white blob	one blob	1	2.4		473
Rubble	28	1	19	1	coal	one piece unburnt coal	1	1.7		474

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	28	1	19	1	colorful fabric	white and reddish on brown	12	0.2		475
Rubble	28	1	19	1	white blobs	5 medium sized pieces	5	17.3		476
Rubble	29	1	20	1	burnt clay/coal	single piece of burnt coal/clay	1	4.8		477
Rubble	29	1	20	1	charcoal	3 pieces of charcoal	3	0.6		478
Rubble	29	1	20	1	cloth	9 pieces of disintegrating cloth	9	1.7		479
Rubble	29	1	20	1	white blob	single piece	1	2.6		480
Rubble	29	1	20	1	wood	large chunk of wood knot from woodedn plank	1	18.1		481
Rubble	9	1	F1	1	burnt conglomerate	2 pieces, black-grey to orange	2	1.7		482
Rubble	9	1	F1	1	burnt wood	single piece of semi-burnt wood	1	1.8		483
Rubble	9	1	F1	1	Leather	2 pieces of leather shoe sole	2	27.5		484
Rubble	9	1	F1	1	wood	small piece of wood	1	0.3		485
Rubble	13	1	F2A	1	burnt clay/coal	3 pieces, one brown	3	3.9		486
Rubble	13	1	F2A	1	charcoal	single piece	1	0.2		487
Rubble	13	1	F2A	1	shell	small pieces of mother of pearl	3	<0.1		488
Rubble	13	1	F2B	1	burnt conglomerate	2 small pieces	2	0.8		489
Rubble	13	1	F2B	1	charcoal	1 piece of charcoal wood	1	0.5		490
Rubble	13	1	F2B	1	white blob	a single blob	1	2.1		491
Rubble	13	1	F2C	1	colorful fabric	small piece of grey-brown fabric	3	<0.1		492
Rubble	18	1	F4A	1	burnt wood	one small piece of burnt wood	1	0.8		493
Rubble	18	1	F4A	1	wood	7 pieces of wood	7	7.2		494
Rubble	22	1	F5	1	burnt conglomerate	2 pieces	2	5		495
Rubble	wall	1		1	burnt conglomerate	orange burnt clay w/red bubbly conglomerate	7	8.1		497
Rubble	17	2	1	1	brick	fragments of brick	3	9.2		498
Rubble	17	2	1	1	burnt coal	burnt coal and burnt dirt	6	3.7		499
Rubble	17	2	1	1	coal		3	2.6		500
Rubble	17	2	1	1	concrete	2 fragments of concrete	2	6.1		501
Rubble	17	2	1	1	rubber	thin flat pieces of rubber	6	13.7		502
Rubble	17	2	1	1	white blobs	limestone	1	7.1		503

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	20	2	2	1	brick	small fragments of brick	1	36.3		504
Rubble	20	2	2	1	burnt conglomerate	large chunk of burnt dirt and clay, glassy	12	15.9		505
Rubble	20	2	2	1	concrete	chunk from concrete block	1	27.8		506
Rubble	20	2	2	1	white blob		3	3.7		507
Rubble	30	2	3	1	brick	Small brick fragments	4	29.6		508
Rubble	30	2	3	1	burnt coal	single fragment	1	0.3		509
Rubble	30	2	3	1	charcoal	small chunks of charcoal	5	4.7		510
Rubble	30	2	3	1	coal	small pieces of unburnt coal	4	1.7		511
Rubble	30	2	3	1	snail shell	shell fragments	4	<0.1		512
Rubble	30	2	3	1	white blob	numerous flaking white blobs	23	40.8		513
Rubble	31	2	4	1	burnt wood	small chunks of burnt	6	16		514
Rubble	31	2	4	1	snails	fragments of snail shells	2	<0.1		515
Rubble	31	2	4	1	white blobs		8	13.5		516
Rubble	32	3	1	2	asphalt	conglomerate of asphalt and gravel	3	34.7	crumbly	517
Rubble	32	3	1	2	brick	1 piece	1	2.6		518
Rubble	32	3	1	2	concrete	brown concrete/cement	4	11		519
Rubble	32	3	1	2	plaster or plastic	hard white	1	17.9		520
Rubble	33	3	2	2	brick	2 small pieces of brick	2	2.5		521
Rubble	33	3	2	2	concrete	one large chunk of concrete	1	23.5		522
Rubble	33	3	2	2	rubber seal	thick rubber complete seal	1	31.1		523
Rubble	34	3	3	2	brick	1 large chunk w/ small flakes	1	104		524
Rubble	34	3	3	2	brick w/ concrete	single piece of brick with concrete	1	2.7		525
Rubble	34	3	3	2	burnt dirt conglomerate	1 large chunk w/ small flakes	1	54.9		526
Rubble	34	3	3	2	chipped enamel	blue and shiny enamel	1	<0.1		527
Rubble	34	3	3	2	coal	medium chunks	3	21.7		528
Rubble	34	3	3	2	concrete	medium chunks of concrete	7	64.5		529
Rubble	35	3	4	2	brick	7 brick pieces	7	21.7		530
Rubble	35	3	4	2	burnt clay/coal	3 small pieces	3	2.5		531

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	35	3	4	2	concrete	4 pieces of concrete	4	8.8		532
Rubble	36	3	5	2	brick	3 pieces of brick	3	4.3		533
Rubble	36	3	5	2	burnt dirt conglomerate	7 pieces of glassy and bubbly	7	11.5		534
Rubble	36	3	5	2	concrete	3 chunks	3	3.4		535
Rubble	37	3	6	2	brick	3 small pieces	3	7.2		536
Rubble	37	3	6	2	burnt clay/coal	1 piece of burnt clay/coal	1	1.1		537
Rubble	37	3	6	2	burnt dirt conglomerate	over twenty pieces of glassy earth	20	51.3		538
Rubble	37	3	6	2	burnt wood	3 small pieces of wood	3	1.4		539
Rubble	37	3	6	2	coal	1 large chunk of coal	1	14.2		540
Rubble	38	3	7	2	burnt wood	approx. 10 small chunks of semi burnt wood	10	20.4		541
Rubble	40	3	9	2	burnt clay/coal	2 pieces	2	2.8		542
Rubble	40	3	9	2	burnt coal	white to light grey burnt coal chunks	4	2.1		543
Rubble	40	3	9	2	burnt dirt conglomerate	2 small chunks	2	2.9		544
Rubble	40	3	9	2	rubber	thin flat pieces of rubber	4	5.2	tar paper	545
Rubble	40	3	9	2	wood	partially burnt	1	2.9		546
Rubble	41	3	10	2	brick	one small piece	1	2.9		547
Rubble	41	3	10	2	burnt clay/coal	two small pieces of clay/coal	2	1.9		548
Rubble	42	3	11	2	brick	2 large chunks	2	63.2		549
Rubble	42	3	11	2	burnt clay/coal	small chunks of clay/coal	3	1.8		550
Rubble	42	3	11	2	burnt coal	single piece of burnt coal	1	0.5		551
Rubble	42	3	11	2	coal	2 medium chunks	2	18.9		552
Rubble	42	3	11	2	rubber	four pieces thin flat pieces of rubber	4	2.1		553
Rubble	43	3	12	2	burnt clay/coal	approx. 10 pieces	10	16.5		554
Rubble	43	3	12	2	coal	5 small pieces	5	3.9		555
Rubble	43	3	12	2	white blobs	2 pieces	2	1		556
Rubble	69	3	13	2	burnt coal	two small pieces of ashy white coal	2	1.7		557
Rubble	44	3	13	2	burnt coal	1 piece of burnt coal	1	0.9		558
Rubble	69	3	13	2	burnt conglomerate	one large chunk, bubbly and glassy	1	19.5		559

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	69	3	13	2	coal	one small piece	1	2.3		560
Rubble	44	3	13	2	coal	6 pieces of unburnt coal	6	10.4		561
Rubble	69	3	13	2	colorful fabric	reddish brown on white	4	<0.1		562
Rubble	44	3	13	2	rubber	very thin, black and brittle	1	1		563
Rubble	44	3	13	2	white blobs	very pale, three blobs	3	6.1		564
Rubble	44	3	13	2	wood	small thin piece of wood	1	0.8		565
Rubble	46	3	14	2	burnt wood	7 pieces of burnt/semi-burnt wood	7	2.3		566
Rubble	46	3	14	2	coal	1 piece	1	0.8		567
Rubble	46	3	14	2	colorful fabric	ten pieces of white on green	10	1.7		568
Rubble	46	3	14	2	concrete	1 chunk	1	4		569
Rubble	46	3	14	2	rock w/concrete	single chunk	1	2.2		570
Rubble	46	3	14	2	rounded metal chunk	strange shaped very heavy piece of metal	1	89.3		571
Rubble	46	3	14	2	seeds	3 choke cherry pits	3	>0.1		572
Rubble	47	3	15	2	burnt clay/coal	single piece	1	0.2		573
Rubble	47	3	15	2	burnt wood/charcoal	small pieces	5	4.5		574
Rubble	47	3	15	2	coal	2 pieces of unburnt coal	2	3		575
Rubble	47	3	15	2	concrete	2 small pieces	2	0.6		576
Rubble	47	3	15	2	rock w/concrete		1	2.5		577
Rubble	47	3	15	2	white blobs	6 small pieces	6	8.2		578
Rubble	53	4	1	1	burnt clay/coal		1	1.7		579
Rubble	53	4	1	1	burnt coal	grey to black semi-burnt coal	4	19.1		580
Rubble	53	4	1	1	coal	single piece of coal	1	1.7		581
Rubble	53	4	1	1	nut	hazelnut shell	1	0.1		582
Rubble	53	4	1	1	shell	mother of pearl	1	0.1		583
Rubble	54	4	2	1	burnt coal	grey white to orange	6	77.6		584
Rubble	54	4	2	1	burnt conglomerate	red and bubbly	1	1.8		585
Rubble	54	4	2	1	burnt rubber	burnt chunk of rubber	1	7.1		586
Rubble	54	4	2	1	wood	small piece of bark	1	1.3		587

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	55	4	3	1	brick	small fleck	1	0.2		588
Rubble	55	4	3	1	burnt coal	grey to light grey with some orange	46	110.2		589
Rubble	55	4	3	1	burnt coal	large chunks of semi-burnt coal	19	172.8		590
Rubble	55	4	3	1	burnt conglomerate	glassy orange to brown	6	24		591
Rubble	55	4	3	1	burnt conglomerate	one piece of burnt dirt and clay	1	5.4		592
Rubble	55	4	3	1	burnt rubber	3 pieces of burnt rubber	3	5.1		593
Rubble	55	4	3	1	burnt rubber	2 large chunks of burnt rubber	2	51.9		594
Rubble	55	4	3	1	coal	single piece of coal	1	1.1		595
Rubble	55	4	3	1	egg shell	3 pieces of eggshell	3	>0.1		596
Rubble	55	4	3	1	FCR	2 pieces	2	5.4		597
Rubble	55	4	3	1	shell	snail shell	1	0.1		598
Rubble	55	4	3	1	shell	mother of pearl-4 pieces	4	0.2		599
Rubble	55	4	3	1	white blob	one piece of blob	1	2.6		600
Rubble	55	4	3	1	brick	2 chunks of brick	2	7		601
Rubble	56	4	4	1	brick	3 chunks of brick	3	17		602
Rubble	56	4	4	1	burnt clay/coal	5 small chunks: orange to brown	5	12		603
Rubble	56	4	4	1	burnt coal	light grey to dark grey	22	66.4		604
Rubble	56	4	4	1	burnt coal	white to black to orange chunks of coal	17	103.3		605
Rubble	56	4	4	1	burnt conglomerate	large glassy chunks of burnt conglomerate	8	61.8		606
Rubble	56	4	4	1	burnt conglomerate	red in brown glassy	10	46.6		607
Rubble	56	4	4	1	coal	unburnt small pieces	5	13.2		608
Rubble	56	4	4	1	coal	3 pieces of coal	3	10.8		609
Rubble	56	4	4	1	concrete	2 small chunks of concrete	2	10.1		610
Rubble	56	4	4	1	fruit pit	plum pit	1	0.1		611
Rubble	56	4	4	1	rubber	thin flat pieces of rubber	2	0.5		612
Rubble	56	4	4	1	rubber	thin flat pieces of rubber	11	7.2		613
Rubble	56	4	4	1	seed	1/2 of choke cherry pit	1	<0.1		614
Rubble	59	4	5	1	burnt coal	large chunks of semi-burnt coal	13	337.9		615

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	59	4	5	1	burnt coal	slightly burnt coal	14	348.6		616
Rubble	59	4	5	1	colorful fabric	grey and reddish fabric	8	0.7		617
Rubble	59	4	5	1	rubber	thin flat pieces of rubber	6	1.1		618
Rubble	60	4	6	1	burnt coal	dark to light, grey to orange	5	21.5		619
Rubble	60	4	6	1	burnt conglomerate	red glassy and bubbly chunks	14	19.1		620
Rubble	60	4	6	1	burnt rubber	single chunk of rubber	1	2.7		621
Rubble	60	4	6	1	coal	unburnt coal	4	8.9		622
Rubble	60	4	6	1	colorful fabric	grey and reddish fabric	14	2.9	stippled back	623
Rubble	60	4	6	1	rubber	rubber chunk with metal wire through it	1	27	stippled bottom	624
Rubble	60	4	6	1	white blob	one piece	1	4.1		625
Rubble	62	4	8	1	burnt clay/coal	2 pieces	2	19.2		626
Rubble	62	4	8	1	burnt rubber	chunk of burnt rubber	1	6.3		627
Rubble	62	4	8	1	rubber	thin flat pieces of rubber	2	0.7	tar paper	628
Rubble	62	4	8	1	rubber	thin flat pieces of rubber	3	0.5		629
Rubble	63	4	9	1	burnt coal	large chunks of semi-burnt coal	6	136.5		630
Rubble	63	4	9	1	charcoal	single piece	1	0.7		631
Rubble	63	4	9	1	coal	big piece of unburnt coal	1	19		632
Rubble	66	4	11	1	brick	2 chunks of brick	2	18.4		633
Rubble	66	4	11	1	burnt coal	three pieces of burnt coal	3	33.3		634
Rubble	66	4	11	1	burnt coal	light grey to orange	5	15.7		635
Rubble	66	4	11	1	burnt conglomerate	4 pieces of glassy, reddish	4	16.3		636
Rubble	66	4	11	1	burnt conglomerate	single piece glassy	1	2.1		637
Rubble	66	4	11	1	burnt rubber/ asphalt	single piece	1	3.6		638
Rubble	66	4	11	1	colorful fabric	green on white, white on marroon, blue on white	32	5		639
Rubble	66	4	11	1	fruit pit	peach pit	1	1.1		640
Rubble	66	4	11	1	leather	shoe leather piece	1	2.3		641
Rubble	66	4	11	1	rubber	thin flat pieces of rubber	6	6.3		642
Rubble	66	4	11	1	rubber	thin flat pieces of rubber	4	1.8	tar paper	643

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	66	4	11	1	white blobs	2 large chunks	2	32.9		644
Rubble	67	4	12	1	burnt coal	2 pieces of white to grey	2	5.6		645
Rubble	67	4	12	1	burnt conglomerate	3 pieces red and bubbly	3	27.3		646
Rubble	67	4	12	1	coal	2 pieces of unburnt coal	2	2.5		647
Rubble	67	4	12	1	colorful fabric	grey and red fabric along with green and white	20	4.1		648
Rubble	67	4	12	1	white blob	2 pieces of white blob	2	17.2		649
Rubble	70	4	14	1	burnt coal	large chunks of burnt coal	12	264.5		650
Rubble	70	4	14	1	burnt conglomerate	orange to brown, glassy and bubbly	9	26.7		651
Rubble	70	4	14	1	charcoal	single chunk	1	0.3		652
Rubble	70	4	14	1	coal	unburnt coal	15	90.9		653
Rubble	70	4	14	1	colorful fabric	white and reddish brown, raised textured design	10	0.8		654
Rubble	70	4	14	1	wood	bark	1	0.3		655
Rubble	77	4	19	1	burnt clay/coal	2 small pieces	2	6.7		656
Rubble	80	4	21	1	burnt nut	burnt hazelnut shell	1	0.2		657
Rubble	80	4	21	1	burnt wood	7 pieces of burnt/semi-burnt wood	7	1.4		658
Rubble	80	4	21	1	quartzite	flakes of quartzite	2	0.6		659
Rubble	82	4	22	1	burnt coal	4 chunks of burnt coal	4	33.1		660
Rubble	82	4	22	1	burnt conglomerate	glassy red to brown	4	10.2		661
Rubble	82	4	22	1	coal	unburnt	3	8.4		662
Rubble	82	4	22	1	quartzite rock	single shiny stone	3	41.4		663
Rubble	82	4	22	1	white blob	1 blob	1	4.6		664
Rubble	82	4	22	1	wood	2 chunks of wood, soft and rotten	2	7.5		665
Rubble	92	4	24	1	burnt wood	small chunks of burnt/unburnt wood	5	5.1		666
Rubble	94	4	26	1	burnt coal	4 pieces, orange to white to grey	4	6.7		667
Rubble	94	4	26	1	burnt wood	charcoal and semi-burnt wood	9	7.5		668
Rubble	95	4	27	1	burnt rubber	cover w/ rough exterior	1	0.4	long and thin	669
Rubble	95	4	27	1	burnt wood	pieces of half burnt/unburnt wood	2	0.8		670
Rubble	95	4	27	1	burnt wood	wood chunks mostly charcoal with some unburnt	14	27.2		671

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	96	4	28	1	charcoal	single piece	1	0.1		672
Rubble	96	4	28	1	coal	single chunk unburnt	1	0.6		673
Rubble	96	4	28	1	wood	small piece of bark	1	0.4		674
Rubble	100	4	30	1	white blob	one single white blob	1	5.6		675
Rubble	100	4	30	1	wood	slightly rotten	1	13.8		676
Rubble	101	4	31	1	white blob	7 pieces	7	10.6		677
Rubble	101	4	31	1	wood	one small piece	1	0.2		678
Rubble	102	4	32	1	charcoal	single piece	1	0.6		679
Rubble	102	4	32	1	white blob	2 pieces	2	4.4		680
Rubble	102	4	32	1	wood	wood knot	1	1		681
Rubble	103	4	33	1	white blob	2 pieces	2	15.9		682
Rubble	106	4	34	1	white blob	2 pieces	2	6.3		683
Rubble	106	4	34	1	wood	disintegrating wood	3	2.2		684
Rubble	108	4	36	1	paper	1 chunk of burned paper	1	1.9	paper	685
Rubble	109	4	37	1	rubber	flat thin single piece	1	0.9		686
Rubble	60	4	6-I	1	burnt coal	5 pieces, white to dark grey	5	33.3		687
Rubble	60	4	6-I	1	burnt conglomerate	bubbly and red	4	5.3		688
Rubble	60	4	6-I	1	colorful fabric	white on red textured	9	0.5		689
Rubble	60	4	6-I	1	rubber	thin flat pieces of rubber	12	24		690
Rubble	60	4	6-I	1	white blob	single piece	1	3.5		691
Rubble	62	4	8-I	1	brick	whole fire brick	1	approx 900g		692
Rubble	62	4	8-I	1	Burnt Coal	single chunk ashy grey	1	2.9		693
Rubble	62	4	8-I	1	Coal	single chunk unburnt	1	3.4		694
Rubble	62	4	8-I	1	leather	three strips of fragile leather	3	0.6		695
Rubble	62	4	8-I	1	rubber	thin flat rubber	4	16.4		696
Rubble	62	4	8-I	1	rubber	thin flat pieces of rubber	9	7	evidence of nails in the rubber	697
Rubble	62	4	8-I	1	rubber	thin flat pieces of rubber w/ nail holes stitching pieces together	27	165.8	evidence of nails in the rubber	698

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	62	4	8-I	1	wood	slightly curved, flat and thin	1	4.2		699
Rubble	57	4	F1	1	burnt coal	large chunks of partially burnt from orange to grey	7	60.6		700
Rubble	57	4	F1	1	burnt coal	large chunks of burnt coal	11	87.5		701
Rubble	57	4	F1	1	burnt conglomerate	burnt clay made glassy and red	7	34		702
Rubble	57	4	F1	1	burnt conglomerate	metallic and rubber	1	2.3		703
Rubble	57	4	F1	1	coal	unburnt coal	24	101.9		704
Rubble	57	4	F1	1	colorful fabric	grey with some red	10	0.7	construction lining	705
Rubble	57	4	F1	1	rubber	thin flat pieces of rubber	4	1.3		706
Rubble	57	4	F1	1	unburnt coal	2 small pieces	2	1.5		707
Rubble	58	4	F2	1	rubber	thin flat pieces of rubber	6	6.8		708
Rubble	58	4	F3	1	Burnt Coal	small piece of burnt coal	1	0.9		709
Rubble	90	4	F3	1	burnt wood	pieces of half burnt/unburnt wood	4	11.8		710
Rubble	90	4	F3	1	wood	large chunk of wood post	1	9.6		711
Rubble	110	4	F4	1	concrete	single block of concrete	1	30.1		712
Rubble	110	4	F4	1	white blob	three pieces of blob	3	21.4		713
Rubble	wall	4	PL16-E	1	seed	UID seed	1	<0.1		714
Rubble	61	5	1	1	brick	small fragments of brick	43	50.1		715
Rubble	61	5	1	1	burnt clay/coal	2 small chunks	2	4.8		716
Rubble	61	5	1	1	charcoal	rounded burnt wood, potentially seed or nut	1	<0.1		717
Rubble	61	5	1	1	coal	medium sized chunks of unburnt coal	8	23.2		718
Rubble	61	5	1	1	colorful fabric	green + beige small fragments	45	6		719
Rubble	61	5	1	1	concrete	1 chunk of concrete block	1	6.6		720
Rubble	61	5	1	1	leather	soft leather	1	3.2		721
Rubble	61	5	1	1	white blobs	small blobs of limestone	7	5.6		722
Rubble	65	5	2	1	burnt clay/coal	small chunks	5	14.1		723
Rubble	65	5	2	1	burnt coal	2 chunks	2	8.4		724
Rubble	65	5	2	1	burnt conglomerate	glassy dirt with flakes of burnt coal/clay	10	9.9		725
Rubble	65	5	2	1	coal	large unburnt chunks	13	65		726

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	65	5	2	1	concrete	2 large chunks	2	66.6		727
Rubble	65	5	2	1	leather	2 chunks of leather with small nails inside	2	2		728
Rubble	65	5	2	1	paper	fragment of paper label "Re"	1	0.1		729
Rubble	65	5	2	1	white blobs	small blobs of limestone	9	14.6		730
Rubble	68	5	3	1	burnt clay/coal	small chunks	4	14.1		731
Rubble	68	5	3	1	burnt coal	medium sized chunks of burnt coal	4	6.9		732
Rubble	68	5	3	1	burnt conglomerate	glassy medium sized chunks	7	21.9		733
Rubble	68	5	3	1	charcoal	2 chunks	2	1		734
Rubble	68	5	3	1	coal	medium sized chunks of unburnt coal	14	32.3		735
Rubble	68	5	3	1	concrete	1 large chunk	1	74.7		736
Rubble	68	5	3	1	fruit pit	stone fruit pit (peach)	1	0.6		737
Rubble	76	5	5	1	charcoal	large chunks of burnt wood	6	21.6		738
Rubble	76	5	5	1	rock	small piece of sandstone	1	6.6		739
Rubble	76	5	5	1	snail shells	fragments of snail shells	2	<0.1		740
Rubble	76	5	5	1	white blob	white limestone blob	1	0.6		741
Rubble	76	5	5	1	wood	flat machined plywood	1	0.4		742
Rubble	78	6	1	1	plastic	plastic hangers	1	2.1		743
Rubble	81	6	2	1	ceramic pipe	large ceramic sherd of water pipes	1	2.7		744
Rubble	81	6	2	1	concrete	chunk of concrete block	1	2		745
Rubble	81	6	2	1	shell	mother of pearl shell	1	0.2		746
Rubble	84	6	3	1	burnt coal	burnt coal and burnt dirt	2	0.4		747
Rubble	84	6	3	1	colorful fabric	white and green design	2	<0.1		748
Rubble	84	6	3	1	FCR	Cracked rock	1	4.2		749
Rubble	84	6	3	1	red ochre	large chunk of deep red stone	1	66.1		750
Rubble	84	6	3	1	shell	mother of pearl	1	0.1		751
Rubble	84	6	3	1	white blob	single piece	1	0.3		752
Rubble	87	6	4	1	burnt coal	ashy grey coal	3	0.9		753
Rubble	87	6	4	1	burnt dirt conglomerate	glassy black due to heat	3	13.1		754

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	87	6	4	1	charcoal	single piece	1	1.2		755
Rubble	87	6	4	1	FCR		3	5.5		756
Rubble	87	6	4	1	red ochre	small chunk of ochre	1	0.9		757
Rubble	87	6	4	1	rocks	UID	3	7.6		758
Rubble	87	6	4	1	shell	small flecks of mother of pearl	3	0.1		759
Rubble	97	6	5	1	charcoal	chunks of charcoal	2	1.7		760
Rubble	97	6	5	1	red ochre	small chunk of ochre	1	<0.1		761
Rubble	97	6	5	1	rocks	white and orange rock	1	0.7		762
Rubble	89	7	2	2	plaster	small white chunk of plaster	1	0.3		763
Rubble	89	7	2	2	plastic	white bendable plastic: linoleum	1	>0.1		764
Rubble	99	7	3	2	brick	single piece	1	12.1		765
Rubble	99	7	3	2	burnt conglomerate	black glasy and bubbly	2	1.4		766
Rubble	99	7	3	2	coal	2 small chunks	2	5.4		767
Rubble	99	7	3	2	plastic	soft blue and white plastic wrapper	1	>0.1		768
Rubble	99	7	3	2	plastic	plastic roofing	2	0.2		769
Rubble	111	7	4	2	asphalt	black and crumbly road asphalt with stones	2	17.3		770
Rubble	111	7	4	2	brick	two large pieces and hundreds of small sherds	143	182.6	big piece has concrete on it	771
Rubble	111	7	4	2	brick	large chunks of brick	4	117.8		772
Rubble	111	7	4	2	burnt conglomerate	a number of bubbly conglomerate from bright red to dark black	13	28.5		773
Rubble	111	7	4	2	burnt dirt conglomerate	glassy and bubbly earth red-black	2	11.9		774
Rubble	111	7	4	2	coal	six small pieces	6	7		775
Rubble	111	7	4	2	concrete	a mix of cement and large stones	24	57.5		776
Rubble	111	7	4	2	concrete	large chunks of cement	19	995.4		777
Rubble	111	7	4	2	flat plastic	clear flat plastic w/ green paint	1	0.1		778
Rubble	111	7	4	2	plastic figurine	small pink plastic arms from human figurine	1	1		779
Rubble	111	7	4	2	quartzite	small stone flakes	3	2.4		780
Rubble	111	7	4	2	wood	unburnt	1	2.2		781
Rubble	111	7	4	2	wood	unburnt	1	1.3		782

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	112	7	5	2	brick	10 brick chunks	10	45.5		783
Rubble	112	7	5	2	burnt conglomerate	bubbly and glassy, brown to red	3	5.8		784
Rubble	112	7	5	2	coal	2 medium pieces of wood	2	15.3		785
Rubble	112	7	5	2	concrete	concrete w/rocks	25	203		786
Rubble	112	7	5	2	soft white plastic	flat plastic	1	>0.1		787
Rubble	112	7	5	2	wood	small pieces of wood	5	3.7		788
Rubble	113	7	6	2	brick	2 small pieces of brick	2	2.3		789
Rubble	113	7	6	2	burnt conglomerate	3 small pieces of bubbly conglomerate	3	2.1		790
Rubble	113	7	6	2	burnt wood	4 small pieces	4	5.5		791
Rubble	113	7	6	2	coal	9 small pieces of coal	9	11.4		792
Rubble	113	7	6	2	concrete	7 small chunks of concrete	7	19.7		793
Rubble	113	7	6	2	wood	rotten pieces of wood	1	1.2		794
Rubble	114	7	7	2	brick	single chunk of brick	1	1.7		795
Rubble	114	7	7	2	burnt clay/coal	2 pieces	2	2.1		796
Rubble	114	7	7	2	white blob	1 piece	1	3.5		797
Rubble	114	7	7	2	wood	2 pieces unburnt, one piece burnt	2	0.7		798
Rubble	115	7	8	2	brick	pieces of brick	1	1.9		799
Rubble	115	7	8	2	burnt wood	one piece of wood	1	0.5		800
Rubble	115	7	8	2	concrete	one piece of concrete	1	1.4		801
Rubble	115	7	8	2	wood	unburnt flecks of wood	4	0.6		802
Rubble	116	7	9	2	wood	thin long piece of old wood	1	9.9		803
Rubble	117	7	10	2	coal	single piece of coal	1	0.06		804
Rubble	118	7	11	2	burnt clay/coal	2 pieces grey to orange	2	6.6		805
Rubble	118	7	11	2	stone w/concrete	small stone with concrete on it	1	30.4		806
Rubble	119	7	12	2	burnt wood	small pieces of burnt wood	4	1.5		807
Rubble	119	7	12	2	egg shells	small egg shells sherds	14	>0.1		808
Rubble	119	7	12	2	shell	mother of pearl shell	1	0.1		809
Rubble	119	7	12	2	wood	rotten pieces of wood	6	1.3		810

Table A.3 cont. Rubble recovered from FjPi-170

Rubble	120	7	13	2	burnt wood	charcoal w/burnt wood	1	2.7		811
Rubble	122	7	15	2	wood	rotten wood-singed	1	0.2		812
Rubble	123	7	16	2	burnt wood	numerous flaky pieces of burnt/unburnt wood	26	15.1		813

Table A.3 cont. Rubble recovered from FjPi-170

Ceramic

Material	LRF	Unit	Lvl	Area	Type	Description	Count	Notes	Paste	Portion	Design	Artifact ID
Ceramic	56	4	4	1	American stoneware	salt glaze crock	1	impressed design on base	stoneware	Base	"W. PHAR…" "trade…" "Re…"	828
Ceramic	56	4	4	1	bone china	polychrome and TP teacup	1	evidence of burning on outside	soft paste	body	pink flower pattern	829
Ceramic	56	4	4	1	bone china	UID	3	burnt yellow exterior	soft paste	body		830
Ceramic	56	4	4	1	bone china	UID	1		soft paste	handle	thin gold line along the handle	831
Ceramic	56	4	4	1	bone china	UID	1	burnt grey glaze	soft paste	handle		832
Ceramic	56	4	4	1	whiteware	white glaze	2		fine earthenware	body	brown line	833
Ceramic	56	4	4	1	bone china	UID	3		soft paste	body		834
Ceramic	56	4	4	1	bone china	Yellow TP	1	base of saucer	soft paste	base	yellow leafy pattern	835
Ceramic	56	4	4	1	bone china	polychrome TP	1		soft paste	rim	floral designs	836
Ceramic	56	4	4	1	bone china	UID	1		soft paste	rim	gold band on rim and around outside	837
Ceramic	56	4	4	1	bone china	UID	4		soft paste	rim and base	silver band along inside of cup	838
Ceramic	67	4	12	1	fine china	UID	1	slight burning on outside	soft paste	body		839
Ceramic	54	4	2	1	American stoneware	salt glaze crock	1		stoneware	body		840
Ceramic	54	4	2	1	bone china	UID	1		soft paste	body		841
Ceramic	54	4	2	1	fine china	UID	1		soft paste	body		842
Ceramic	54	4	2	1	porcelein	UID	1	small triangular potentially worked	hard paste	body		843
Ceramic	62	4	8	1	whiteware	white glaze	1	ribbed bottom	fine earthenware	base	thin silver band on inside	844
Ceramic	53	4	1	1	whiteware	white glaze	5	chipped off pieces from single piece	fine earthenware	plate rim		845

Table A.4 Ceramic artifacts recovered in FjPi-170

Ceramic	60	4	6-I	1	fine china	UID	1		soft paste	body		846
Ceramic	66	4	11	1	whiteware	white glaze	5	chipped off pieces from single piece	fine earthenware	body	none	847
Ceramic	60	4	6	1	bone china	UID	1	burning on inside	soft paste	rim and base	thin silver line along rim and along outside	848
Ceramic	60	4	6	1	fine china	UID	1	burnt	soft paste	body		849
Ceramic	62	4	8	1	fine china	UID	1	glaze burnt off inside	soft paste	body		850
Ceramic	55	4	3	1	whiteware	white glaze	1	chipped	fine earthenware	rim		851
Ceramic	55	4	3	1	whiteware	white glaze	1		fine earthenware	rim		852
Ceramic	55	4	3	1	whiteware	white glaze	2		fine earthenware	body	white glaze with silver band on rim	853
Ceramic	55	4	3	1	fine stoneware	salt glaze	1	glaze worn on inside	stoneware	body	V in red on inside	854
Ceramic	55	4	3	1	bone china	UID	1		soft paste	body		855
Ceramic	55	4	3	1	fine china	TP polychrome	1		soft paste	body	floral designs	856
Ceramic	55	4	3	1	porcelein	UID	1		hard paste	body		857
Ceramic	6	1	6	1	whiteware	white glaze	1	burning on inside	fine earthenware	body		858
Ceramic	29	1	20	1	whiteware	white glaze	1	chipped	fine earthenware	body		859
Ceramic	29	1	20	1	bone china	polychrome TP	1		soft paste	rim and base	floral designs	860
Ceramic	29	1	20	1	bone china	toy saucer	1	Also identified in P&O	soft paste	half of toy saucer		861
Ceramic	4	1	4	1	whiteware	white glaze	1		fine earthenware	body		862
Ceramic	4	1	4	1	bone china	UID	1		soft paste	body		863
Ceramic	4	1	4	1	bone china	UID	1		soft paste	base		864
Ceramic	4	1	4	1	unglazed	terra cotta	1		earthenware	body		865
Ceramic	4	1	4	1	fine china	green glazed	1	raised design	soft paste	creamer spout	green glazed	866
Ceramic	26	1	17	1	fine china	UID	1	burnt exterior	soft paste	body		867
Ceramic	26	1	17	1	whiteware	white glaze	1		fine earthenware	rim		868
Ceramic	26	1	17	1	whiteware	white glaze	1		fine earthenware	rim		869
Ceramic	3	1	3	1	bone china	UID	1		soft paste	base	silver line on inside	870

Table A.4 cont. Ceramic artifacts recovered in FjPi-170

Ceramic	3	1	3	1	fine china	UID	1		soft paste	rim		871
Ceramic	3	1	3	1	fine china	UID	2		soft paste	body		872
Ceramic	18	1	F4A	1	American stoneware	salt glaze crock	1		stoneware	rim	curved panel exterior	873
Ceramic	2	1	2	1	whiteware	white glaze	1		fine earthenware	body		874
Ceramic	2	1	2	1	bone china	UID	1		soft paste	rim	faded silver design on outside of teacup	875
Ceramic	40	3	9	2	whiteware	white glaze	1		fine earthenware	body		876
Ceramic	38	3	7	2	fine china	UID	1		soft paste	rim	floral and gold designs	877
Ceramic	38	3	7	2	fine china	UID	1	burnt	soft paste	handle	angular handle	878
Ceramic	38	3	7	2	fine china	UID	1	burnt	soft paste	handle	straight handle	879
Ceramic	34	3	3	2	American stoneware	salt glaze crock	1		stoneware	body	inside brown slip	880
Ceramic	34	3	3	2	whiteware	white glaze	1		fine earthenware	body		881
Ceramic	37	3	6	2	brown glaze	UID	1		earthenware	body		882
Ceramic	35	3	4	2	unglazed	terra cotta	1		earthenware	body		883
Ceramic	33	3	2	2	unglazed	terra cotta	1		earthenware	body		884
Ceramic	36	3	5	2	fine china	UID	1		soft paste	rim		885
Ceramic	42	3	11	2	whiteware	white glaze	1		fine earthenware	base		886
Ceramic	42	3	11	2	fine china	UID	2		soft paste	rim + base	silver lines along inside	887
Ceramic	5	1	5	1	bone china	UID	1	"Royal Grafton" "Bone China"	soft paste	base	makers mark	888
Ceramic	5	1	5	1	fine china	UID	1		soft paste	body		889
Ceramic	111	7	4	2	whiteware	white glaze	6		fine earthenware	body		890
Ceramic	111	7	4	2	bone china	UID	1		soft paste	body		891
Ceramic	111	7	4	2	unglazed	terra cotta-burnished	2		earthenware	body	burnished inside and outside	892
Ceramic	111	7	4	2	unglazed	terra cotta	2		earthenware	body		893
Ceramic	114	7	7	2	whiteware	white glaze	1		fine earthenware	body		894
Ceramic	114	7	7	2	whiteware	white glaze	1	burning on inside	fine earthenware	rim		895
Ceramic	99	7	3	2	American stoneware	salt glaze crock	1		stoneware	base	inside brown slip	896

Table A.4 cont. Ceramic artifacts recovered in FjPi-170

Ceramic	113	7	6	2	whiteware	white glaze	1		fine earthenware	rim		897
Ceramic	81	6	2	1	brown glaze	water pipe	1	large ceramic industrial water pipe	earthenware	body		901
Ceramic	17	2	1	1	unglazed	terra cotta	2		earthenware	body		902
Ceramic	17	2	1	1	bone china	UID	1		soft paste	rim		903
Ceramic	17	2	1	1	fine china	UID	1		soft paste	body	silver line on outside	904
Ceramic	30	2	3	1	porcelein figurine	Toy	1	Also analyzed in P&O	soft paste	legs	figurine in shape of (horse?) legs	905
Ceramic	30	2	3	1	bone china	UID	1		soft paste	body		906
Ceramic	30	2	3	1	bone china	UID	1		soft paste	rim		907
Ceramic	65	5	2	1	white ware	White glaze w/blue TP	8		fine earthenware	body	blue floral	908
Ceramic	61	5	1	1	white ware	Blue on white glaze	1		fine earthenware	rim	blue line along rim	909
Ceramic	61	5	1	1	brown glaze	UID	1		earthenware	spout		910
Ceramic	68	5	3	1	whiteware	White glaze w/blue TP	10		fine earthenware	body	blue floral	911
Ceramic	68	5	3	1	whiteware	White glaze w/blue TP	1		fine earthenware	rim	blue line along rim	912
Ceramic	68	5	3	1	whiteware	White glaze w/blue TP	1		fine earthenware	base	blue line along base	913
Ceramic	68	5	3	1	bone china	UID	2		soft paste	body		914
Ceramic	68	5	3	1	porcelein	UID	1		hard paste	body		915

Table A.4 cont. Ceramic artifacts recovered in FjPi-170

Glass

Material	LRF	Unit	Level	Area	Type	Description	Count	Notes	Diagnostic	Section	Artifact ID
Glass	1	1	1	1	blue	round container	1		no	body-shoulder	942
Glass	1	1	1	1	clear	round container	1		no	body	976
Glass	1	1	1	1	clear/off colour amethyst	round container	1		no	body	1042
Glass	2	1	2	1	clear	square container	2	bubbles in body, side seams, finish seam, cork finish, Owens machine suction scar on base, "3" on base (3 oz)	yes	whole	977
Glass	2	1	2	1	clear	round container	1		no	body	978

Table A.5 Glass Artifacts Recovered at FjPi-170

Glass	2	1	2	1	clear	round container	1		no	body	979
Glass	2	1	2	1	clear/off colour amethyst	round container	1	panelled exterior-curved sides	no	body-shoulder	1043
Glass	2	1	2	1	clear/off colour amethyst	round container	1	side seam	no	body	1044
Glass	3	1	3	1	clear	tableware	1	pressed moulded candy bowl	no	body	980
Glass	3	1	3	1	PBG	round container	2	raised embossed design, curved lines	no	body	1079
Glass	4	1	4	1	clear	tableware	1	diamond motif raised pressed mould	no	body	974
Glass	4	1	4	1	clear	tableware	1	raised ridge line on outside	no	body	975
Glass	4	1	4	1	clear/off colour amethyst	round container	1		no	body	1041
Glass	6	1	6	1	clear	tableware	1	pressed moulded candy bowl	no	body	971
Glass	6	1	6	1	Milk	round container	2	external thread inturrupted, vaseline jar, post-1920	yes	finish	1055
Glass	6	1	6	1	milk	round container	2	vaseline bottle	no	body	1056
Glass	6	1	6	1	PBG	square container	1	machine made, prior to 1920	no	body	1075
Glass	8	1	8	1	Milk	round container	1	Vaseline-jar	yes	finish	1059
Glass	8	1	8	1	PBG	round container	1	side seam	no	body	1078
Glass	12	1	11	1	clear	square container	1	bubbles in body	yes	base	972
Glass	12	1	11	1	clear	UID container	1		no	body	973
Glass	12	1	11	1	milk	round container	1	external thread finish vaseline jar, 1945-1950	yes	rim	1058
Glass	12	1	11	1	PBG	round container	1		no	body	1076
Glass	15	1	12	1	clear	UID container	1		no	body	983
Glass	23	1	15	1	amber	round container	1	post-bottom mold, pre-1900	yes	base	924
Glass	23	1	15	1	amber	round container	1		no	body	925
Glass	23	1	15	1	milk	round container	1	"CHESEBROUGH MFC CO NY" embossed on bottom, 1945-1950	yes	whole	1057
Glass	25	1	16	1	blue	UID container	1		no	body	943
Glass	25	1	16	1	PBG	flat	1		no		1081
Glass	26	1	17	1	clear	round container	1		no	body	982
Glass	29	1	20	1	7-up green	round container	1	flat base, small pushup	yes	base	917
Glass	29	1	20	1	amber	round container	1	3 piece moulded beer bottle, porter or ale	yes	base	926
Glass	29	1	20	1	Amber	round container	3	horizontal seam along shoulder	no	neck+shoulder	927

Table A.5 cont. Glass Artifacts Recovered at FjPi-170

Glass	29	1	20	1	amber	round container	1		no	body-shoulder	930
Glass	29	1	20	1	clear	tableware	1	raised moulded ridge	no	body	981
Glass	29	1	20	1	PBG	round container	1		no	body	1077
Glass	29	1	20	1	PBG	round container	3		no	body	1080
Glass	wall cleaning	1	-	1	clear	round container	1		yes	base	984
Glass	18	1	F4B	1	Amber	round container	1	side seam	yes	shoulder-finish	928
Glass	18	1	F4B	1	Amber	round container	4	side seam	no	body-shoulder	929
Glass	18	1	F4B	1	PBG	round container	7	bubbles in body	no	body	1082
Glass	17	2	1	1	clear	round container	3		no	body	1034
Glass	17	2	1	1	clear/off colour amethyst	UID container	1		no	body	1051
Glass	20	2	2	1	clear	round container	2	panelled exterior	no	body	1032
Glass	30	2	3	1	clear	uid	3	thick glass	no	body	1035
Glass	30	2	3	1	PBG	uid	1		no	body	1102
Glass	33	3	2	2	clear	UID container	1		no	body	1015
Glass	33	3	2	2	PBG	flat	1		no		1089
Glass	34	3	3	2	clear	round container	1	jar lid	yes	lid	1005
Glass	34	3	3	2	clear	UID container	4		no	body	1006
Glass	34	3	3	2	PBG	flat	3		no		1084
Glass	35	3	4	2	Clear	UID container	1		no	body	1017
Glass	36	3	5	2	clear	thin glass	1		no	body	1014
Glass	36	3	5	2	PBG	flat	1		no		1088
Glass	38	3	7	2	clear	uid	1		no	body	1013
Glass	38	3	7	2	PBG	flat	1	raised emobossed V design	no		1086
Glass	38	3	7	2	PBG	round container	1		no	body	1087
Glass	40	3	9	2	clear	round container	1		no	lid	1007
Glass	40	3	9	2	clear	round container	1		yes	shoulder	1008
Glass	40	3	9	2	clear	thin glass	3	potential light bulb	no	body	1009
Glass	40	3	9	2	clear/off colour amethyst	round container	1	large bottle, side seam	no	body	1045

Table A.5 cont. Glass Artifacts Recovered at FjPi-170

Glass	40	3	9	2	PBG	flat	2		no		1085
Glass	42	3	11	2	clear	round container	2		no	body	1010
Glass	42	3	11	2	clear	thin glass	1	medicinal glass vial	no	body	1011
Glass	42	3	11	2	clear/off colour amethyst	round container	1	very faint amathyst	no	body	1046
Glass	44	3	13	2	clear	round container	2	side seam	no	body	1016
Glass	46	3	14	2	clear	uid	2		no	body	1019
Glass	47	3	15	2	clear	uid	1		no	body	1018
Glass	wall	3		2	clear	round container	1		yes	lid	1012
Glass	53	4	1	1	clear	tableware	1	raised horizontal lip	no	body	955
Glass	108	4	2	1	amber	round container	1	bubbles in body, vertical seam	no	neck and shoulder	923
Glass	54	4	2	1	clear	bottle	1	bottle top and metal lid	yes	finish	964
Glass	54	4	2	1	clear	round container	2	patina	no	body	965
Glass	54	4	2	1	clear	round container	2		no	body	966
Glass	54	4	2	1	olive	UID container	1		no	body	1062
Glass	55	4	3	1	clear	tableware	1	horizontal lines and triangular raised bumps	no	body	946
Glass	55	4	3	1	clear	UID container	1		no	body	947
Glass	55	4	3	1	clear	thin glass	3	very thin glass	no	body	956
Glass	55	4	3	1	clear/off colour amethyst	glassware	3		no	body	1037
Glass	55	4	3	1	PBG	flat	2		no		1063
Glass	55	4	3	1	PBG	small bottle	1	"…NAIOR"-burnt	yes	base	1064
Glass	55	4	3	1	PBG	UID container	1		no	body	1065
Glass	56	4	4	1	blue	round container	3		no	body	938
Glass	56	4	4	1	clear	tableware	1		yes	rim	948
Glass	56	4	4	1	clear	UID container	3		no	body	949
Glass	56	4	4	1	PBG	flat	3		no		1066
Glass	56	4	4	1	PBG	round container	1	floral embossed design with "" marks	body		1067
Glass	56	4	4	1	PBG	round container	1	melted	no	body + handle	1068
Glass	59	4	5	1	round container	yes	1	wide mouthed, cork finish, offset seams, bubbles in base. 1910-1920 approximate date.	yes	whole	1104

Table A.5 cont. Glass Artifacts Recovered at FjPi-170

Glass	60	4	6	1	amber	bottle	1	1850-1950 liquor or sauce bottle	no	stopper	920
Glass	60	4	6	1	clear/off colour amethyst	round container	1	feathered suction scar on base	yes	base	1038
Glass	62	4	8	1	clear	round container	1	embossed webbing design	no	base	957
Glass	62	4	8	1	Clear	thin glass	5	very thin glass	no	body	970
Glass	62	4	8	1	milk	round container	1		no	neck	1054
Glass	63	4	9	1	clear/off colour amethyst	thin glass	5	very thin glass	no	body	1039
Glass	63	4	9	1	milk	UID container	1		no		1053
Glass	63	4	9	1	PBG	round container	1	burnt melted glass			1071
Glass	66	4	11	1	clear	flat	1		no		954
Glass	66	4	11	1	PBG	flat	1		no		1070
Glass	67	4	12	1	blue	UID	2	thin glass	no	body	941
Glass	67	4	12	1	clear	thin glass	1	very thin curved glass	no	body	960
Glass	67	4	12	1	clear	round bottle	1	embossed design with dot and lines	no	body	961
Glass	67	4	12	1	clear	round bottle	1		no	body	962
Glass	67	4	12	1	clear	round bottle	1	patinated, vertical and horizontal seams, cork finish. 1910s-1920s	yes	rim and body	963
Glass	67	4	12	1	clear/off colour amethyst	round bottle	1	glass lid for wide mouthed bottle	no	lid	1040
Glass	70	4	14	1	7-up green	UID container	1		no	body	916
Glass	70	4	14	1	clear	tableware	1	slightly patinated	yes	rim	944
Glass	70	4	14	1	clear	UID container	1		no	body	945
Glass	75	4	18	1	clear	round bottle	1	horizontal seam	yes	finish and neck	968
Glass	75	4	18	1	clear	round container	1	embossed label, not decipherable	no	body	969
Glass	80	4	21	1	clear	thin glass	2	very thin glass	no	body	967
Glass	82	4	22	1	clear	thin glass	1	very thin curved glass	no	body	953
Glass	93	4	25	1	clear	small round vial	1	very thin glass, rounded, slightly melted, 1-2cm diamter.	yes	body	958
Glass	93	4	25	1	olive	round bottle	1	high pushup	yes	base	1061
Glass	100	4	30	1	PBG	UID container	1	patinated	no	body	1074
Glass	102	4	32	1	amber	UID container	1		no	body	922
Glass	102	4	32	1	clear	UID container	1	thin ridge designe	no	body	959

Table A.5 cont. Glass Artifacts Recovered at FjPi-170

Glass	109	4	37	1	PBG	UID container	1		no	body	1072
Glass	60	4	6-I	1	blue	round container	1		no	body	939
Glass	60	4	6-I	1	PBG	round container	1		no	body-shoulder	1069
Glass	57	4	F1	1	clear	tableware	1	horizontal lines and triangular raised bumps	no	body	950
Glass	57	4	F1	1	clear	tableware	1	raised horizontal line designs	yes	base	951
Glass	57	4	F1	1	clear	tableware	1		no	body	952
Glass	57	4	F1	1	PBG	UID	1	melted	no	body	1073
Glass	wall	4	PL19W	1	Amber	round container	1	Owen's machine scar on base	yes	body + base	921
Glass	61	5	1	1	clear	tableware	3	raised ridge line	no	body	1025
Glass	61	5	1	1	clear	round container	1	bubbles in body	yes	rim	1030
Glass	61	5	1	1	clear	round container	2		no	body	1031
Glass	61	5	1	1	clear/off colour amethyst	thin glass	1		no	body	1050
Glass	61	5	1	1	Milk	round container	1	screw top vaseline jar	yes	rim	1060
Glass	61	5	1	1	PBG	round container	3	club sauce stopper	yes	stopper	1097
Glass	61	5	1	1	PBG	flat	1		no		1098
Glass	65	5	2	1	clear/off colour amethyst	round container	3	panelled exterior	no	body	1049
Glass	65	5	2	1	PBG	flat	5		no		1096
Glass	68	5	3	1	clear	tableware	2	raised ridge line	no	body	1027
Glass	68	5	3	1	clear	uid	1	thick glass with weathering	no	body	1028
Glass	68	5	3	1	clear	thin glass	1		no	body	1029
Glass	68	5	3	1	PBG	flat	3		no		1100
Glass	71	5	4	1	clear	tableware	2	raised ridge line	no	body	1026
Glass	71	5	4	1	PBG	flat	1		no		1099
Glass	wall	5	PL19W	1	blue	UID container	2	thin glass	no	body	940
Glass	84	6	3	1	PBG	flat	1		no		1101
Glass	87	6	4	1	clear	UID	1		no	body	1033
Glass	86	7	1	2	Aqua	uid	1		no	body	937
Glass	99	7	3	2	7-up green	round container	19		no	body	919

Table A.5 cont. Glass Artifacts Recovered at FjPi-170

Glass	99	7	3	2	amber	round container	2		no	body	936
Glass	99	7	3	2	clear/off colour amethyst	round container	1	panelled exterior	no	body	1048
Glass	99	7	3	2	PBG	flat	38		no		1095
Glass	111	7	4	2	7-up green	uid	1		no	body	918
Glass	111	7	4	2	clear/off colour amethyst	round container	1		no	body	1047
Glass	111	7	4	2	PBG	flat	37		no		1090
Glass	111	7	4	2	PBG	uid	6		no	body	1091
Glass	112	7	5	2	green	round container	1	bubbles in body	no	body	1052
Glass	112	7	5	2	PBG	flat	1		no		1093
Glass	114	7	7	2	clear	tableware	1		yes	rim	1020
Glass	114	7	7	2	clear	uid	1		no	body	1021
Glass	114	7	7	2	PBG	flat	1		no		1092
Glass	117	7	10	2	clear	round container	1		yes	base	1022
Glass	117	7	10	2	PBG	uid	1	burnt on outside, pockmarcked	no	body	1103
Glass	118	7	11	2	clear	UID container	2		no	body	1024
Glass	118	7	11	2	PBG	round container	1		yes	base	1094
Glass	118	7	11	2	yellow	UID container	1	curved bent yellow glass	no	body	1105
Glass	120	7	13	2	clear	uid	1		no	body	1036
Glass	121	7	14	2	clear	uid	1		no	body	1023

Table A.5 cont. Glass Artifacts Recovered at FjPi-170

Personal Objects

Material	LRF	Unit	Level	Area	Type	Description	Count	Notes	Artifact ID
P&O	29	1	20	1	bone china	toy saucer	1		1112
P&O	29	1	20	1	lead w/ white filling	pharmaceutical tube w/white powdery filling	1		1139
P&O	2	1	2	1	milk glass	broken milk glass button- 2 holes	1		1140
P&O	26	1	17	1	slate	slate pencil- 0.5cm thick 5.0cm long	1		1141
P&O	30	2	3	1	ceramic	small ceramic figurine-the legs of a 4 legged animal	1		1106
P&O	42	3	11	2	milk glass	milk glass button- 2 holes	1		1142

Table A.7 Personal Objects Recovered at FjPi-170

P&O	47	3	15	2	brass	snap fastener-part	1		1143
P&O	34	3	3	2	iron	piece from broken locking mechanism: 2 screws, burnt	1		1144
P&O	43	3	12	2	brass	spring ring clasp- potential earring	1		1145
P&O	38	3	7	2	iron	corroded metal button	1		1146
P&O	38	3	7	2	shell	mother of pearl shell button - stylized carved	1		1147
P&O	wall cleaning	4	PL16-S	1	metal iron/tin	long rounded heart shaped keyhole from small from metal box	1		1113
P&O	54	4	2	1	metal	circular metal button, hole in the middle	1		1114
P&O	56	4	4	1	metal	Jeans button - stippled outside	1		1115
P&O	56	4	4	1	graphite	pencil lead-graphite	1		1116
P&O	56	4	4	1	metal	small metal belt piece	1		1117
P&O	62	4	8	1	milk glass	small milk glass button - four holes (1840s-1940s)	1	1840s-1940s	1118
P&O	67	4	12	1	glass	amber coloured faceted glass bead- czech style	1	1920s	1119
P&O	63	4	9	1	graphite	pencil lead fragments	2		1120
P&O	63	4	9	1	lead	lead clothing pins	2		1121
P&O	63	4	9	1	string	string tied in ring (finger sized)	1		1122
P&O	55	4	3	1	metal:brass	GWG jeans buttons	2		1123
P&O	60	4	6	1	metal + denim	1/2 of jean button: broken with piece of denim present	1		1124
P&O	59	4	5	1	copper/brass	empty cartridge .22 LR	1		1125
P&O	59	4	5	1	metal	conical button	1		1126
P&O	56	4	4	1	plastic	black plastic spike :potentially comb	1		1127
P&O	56	4	4	1	metal	snap fastener	1		1128
P&O	56	4	4	1	copper/brass + lead	2 empty cartridges, 1 full - .22 LR	3		1129
P&O	57	4	F1	1	metal	small clothing grommet- eyelet	1		1130
P&O	68	5	3	1	graphite	pencil lead-graphite	2		1107
P&O	68	5	3	1	copper/brass	empty cartridge .22 LR	1		1108
P&O	68	5	3	1	shell	2 holed shell button	1		1109
P&O	65	5	1	1	brass	snap button	1		1110
P&O	65	5	1	1	metal	snap fastener	1		1111

Table A.7 cont. Personal Objects Recovered at FjPi-170

P&O	78	6	1	1	wax	wax candle	1		1148
P&O	111	7	4	2	copper/brass	empty cartridge .22 LR	1		1131
P&O	111	7	4	2	copper	copper pin	1		1132
P&O	111	7	4	2	brass	small clothing grommet- eyelet	1		1133
P&O	111	7	4	2	shell	shell button	1		1134
P&O	111	7	4	2	brass	edge grommet	1		1135
P&O	99	7	3	2	brass	female side of large snap button	1		1136
P&O	112	7	5	2	glass	clear glass bead - cloudy	1		1137
P&O	114	7	7	2	copper/brass	hook eye-clasp	1		1138

Table A.7 cont. Personal Objects Recovered at FjPi-170

Faunal

Faunal ID	LRF	Unit	Area	Level	Element	Size Class	Taxon	Common Name	NISP	Weight (g)	%Comp	Butcher (Y/N) Description	Comments
1	NA	1	1	Wall	axis vertebrae	large	Bos Taurus	Cattle	1	33.16	30.00%	y- Saw Cut Marks	gnawing marks
2	NA	1	1	Rib	medium	medium	sus scrofa domesticus	pig	1	5.13	90.00%	n	Juvenile
37	NA	1	1	Wall	fragments				2	8.75		n	burnt
41	29	1	1	Level 20	fragment				1	0.79			
42	29	1	1	Level 20	right humerous	large	sus scrofa domesticus	pig	1	49.63	30.00%	y-saw cut at distal end, some cut marks	gnawmarks
77	25	1	1	Feature 6	hyomandibolar	small	essox lucius	Northern Pike	1	0.25	100.00%	n	
38	23	1	1	Level 15	right magnum (skull)	large	Bos Taurus	Cattle	1	22.65	100.00%	n	
58	22	1	1	Feature 5	fragment	medium	mammalia	mammal	1	1.29		Y-cut mark	
61	16	1	1	Level 13	fragment	large	mammalia	mammal	1	2.76	10.00%	N	
39	15	1	1	Level 12	vertebrae	small		fish	1	0.09	50.00%	n	
40	15	1	1	Level 12	fragment	small			1	0.13			
59	13	1	1	Feature 2	right tibia	medium	caprinae	Goat/Sheep	1	31.32	40.00%	y-shaft is chopped	gnawed
273	13	1	1	Feature 2A	two articulated skeletons	small	gallus domesticus		283	520.63		n	2 complete individuals
57	12	1	1	Level 11	sternum	small	gallus domesticus	chicken	1	0.87	10.00%	n	
35	10	1	1	Level 8b	fragment		mammalia	mammal	1	0.1	5.00%	n	immature

Table A.7 Faunal Remains Recovered in FjPi-170

36	10	1	1	Level 8b	vomer	small	Esox Lucius	Northern Pike	1	0.43		n	
47	10	1	1	level 8	fragment	small			1	0.12	10.00%	n	
60	10	1	1	Level 9	rib	med	caprinae	Goat/Sheep	1	4.71	30.00%	Y-sawed, at least two prominent cutmarks	
29	9	1	1	Feature 1	mandible	large		Pig	1	24.46	30.00%	y-cut marks on medial surface	two teeth are still in place
30	9	1	1	Feature 1	fragments				6	4.73		n	
31	9	1	1	Feature 1	sternum	medium	Meleagris Gallopavo	Turkey	1	9.92	30.00%	n	
3	8	1	1	Level 8	fragment	large	mammalia		1	6.42	5.00%	y- Saw Cut Marks	small bit of cortex remains
4	8	1	1	Level 8	tarsal (astraegalus)	small	lepus americanus	snowshoe hare	1	0.14	100.00%	n	
5	8	1	1	Level 8	radius	small	Aves c.f anatidae	bird, probably duck	1	1.12	100.00%	n	
6	8	1	1	Level 8	sphenoid	large	sus scrofa domesticus	Pig	1	0.98	40.00%	n	juvenile
7	8	1	1	Level 8	right second premolar	medium	sus scrofa domesticus	pig	1	1.69	100.00%	n	
8	8	1	1	Level 8	fragment	large	mammalia	mammal	1	8.85		y- numerous cut marks	
9	8	1	1	Level 8	right ulna	large	sus scrofa domesticus	pig	1	2.68	30.00%	n	juvenile
32	8	1	1	Level 8a	fragment				1	4.06		n	heated/burnt
33	8	1	1	Level 8a	radius	large	sus scrofa domesticus	pig	2	14.28	20.00%	n	immature- part of shaft and unfused epiphysis
34	8	1	1	Level 8a	right radius	large	Bos Taurus	Cattle	1	60	50.00%	y-saw cut	immature-unfused epiphysis
62	6	1	1	Level 6	fragments	large	mammalia	mammal	4	5.84	5.00%	n	burnt, one piece is immature
63	6	1	1	Level 6	fragment		mammalia	mammal	1	0.56	10.00%	Y-sawed	
64	6	1	1	Level 6	unfused distal right ulna	large	Bos Taurus	Cattle	1	13.67	10.00%	Y- sawed	burnt, immature
65	6	1	1	level 6	fragment of scapula	large	mammalia	mammal	1	12.8	10.00%	y- sawed, cut marks	gnawed
66	6	1	1	level 6	vertebrae	medium	mammalia	mammal	1	2.57	25.00%	y- sawed	immature
67	6	1	1	level 6	right tibia	medium	Caprinae	Goat/Sheep	1	37.38	50.00%	y-saw cut, cut marks	
68	6	1	1	Level 6	right calcaneous	medium	caprinae	Goat/Sheep	1	10.17	100.00%	y- cut marks	gnawed
69	6	1	1	level 6	left lunate	large	Bos Taurus	Cattle	1	14.57	100.00%	n	
70	6	1	1	level 6	proximal late scapula	large	Bos Taurus	Cattle	1	19.12	20.00%	y- saw cut, along two planes	
71	6	1	1	level 6	phalanx digit II	small	gallus domesticus	chicken	1	0.2	100.00%	n	

Table A.7 cont. Faunal Remains Recovered in FjPi-170

72	5	1	1	level 5	fragment	large	mammalia	mammal	1	3.06	5.00%	y-saw cut	immature
73	5	1	1	level 5	unfused vertebrael disk	large	mammalia	mammal	1	1.58	30.00%	y-saw cut	immature
74	5	1	1	level 5	fragment	medium	mammalia	mammal	1	3.39	10.00%	y- saw cut	gnawed
75	5	1	1	level 5	shaft of longbone	small	mammalia	mammal	1	0.74	10.00%	n	
76	5	1	1	level 5	femur	small	rodentia	small rodent	1	0.06	90.00%	n	immature
48	4	1	1	level 4	fragments				3	0.47	5.00%	y-one has been chopped	
49	4	1	1	level 4	fragment	large	mammalia	mammal	1	4.51	10.00%	y- cut mark	gnawed
50	4	1	1	level 4	fragment	large	mammalia	mammal	1	1.77	10.00%	n	immature
51	4	1	1	level 4	tibiotarsus	medium	amatidae	waterfowl (goose)	1	2.11	25.00%	n	
52	4	1	1	level 4	thoracic vertebrae	small	mammalia	mammal	1	0.34	90.00%	n	
53	4	1	1	level 4	right lunate	large	Bos Taurus	Cattle	1	23	100.00%	n	
54	4	1	1	level 4	vertebrae	medium	mammalia	mammal	1	0.34	25.00%	n	
55	4	1	1	level 4	fragment	large	mammalia	mammal	1	3.99	10.00%	n	
56	4	1	1	level 4	proximal right femur	small	lepus americanus	snowshoe hare	1	0.7	10.00%	n	immature
24	3	1	1	level 3	rib	medium	mammalia	mammal	1	2.29	25.00%	y- cut mark	
25	3	1	1	level 3	fragments				5	1.57		n	
26	3	1	1	level 3	rib	large	mammalia	mammal	2	1.77	5.00%	n	
27	3	1	1	level 3	fragment	small			1	0.28		n	
28	3	1	1	level 3	fragment	medium			1	0.54		n	
17	2	1	1	level 2	fragment	small	aves	bird	1	0.22		n	
18	2	1	1	level 2	fragment	large			1	3.13		n	
19	2	1	1	level 2	rib	large	Bos Taurus	Cattle	1	17.05	30.00%	y- saw cut and cut marks	gnawing marks
20	2	1	1	level 2	rib	large	mammalia	mammal	1	4.72	10.00%	y- saw cut	gnawing marks
21	2	1	1	level 2	fragment	small			3	0.74		n	gnawing marks
22	2	1	1	level 2	vertebrae	large	mammalia	mammal	2	14.09	30.00%	n	
23	2	1	1	level 2	rib	medium	mammalia	mammal	1	0.19	10.00%	n	
10	1	1	1	level 1	mandible	small	felis domesticus	domestic cat	1	2.26	90.00%	n	
11	1	1	1	level 1	fragments	large	mammalia	mammal	28	15.14		n	Many fragments, some burnt
12	1	1	1	level 1	vertebrae (thoracic)	medium	mammalia	mammal	1	1.03	20.00%	n	
13	1	1	1	level 1	fragment	large	mammalia		1	3.1	5.00%	y- saw cut	

Table A.7 cont. Faunal Remains Recovered in FjPi-170

14	1	1	1	Level 1	fragment	medium-small			1	0.42	10.00%	y- one cut mark	
15	1	1	1	Level 1	fragment				1	0.12			
16	1	1	1	Level 1	right scaphoid	large	Bos Taurus	Cattle	1	26.99	100.00%	n	
46	45	2	1	level 5	fragment		mammalia	mammal	1	1.16	5.00%	n	burnt
44	30	2	1	Level 3	fragment	medium	mammalia	mammal	1	1.77	10.00%	n	
45	30	2	1	Level 3	fragment	medium	mammalia	mammal	1	1.52	5.00%	n	burnt
272	30	2	1	level 3	fragments	large	mammalia	mammal	2	1.75		n	burnt
224	20	2	1	level 2	fragment				1	0.47		n	
43	17	2	1	Level 1	Fragment	large			1	1.69	5.00%	Y-saw cut	
271	17	2	1	level 1	fragment	large	mammalia	mammal	2	1.83		n	burnt
87	47	3	2	Level 15	fragments	mammalia	mammal	3	1.64	60.00%	y- one sawed	some gnawing	
88	46	3	2	Level 14	left mandible with 4 teeth	small	lepus townsendi	jack rabbit	6	1.66	40.00%	n	
89	46	3	2	Level 14	scapula	large	mammalia	mammal	1	6.5	10.00%	y-saw cut	
79	44	3	2	level 13	fragment	medium-small	mammalia	mammal	1	0.09		n	immature
80	44	3	2	level 13	right 3rd metacarpal	small	lepus americanus	snowshoe hare	1	0.14	100.00%	n	
93	42	3	2	Level 11	fragment	large	mammalia	mammal	1	2.16		n	ossified costal cartilage
90	41	3	2	Level 10	lumbar vertebrae	small	leporidae	rabbit of hare	1	0.74	85.00%	y-cut marks	
91	41	3	2	Level 10	vertebrae	large	mammalia	mammal	1	3.23	20.00%	n	immature
85	40	3	2	Level 9	Fragment		mammalia	mammal	1	0.16		y-cut marks	
86	40	3	2	Level 9	fragment	small			1	0.33		n	
78	38	3	2	Level 7	fragment	small	mammalia	mammal	1	0.25		n	immature
81	38	3	2	level 7	fragment				1	0.15		n	burnt
82	38	3	2	Level 7	fragment	medium-small	aves	bird	1	0.47		n	
92	37	3	2	Level 6	fragment	large	mammalia	mammal	1	1.26	5.00%	y- saw cut	burnt
94	35	3	2	level 4	scapula	medium-small	aves	bird	1	0.16	40.00%	n	cracked
83	34	3	2	Level 3	fragment	large	mammalia	mammal	1	3.34		Y-sawcut, and cut marks	burnt
84	34	3	2	Level 3	fragments		mammalia	mammal	4	1.64		n	
265	108	4	1	level 36	right femur	small	gallus domesticus	chicken	1	3.75	100.00%	y- cut marks at proximal end	
215	106	4	1	level 34	fragment		mammalia	mammal	1	0.33		n	
214	100	4	1	level 30	fragment		mammalia	mammal	1	13.29	30.00%	y- partly saw cut	
181	94	4	1	level 26	right femur	large	Bos Taurus	Cattle	2	52.5	50.00%	y-blunt cut marks	immature

Table A.7 cont. Faunal Remains Recovered in FjPi-170

182	94	4	1	level 26	right tibia	large	Bos Taurus	cattle	1	14.31	10.00%	n	immature
216	92	4	1	level 24	fragment		mammalia	mammal	1	1.7		n	gnawed, burnt
264	90	4	1	feature 3	rib	medium	mammalia	mammal	1	3.37	30.00%	y- cut marks	immature
183	82	4	1	level 22	rib	large	Bos Taurus	Cattle	2	17.42	20.00%	y- saw cut, cut marks	green spot on bone
184	82	4	1	level 22	fragments				2	1.11		n	gnawed
185	82	4	1	level 22	vertebrae	small			1	0.26	30.00%	n	immature
186	82	4	1	level 22	fragment	small			1	0.24	10.00%	n	
187	82	4	1	level 22	fragment	medium-small			1	0.95		n	
218	79	4	1	level 20	fragment		mammalia	mammal	1	0.75		n	
136	70	4	1	level 14	fragment	large			1	19.51	5.00%	y-saw cut, slice	
108	69	4	1	level 13	right mandible	small	myodes gappoi	redbacked vole	1	0.07	100.00%	n	
109	69	4	1	level 13	left innominate	medium	caprinae	Goat/Sheep	1	17.69	30.00%	y-cut marks	gnawed
242	67	4	1	level 12	left scapula	medium	caprinae	Goat/Sheep	1	1.54	10.00%	y-sawcut	immature
243	67	4	1	level 12	fragments		mammalia	mammal	2	0.83		n	gnawed
244	67	4	1	level 12	fragment		mammalia	mammal	1	2.62		y- cutmarks	gnawed
245	67	4	1	level 12	right ilium	small	lepus americanus	snowshoe hare	1	0.78	90.00%	n	burnt
246	67	4	1	level 12	thoracic vertebrae	medium	mammalia	mammal	1	3.35	25.00%	n	immature
188	66	4	1	level 11	fragment	large			1	5.25		n	burnt
189	66	4	1	level 11	right spheroid	large	Bos Taurus	cattle	1	34.55	100.00%	n	
190	66	4	1	level 11	rib	large	Bos Taurus	cattle	1	21.73	40.00%	y-saw cut	impact break
191	66	4	1	level 11	thoracic vertebrae	large	Bos Taurus	Cattle	1	4.01	15.00%	y-saw cut	
192	66	4	1	level 11	vertebrae		mammalia	mammal	1	0.72	5.00%	n	immature
193	66	4	1	level 11	vertebrae		mammalia	mammal	1	1.86	25.00%	n	immature
270	66	4	1	level 11	fragment		mammalia	mammal	1	0.21		n	burnt
137	63	4	1	level 9	ribs	medium large			2	4.15	5.00%	n	gnawed on
138	63	4	1	level 9	left mandible	small	sciuridae	squirrel	1	0.18	95.00%	n	
139	63	4	1	level 9	lumbar vertebrae	large	Bos Taurus	Cattle	1	30.07	25.00%	y-saw cut, and cut marks along transverse process.	gnawed.
140	63	4	1	level 9	vomer	medium-small	essox lucius	Northern Pike	1	0.72	20.00%	n	
141	63	4	1	level 9	ethnoid	medium-small	essox lucius	Northern Pike	1	0.51	60.00%	n	

Table A.7 cont. Faunal Remains Recovered in FjPi-170

110	62	4	1	level 8	fragment of long bone	large	mammalia	mammal	1	9.77	10.00%	y-sawcut, sliced	
111	62	4	1	level 8	left radius	large	Bos Taurus	Cattle	1	>60	45.00%	y- saw cut, cut mark	gnawed
112	62	4	1	level 8	fragment of long bone	large	mammalia	mammal	1	10.22	10.00%	y- saw cut	
113	62	4	1	Level 8	axis vertebrae	large	Bos Taurus	Cattle	1	20.35	20.00%	y- saw cut	
114	62	4	1	level 8	left navicular	large	Bos Taurus	Cattle	1	48.62	100.00%	n	
115	62	4	1	level 8	ribs	medium	mammalia	mammal	2	1.38	25.00%	n	
116	62	4	1	level 8	ribs	medium	Caprinae	Goat/Sheep	1	3.98	45.00%	n	
117	62	4	1	level 8	vertebrae	medium	mammalia	mammal	1	0.57	15.00%	n	weathered
118	62	4	1	level 8	incisor	large	Bos Taurus	Cattle	1	1.18	90.00%		
119	62	4	1	level 8	Fragment	large	mammalia	mammal	1	7.81	20.00%		
120	62	4	1	level 8	fragment		mammalia	mammal	1	0.5		n	
259	62	4	1	level 8	long bone fragment	medium	aves	large bird	1	2.51		y - cut marks	
260	62	4	1	level 8	fragment	small			1	0.33		n	
266	62	4	1	level 8	ossified costal cartilage	large	Bos Taurus	cattle	1	17.33		y- saw cut, cut marks	
267	62	4	1	level 8	long bone fragment	medium	mammalia	mammal	1	6.84		y- cut marks	
268	62	4	1	level 8	cranial fragment	medium	mammalia	mammal	1	1.17		n	
269	62	4	1	level 8	rib		mammalia	mammal	1	4.19	20.00%	y- saw cut	
207	60	4	1	level 6	fomoral head, right	large	bos taurus	cattle	1	39.79	90.00%	y-deep cut marks	immature
208	60	4	1	level 6	fragment		mammalia	mammal	1	3.17		y- saw cut	gnawed
209	60	4	1	level 6	right humerous	small	felis domesticus	domestic cat	1	0.42	30.00%	n	juvenile
210	60	4	1	level 6	rib	medium	mammalia	mammal	1	2.07	30.00%	y-saw cut	
211	60	4	1	level 6	fragment	large	mammalia	mammal	1	9.95		n	
212	60	4	1	level 6	right cuneiform (ankle bone)	large	Bos Taurus	Cattle	1	16.4	100.00%	n	
213	60	4	1	level 6	vertebrae	small	mammalia	mammal	1	0.07	100.00%	n	
250	60	4	1	level 6	right magnum (skull)	large	Bos Taurus	cattle	1	31.59	100.00%	n	very big animal
251	60	4	1	level 6	fragments				4	1.01		n	
252	60	4	1	level 6	rib	medium			1	2.02	10.00%	n	chunk removed, well worn
253	60	4	1	level 6	fragments	large	mammalia	mammal	2	8.27		n	gnawed
254	60	4	1	level 6	left scapula	large	sus scrofa	pig	1	3.07	30.00%	n	immature
255	60	4	1	level 6	thoracic vertebrae epiphysis	medium	mammalia	mammal	1	0.56	100.00%	n	immature

Table A.7 cont. Faunal Remains Recovered in FjPi-170

256	60	4	1	level 6	vertebrae epiphysis	large	mammalia	mammal	1	4.64	30.00%	n	
261	59	4	1	level 5	lumbar vertebrae	small	mammalia	mammal	1	0.33	90.00%	n	immature
262	59	4	1	level 5	right femur	large	mammalia	mammal	1	10.79	5.00%	y- saw cut, slice	
263	59	4	1	level 5		small	lethys	fish	1	0.27		n	
257	58	4	1	level 4	right femur	large	Bos Taurus	Cattle	1	49.68	20.00%	y- saw cut	immature
258	58	4	1	level 4	fragment		mammalia	mammal	1	0.29		n	
229	57	4	1	feature 1	vertebrae	large	mammalia	mammal	1	10.08	20.00%	y-sawcut	
230	57	4	1	feature 1	phalanx	small	mammalia	mammal	1	0.09	100.00%	n	
231	57	4	1	feature 1	vertebrae	large	mammalia	mammal	1	8.04	20.00%	n	
247	57	4	1	feature 1	fragments		mammalia	mammal	2	0.47		n	
248	57	4	1	feature 1	right ulnar cuneiform	large	Bos Taurus	cattle	1	25.77	100.00%	n	
249	57	4	1	feature 1	fragment	small	mammalia	mammal	1	0.32		n	
126	56	4	1	level 4	left humerous	medium	sus scrofa	pig	1	3.23	20.00%	n	immature (baby)
127	56	4	1	level 4	left radius	large	sus scrofa	pig	1	17.26	60.00%	y-saw cut	
128	56	4	1	level 4	left magnum	large	Bos Taurus	Cattle	1	14.79	100.00%	n	
129	56	4	1	level 4	lumbar vertebrae	medium	caprinae	Goat/Sheep	1	3.16	20.00%	n	
130	56	4	1	level 4	fragments				5	2.04		y- cut marks on one	2 fragments gnawed on
131	56	4	1	level 4	caudel vertebrae	large	Bos Taurus	Cattle	1	4.25		n	immature
132	56	4	1	level 4	femur	small			1	0.66	20.00%	N	immature
232	56	4	1	level 4	long bone	small			2	0.62	30.00%	n	
233	56	4	1	level 4	fragments		mammalia	mammal	8	6.51		n	1 gnawed, 1 burnt
234	56	4	1	level 4	fragments	small			4	0.66		n	
235	56	4	1	level 4	left mandible with teeth	large	sus scrofa	pig	1	3.44	10.00%	n	
236	56	4	1	level 4	fragment		mammalia	mammal	1	1.59		n	immature
237	56	4	1	level 4	left humerous	small	lepus americanus	snowshoe hare	1	0.4	40.00%	n	
238	56	4	1	level 4	left corecoid	small	gallus domesticus	chicken	1	0.98	98.00%	y-cut marks	
239	56	4	1	level 4	epiphysis of left calcaneous	large	bos taurus	cattle	1	15.97	90.00%	y-cut marks	immature
240	56	4	1	level 4	zygomatic process of left squamosel	small	lepus americanus	snowshoe hare	1	0.17	30.00%	n	
241	56	4	1	level 4	left scapula	small	lepus americanus	snowshoe hare	1	0.06	20.00%	n	
194	55	4	1	level 3	fragment				1	0.46		n	

Table A.7 cont. Faunal Remains Recovered in FjPi-170

195	55	4	1	level 3	metapodial	medium	mammalia	mammal	1	6.53	20.00%	y-cut marks	gnawed
196	55	4	1	level 3	left scapula	medium	mammalia	mammal	1	3.07	20.00%	n	
197	55	4	1	level 3	left maxilla with four teeth	large	sus scrofa	pig	1	19.43	30.00%	y-cut mark	
198	55	4	1	level 3	tooth (p3)	large	sus scrofa	pig	1	0.24	40.00%	n	burnt
199	55	4	1	level 3	tooth il	large	sus scrofa	pig	1	3.14	90.00%	n	
200	55	4	1	level 3	fragments		mammalia	mammal	6	1.1		n	gnawed
201	55	4	1	level 3	right femur	small	gallus domesticus	chicken	1	3.15	30.00%	n	
202	55	4	1	level 3	fragment	large			1	0.67		n	burnt
203	55	4	1	level 3	fragments				2	0.77		n	one is tooth
204	55	4	1	level 3	phalanx	small	lepus americanus	snowshoe hare	1	0.08	90.00%	n	
205	55	4	1	level 3	phalanx	small	lepus americanus	snowshoe hare	1	0.08	30.00%	n	
206	55	4	1	level 3	tooth from left mandible	small	Ondatra zibethicus)	muskrat	1	0.25	80.00%	n	
121	54	4	1	level 2	fragment		mammalia	mammal	1	0.81		n	burnt
270	54	4	1	level 2	fragment		mammalia	mammal	4	5.22		n	gnawed on
122	54	4	1	level 2	tooth	small	mammalia	mammal	1	0.27	100.00%	n	
123	54	4	1	level 2	left femur, proximal	small	leporidae	rabbit	1	0.54	20.00%	n	immature
124	54	4	1	level 2	right scapula	large	Bos Taurus		1	36.1	10.00%	y- saw cut	
125	54	4	1	level 2	clavicle, left portion	small	gallus domesticus	chicken	1	0.42	50.00%	n	
133	53	4	1	level 1	left femur	large	Bos Taurus	cattle	1	>60	25.00%	y- saw cut at both ends	
134	53	4	1	level 1	left scapula	large	Bos Taurus	Cattle	1	44.61	25.00%	y- saw cut	
135	53	4	1	level 1	fragments				5	2.55		n	2 fragments gnawed on
169	68	5	1	level 3	right femur distal end	small	lepus americanus	snowshoe hare	1	0.48	20.00%	n	
170	68	5	1	level 3	fragment	small			1	0.6		n	
168	65	5	1	level 2	fragment	medium-small			1	0.62		y-saw cut at both ends	
171	61	5	1	level 1	large fragment	large	mammalia	mammal	1	16.72		y- saw cut, many cut marks	
172	61	5	1	level 1	rib	large	mammalia	mammal	1	4.82	5.00%	y-sawcut	
173	61	5	1	level 1	fragments		mammalia	mammal	1	1.95		n	
174	61	5	1	level 1	left humerous	small	turdus migratorius	american robin	1	0.17	100.00%	n	
175	61	5	1	level 1	left ulna	small	turdus migratorius	american robin	1	0.1	90.00%	n	
176	61	5	1	level 1	axis vertebrae	large	Bos Taurus	cattle	1	17.47	15.00%	n	
177	61	5	1	level 1	rib	medium			1	5.37	30.00%		

Table A.7 cont. Faunal Remains Recovered in FjPi-170

178	61	5	1	level 1	fragment	medium			1	2.17		n	
179	61	5	1	level 1	left ischium	large	Bos Taurus	cattle	1	58.38	40.00%	Y-sawcut	immature
180	61	5	1	level 1	fragment	large			1	4.08			immature
217	61	5	1	level 1	fragment		mammalia	mammal	1	0.4		n	burnt
219	87	6	1	level 4	rib	large	mammalia	mammal	1	3.65	10.00%	y- cut marks	
220	87	6	1	level 4	fragments		mammalia	mammal	2	0.99		y- saw cut	immature
221	87	6	1	level 4	fragment				1	0.5		n	
223	84	6	1	level 3	fragments		mammalia		2	0.32		n	
225		6	1	PLI-5	radius	small	anatidae	duck	2	0.56	90.00%	n	
226		6	1	PLI-5	right ulna	small	anatidae	duck	1	1.95	70.00%	n	
227		6	1	PLI-5	fragment		mammalia	mammal	1	0.58		n	
228		6	1	PLI-5	fragment		aves	bird	1	0.22		n	
160	122	7	2	level 15	innominate	small	leporidae	rabbit	1	0.47	30.00%	n	
161	122	7	2	level 15	fragments				2	1.34		n	gnawed
162	122	7	2	level 15	condyle	medium-small	mammalia	mammal	1	0.49		n	
156	121	7	2	level 14	rib	medium-small	mammalia	mammal	1	1.17	10.00%	n	
157	121	7	2	level 14	fragments		mammalia	mammal	2	0.31		n	
158	121	7	2	level 14	fragment	medium-small	mammalia	mammal	1	0.27		n	
142	120	7	2	level 13	fragment		mammalia	mammal	1	1.11		n	
148	119	7	2	level 12	fragment		mammalia	mammal	1	0.49		n	
163	118	7	2	level 11	fragment		mammalia	mammal	1	0.22		n	
164	118	7	2	level 11	fragments		mammalia	mammal	4	1.31		n	
165	118	7	2	level 11	1st right molar	large	sus scrofa	pig	1	5.57		y- 1 cut mark	
166	118	7	2	level 11	long bone fragment	large	mammalia	mammal	1	18.05		y- sawcut, cut holes	
167	118	7	2	level 11	fragment	medium-large	mammalia	mammal	1	2.49		n	immature
144	117	7	2	level 10	fragments		mammalia	mammal	3	17.81		n	one gnawed on
145	117	7	2	level 10	fragment		mammalia	mammal	1	10.54		y-cut marks	
146	117	7	2	level 10	fragments		mammalia	mammal	3	10.32		n	
149	115	7	2	level 8	rib	large	mammalia	mammal	1	11.61		y- saw cut, and cut marks	gnawed
151	114	7	2	level 7	fragment		mammalia	mammal	2	0.43		n	gnawed
152	114	7	2	level 7	rib	small	mammalia	mammal	1	0.56		y-cut marks	
153	114	7	2	level 7	fragment	small	mammalia	mammal	1	0.18		n	
154	114	7	2	level 7	long bone fragment	small			1	0.29		n	

Table A.7 cont. Faunal Remains Recovered in FjPi-170

155	114	7	2	level 7	fragment	small			1	0.12		n	
150	112	7	2	level 5	fragment		mammalia	mammal	1	1.49		y- cut marks	
147	111	7	2	level 14	fragment		mammalia	mammal	2	1.04		n	gnawed
143	86	7	2	level 1	fragment		mammalia	mammal	1	1.66		n	
159	84	7	2	level 3	fragments	large	mammalia	mammal	2	2.81		n	

Table A.7 cont. Faunal Remains Recovered in FjPi-170

<u>Faunal Analysis</u>

Area 1				# of Bones from different types of animals					Industrial Markings
Occupation	# of bones	Weight of bones (g)	# of Identifiable Elements	Large	Medium	Medium-small or small animals	Domestic	Wild	Saw Marks
1	9	70.89	5	2		3	2	3	0
2	62	340.72	30	19	15	9	13	8	9
3a	357	713.5	32	15	5	19	18	15	5
3b	66	477.06	44	26	10	14	22	8	20
Deep Pit	5	67.79	2	1	0	1	2	0	2

Table A.8 Faunal Data associated with the different occupations of Area 1 in FjPi-170.

Area 2				# of Bones from different types of animals					Industrial Markings
Occupation	# of bones	Weight of bones (g)	# of Identifiable Elements	large	medium	medium-small or small animals	domestic	wild	Saw Marks
1	10	5.09	3	0	0	4	0	4	0
2	28	89.32	5	5	0	1	5	1	3
3	17	10.56	5	3	0	10	1	4	1
Demolition	7	6.63	1	1	0	1	1	1	1

Table A.9 Faunal Data associated with the different occupations of Area 2 in FjPi-170.

Functional Analysis

Area 1	Occupation 1		Occupation 2		Occupation 3a		Occupation 3b		Deep Pit	
Artifact Function	Count	%	Count	%	Count	%	Count	%	Count	%
CONSTRUCTION	69	43.13%	336	48.84%	404	42.30%	292	42.07%	33	24.81%
Nails/screws/bolts	18	11.25%	184	26.74%	317	33.19%	106	15.27%	4	3.01%
Brick/Concrete	0	0.00%	6	0.87%	12	1.26%	32	4.61%	1	0.75%
Pane Glass	1	0.63%	3	0.44%	11	1.15%	3	0.43%	1	0.75%
Other	28	17.50%	39	5.67%	22	2.30%	39	5.62%	26	19.55%
Lining	20	12.50%	103	14.97%	43	4.50%	108	15.56%	1	0.75%
Electricity	0	0.00%	3	0.45%	0	0.00%	4	0.58%	0	0.00%
LEISURE	0	0.00%	4	0.58%	11	1.15%	11	1.59%	1	0.75%
smoking	0	0.00%	3	0.44%	11	1.15%	11	1.59%	0	0.00%
toys	0	0.00%	1	0.15%	0	0.00%	0	0.00%	1	0.75%
FOOD CONSUMPTION	8	5.00%	166	24.13%	220	23.04%	213	30.69%	21	15.79%
Storage	5	3.13%	142	20.64%	189	19.79%	187	26.95%	5	3.76%
Storage-Beverage	1	0.63%	13	1.89%	0	0.00%	6	0.86%	13	9.77%
Serving	2	1.25%	10	1.45%	33	3.46%	20	2.88%	3	2.26%
other	1	0.63%	1	0.15%	5	0.52%	0	0.00%	0	0.00%
HEATING	47	29.38%	83	12.06%	217	22.72%	68	9.80%	25	18.80%
Coal	7	4.38%	80	11.63%	214	22.41%	52	7.49%	5	3.76%
Wood	40	25.00%	10	1.45%	3	0.31%	16	2.31%	20	15.04%
FURNITURE	0	0.00%	0	0.00%	1	0.10%	1	0.14%	0	0.00%

Table A.10 Functional Analysis of Non-Faunal Material Culture recovered from Area 1

MISC TOOLS	0	0.00%	3	0.44%	4	0.42%	6	0.86%	5	3.76%
CLOTHING	0	0.00%	6	0.87%	13	1.36%	5	0.72%	0	0.00%
Buttons	0	0.00%	1	0.15%	8	0.84%	2	0.29%	0	0.00%
Pins	0	0.00%	2	0.29%	0	0.00%	0	0.00%	0	0.00%
Buckles	0	0.00%	0	0.00%	1	0.10%	0	0.00%	0	0.00%
Other	0	0.00%	3	0.44%	4	0.42%	3	0.43%	0	0.00%
ADORNMENT/DECORATION	0	0.00%	3	0.44%	4	0.42%	1	0.14%	0	0.00%
HYGIENE/HEALTH	0	0.00%	9	1.31%	5	0.52%	13	1.87%	3	2.26%
Grooming	0	0.00%	2	0.29%	1	0.10%	1	0.14%	2	1.50%
Medicinal	2	1.25%	7	1.02%	4	0.42%	18	2.59%	1	0.75%
FIRE	0	0.00%	37	5.38%	51	5.34%	37	5.33%	0	0.00%
WRITING	0	0.00%	5	0.73%	1	0.10%	9	1.30%	29	21.80%
FOOD PRODUCTION	0	0.00%	1	0.15%	4	0.42%	1	0.14%	0	0.00%
Hunting	0	0.00%	1	0.15%	4	0.42%	1	0.14%	0	0.00%
Gardening	0	0.00%	0	0.00%	0	0.00%	1	0.14%	0	0.00%
UID	33	20.63%	31	4.51%	19	1.99%	41	5.91%	20	15.04%
Total	160	100.00%	688	100.00%	955	100.00%	694	100.00%	133	100.00%

Table A.10 cont. Functional Analysis of Non-Faunal Material Culture recovered from Area 1

Area 2	Occupation 1		Occupation 2		Occupation 3		Demolition	
Artifact Function	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
CONSTRUCTION	14	43.75%	94	59.87%	96	50.26%	344	80.00%
Nails/screws/bolts	10	31.25%	66	42.04%	54	28.27%	43	10.00%
Brick/Concrete	3	9.38%	2	1.27%	13	6.81%	250	58.14%
Pane Glass	0	0.00%	0	0.00%	4	2.09%	43	10.00%
Other	1	3.13%	16	10.19%	12	6.28%	8	1.86%
Lining	0	0.00%	10	6.37%	13	6.81%	0	0.00%
Electricity	0	0.00%	0	0.00%	0	0.00%	0	0.00%
LEISURE	0	0.00%	0	0.00%	0	0.00%	1	0.23%
smoking	0	0.00%	0	0.00%	0	0.00%	0	0.00%
toys	0	0.00%	0	0.00%	0	0.00%	1	0.23%
FOOD CONSUMPTION	2	6.25%	24	15.29%	21	10.99%	27	6.28%
Storage	2	6.25%	4	2.55%	7	3.66%	16	3.72%
Storage-Beverage	0	0.00%	3	1.91%	3	1.57%	2	0.47%
Serving	0	0.00%	0	0.00%	11	5.76%	8	1.86%
other	0	0.00%	17	10.83%	0	0.00%	1	0.23%
HEATING	13	40.63%	31	19.75%	53	27.75%	16	3.72%
Coal	3	9.38%	19	12.10%	35	18.32%	14	3.26%
Wood	10	31.25%	12	7.64%	18	9.42%	2	0.47%
FURNITURE	0	0.00%	1	0.64%	1	0.52%	0	0.00%

Table A.11 Functional Analysis of Non-Faunal Material Culture recovered from Area 2

MISC TOOLS	0	0.00%	1	0.64%	0	0.00%	4	0.93%
CLOTHING	1	3.13%	0	0.00%	4	2.09%	4	0.93%
Buttons	0	0.00%	0	0.00%	3	1.57%	1	0.23%
Pins	0	0.00%	0	0.00%	0	0.00%	1	0.23%
Buckles	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Other	1	3.13%	0	0.00%	1	0.52%	2	0.47%
ADORNMENT/DECORATION	0	0.00%	2	1.27%	2	1.05%	2	0.47%
	0	0.00%	0	0.00%	0	0.00%	0	0.00%
HYGIENE/HEALTH	0	0.00%	0	0.00%	4	2.09%	0	0.00%
Grooming	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Medicinal	0	0.00%	0	0.00%	4	2.09%	0	0.00%
FIRE	0	0.00%	0	0.00%	6	3.14%	19	4.42%
WRITING	0	0.00%	0	0.00%	0	0.00%	0	0.00%
FOOD PRODUCTION	0	0.00%	0	0.00%	0	0.00%	7	1.63%
Hunting	0	0.00%	0	0.00%	0	0.00%	1	0.23%
Gardening	0	0.00%	0	0.00%	0	0.00%	6	1.40%
UID	6	18.75%	4	2.55%	4	2.09%	6	1.40%
Total	32	100.00%	157	100.00%	191	100.00%	430	100.00%

Table A.11 cont. Functional Analysis of Non-Faunal Material Culture recovered from Area 2

Chemical Analysis

Sample (Year)	Heavy Metal (Pb, As, Cd, Sb, Ni, Se, Be)	Mercury (Hg)	As	Be	Cd	Ni	Pb	Sb	Se	V
			µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
(#1) 2016 Unit 7, Level 16, Bottom of Unit	Yes	Yes	6.2	1.14	0.29	21.4	11.6	0.53	0.35	66.9
(#2) 2016 Unit 7, Profile Level 10	Yes	Yes	6.6	1.15	0.36	21.5	16.1	0.76	0.55	70.0
(#3) 2016 Unit 7, Profile Level 9	Yes	Yes	8.9	1.54	0.48	30.2	27.2	1.23	0.55	79.1
(#4) 2016 Unit 7, Profile Level 7	Yes	No	8.0	1.00	0.25	19.6	23.9	0.55	0.24	60.4
(#5) 2016 Unit 7, Level 4 (LRF 111)	Yes	No	6.4	1.34	0.51	21.4	102.3	0.91	0.34	55.3

Table A. 12: Chemical analysis of soils from Ross Acreage.

Images

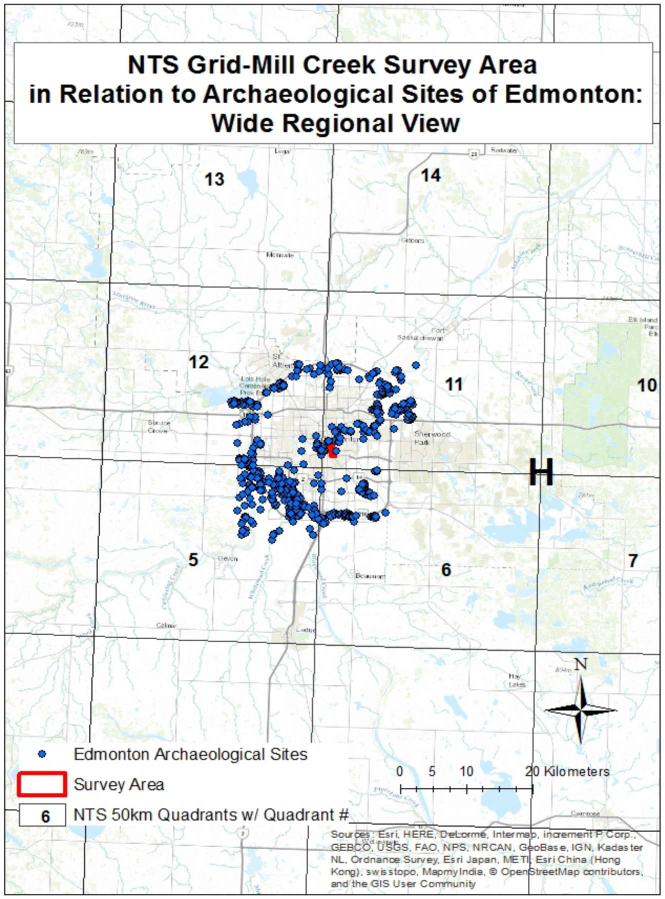

Image A.1 NTS regional Map showing location of Project Survey and surrounding sites in Edmonton. Map by Author.

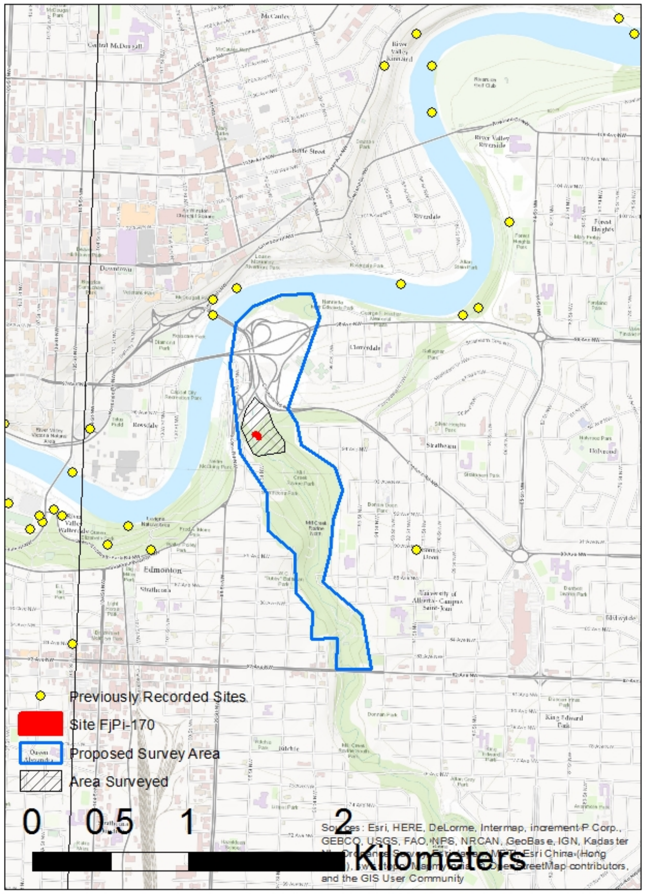

Image A.2 Map showing the area surveyed, the original survey area proposed in the permit application, and surrounding sites in Edmonton. Map by Author.

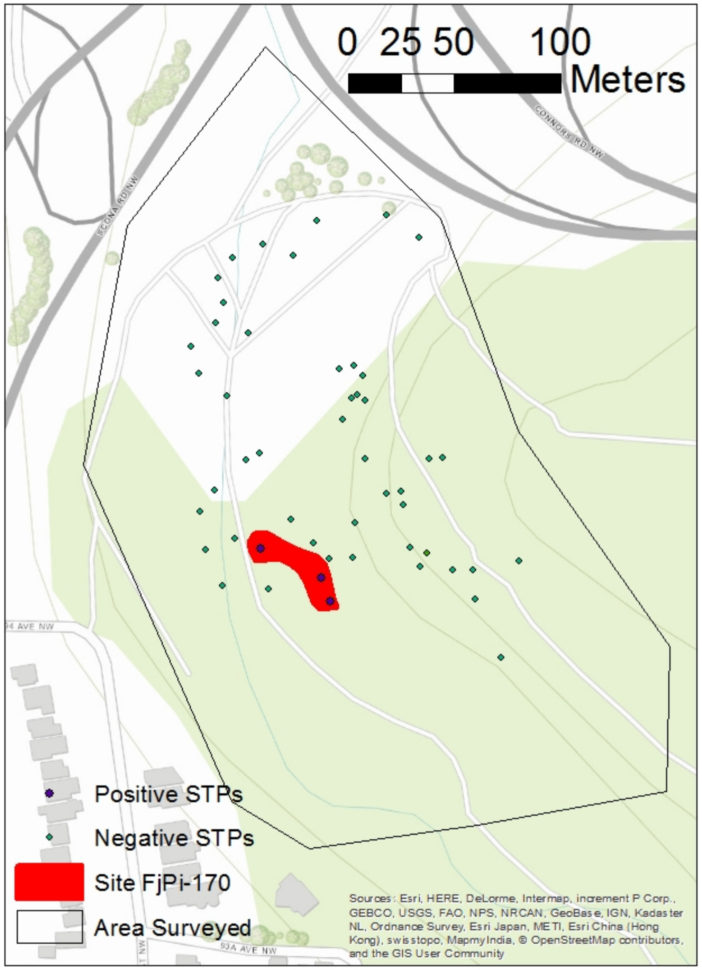

Image A.3 Positive and Negative STPs in the Survey Area. Map by Author.

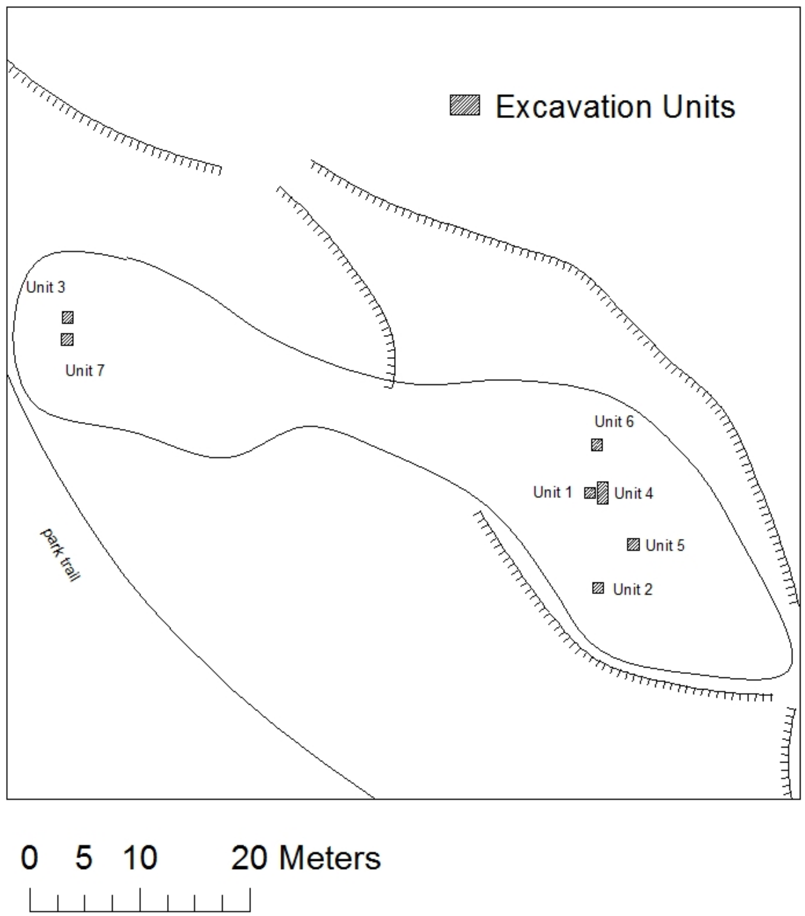

Image A.4 Excavation Units in FjPi-170. Map by Author.

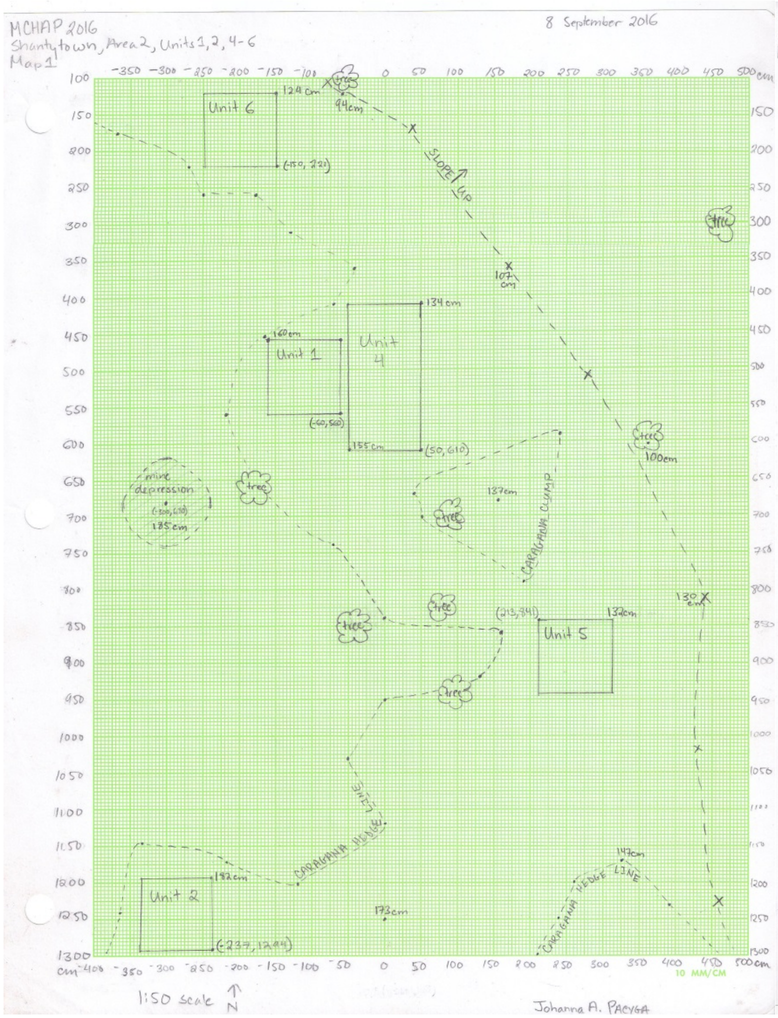

Image A.5 Site Map, Area 1. Drawn by Johanna Pacyga

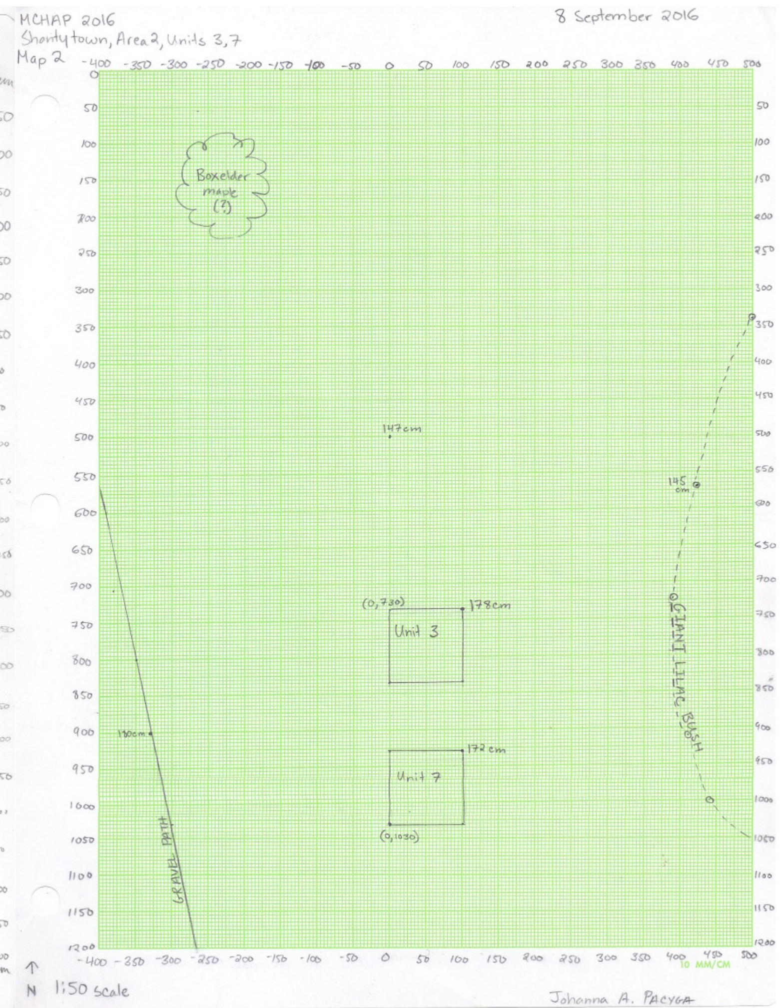

Image A.6 Site Map, Area 2. Drawing by Johanna Pacyga.

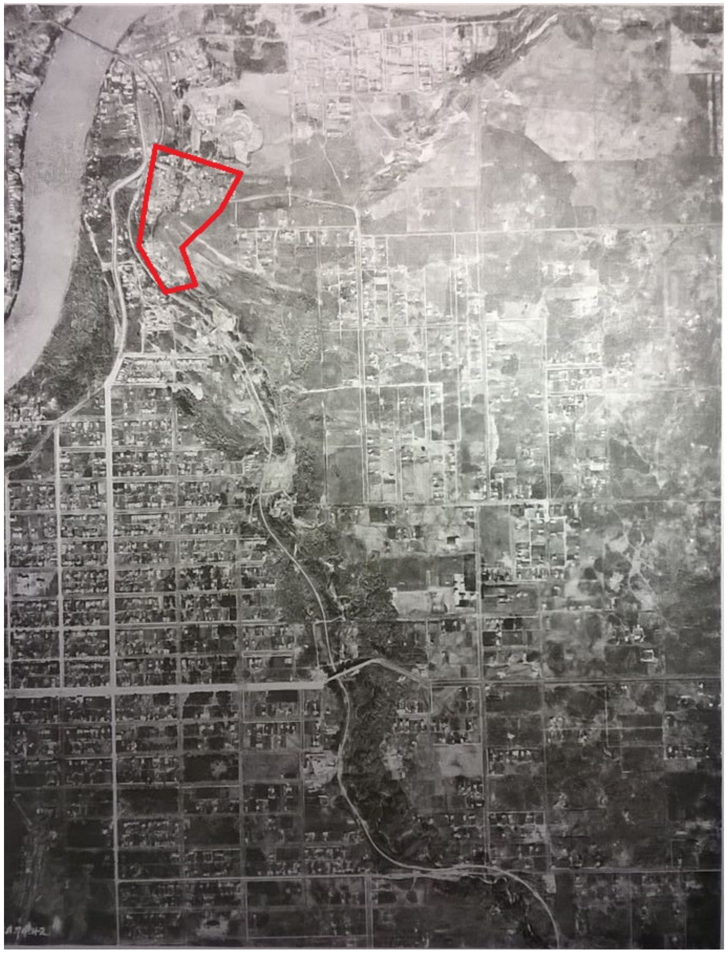

Image A.7 Mill Creek Ravine in 1920. The red polygon highlights the community of Ross Acreage. Image Courtesy of City of Edmonton Archives.

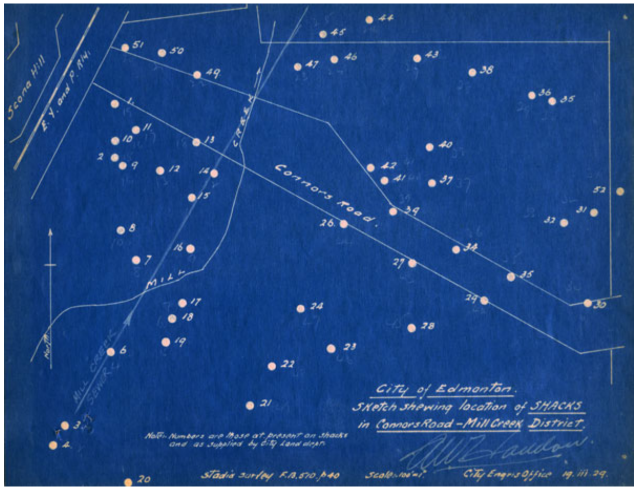

Image A.8 1929 map of Ross Acreage commissioned by the city. Image courtesy of the City of Edmonton Archives.

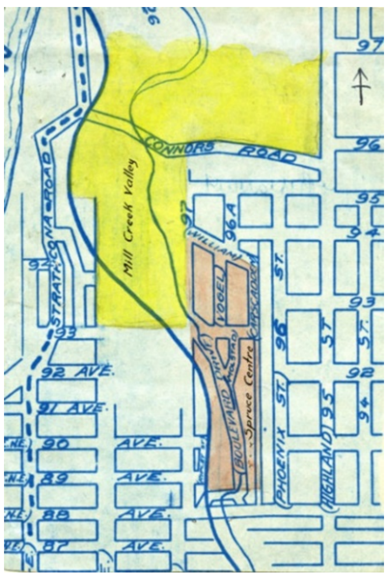

Image A.9 1929 Hand drawn Map of Ross Acreage. Image courtesy of the City of Edmonton Archives.

Unit Profiles:

Image A.10 Area 1, Unit 1, South Profile. Pit. Photo by Author.

Image A.11 Area 1, Unit 4, West Profile. Photo by author.

Image A.12 Area 2, Unit 3, E Profile. Photo by author.

. **Image A.13** Area 2, Unit 7, North Profile. Photo by author.

Image A.14 Area 1, In Situ wooden posts in Unit 4. Photo by author.

Image A.15 Area 1, Unit 4, Bottom of the Pit Feature. Photo by author.

Image A.16 Area 1, Unit 1, Feature 2. In situ articulated chicken skeleton. Photo by author.

Image A.17 Area 1, Unit 1, Feature 1. Pile of tin cans and sawed cattle bone. Photo by author.

Appendix B: Excavations of Vogel's Meats FjPi-173

STP Results

STP #	Depth (cm)	Result
1	63	Negative
2	73.5	Negative
3	70	Negative
4	70	Negative
5	80	Negative
6	70	Negative
7	72	Negative
8	70	Negative
9	70	Negative
10	50	Negative
11	50	Postive
12	60	Positive
13	60	Negative
14	43	Positive
15	60	Negative
16	60	Negative
17	60	Positive
18	60	Positive
19	60	Negative
20	62	Negative
21	48	Positive
22	60	Negative
23	70	Negative
24	65	Positive
25	70	Negative
26	60	Positive

Table B.1 STP results

<u>Artifact Lists by Material</u>

Metal

LRF	Unit	Level	Type	Description	Count	Weight (g)	Artifact ID
1	Unit 1	1	Nail	Wire nail	1	4.5	1
1	Unit 1	1	Nail	Wire Nail	1	1.1	2
1	Unit 1	1	Nail	Nail/metal fragments	8	14.4	3
9	Unit 1	F1	Nails	Nail fragments	3	46.8	4

Table B.2 Metal artifacts

7	Unit 1	2	Nails	Whole nails and metal fragments	59	159.3	5
7	Unit 1	2	Handle	Oval shaped metal handle	1	200.2	6
13	Unit 1	3	-	Short, solid cylindrical tube of metal/possible counterweight	1	1493.6	7
13	Unit 1	3	-	Short, solid cylindrical tube of metal/possible counterweight	1	1414.1	8
13	Unit 1	3	-	Metal plate, thin and slightly curved	1	377.2	9
13	Unit 1	3	Nails	Nail fragments	59	200.2	10
17	Unit 1	5	Nails	Nail fragments	2	5.9	11
20	Unit 1	8	Nails	Curved whole nail	1	16	12
4	Unit 2	2	Nail Frags	Various sizes, with various amounts of rust. Some incomplete. Some straight some bent.	45	298	13
4	Unit 2	2	Wire	Bent metal wire roughly in the shape of a S.	5	97.4	14
4	Unit 2	2	Wire	Wire	3	4.2	15
4	Unit 2	2	Washers	Flat, circular plates of metal; fragmented; one has a hole in the center – maybe a washer	7	3.8	16
14	Unit 2	5	XLarge Nail	A large rusty wire nail	1	42.5	17
2	Unit 2	1	Small to Large Nails	Size range: 2.5 cm- 10.5 cm 4 bent nails	17	113.3	18
2	Unit 2	1	Clothes pin Springs	Springs wider apart and thicker than modern clothespin springs	4	10.2	19
2	Unit 2	1	Bottle caps	Plastic seal in top of cap	1	0.5	20
2	Unit 2	1	Screw	Slotted head, 4 cm long	1	2.3	21
2	Unit 2	1	Metal Frags	3 thin, flat, rusty pieces and 1 small, thin, half sphere, rusty	4	1.4	22
4	Unit 2	2	Nail	Thin, bent	1	0.5	23
6	Unit 2	2	Nail	Varying sizes, range between 2 cm and 11 cm.	23	150.7	24
6	Unit 2	3	Wire	Short, thin, bent	4	3.7	25
10	Unit 2	4	Nail	Varying sizes, range between 4.5 cm and 12.5 cm.	9	116	26
10	Unit 2	4	Washer	Flat, thin disc, hole in center (0.75 cm diameter), 1.5 cm diameter total,	1	2.1	27
12	Unit 2	4	Medium to Large Nails	Varying sizes, range between 5 cm to 12.5 cm. Feature 1.	4	71.4	28
12	Unit 2	4	Screw	Two 6.5 cm screws, one 3 cm screw. Feature 1.	3	10.3	29
15	Unit 3	5A	Wire	Large, rusted pieces of wire	3	70.3	30

Table B.2 cont. Metal artifacts

48	Unit 3	7	Nails	Small Siding Nail	1	0.6	31
48	Unit 3	7	Flat Metal	Fragments of flat metal bands	25	102.8	32
48	Unit 3	7	Nails	Medium Sized nails, approx. 7cm long on average	18	95.7	33
48	Unit 3	7	Nails	UID Wire Nails Fragments	22	28.4	34
48	Unit 3	7	Nails	Very Large Wire Nail	1	58.9	35
48	Unit 3	7	UID Metal	UID Metal Fragments	32	124.8	36
48	Unit 3	7	Wire	Curved Metal Wire	1	7.6	37
48	Unit 3	7	Hook	3 Large heavy meat hooks, 1 for a conveyer belt	3	760.8	38
34	Unit 3	Level 6	Thin Sheet Metal Bands	Small fragments of Flat Metal Bands	16	83.6	39
34	Unit 3	Level 6	Thin Sheet Metal w/rivet	Single thin piece of sheet metal with rivet.	1	14.4	40
34	Unit 3	Level 6	Meat Hook	Single small Meat hook w/ square back piece to connect to a conveyor belt	1	225.2	41
34	Unit 3	Level 6	Extra Large Nail	One very large nail	1	52.8	42
34	Unit 3	Level 6	Curved Wire	Two pieces of curved wire, likely from bucket handle	2	17.4	43
34	Unit 3	Level 6	UID Metal Fragments	Small thin UID metal fragments	80	20.6	44
34	Unit 3	Level 6	Large Framing Nails	8 large framing nails, approximately 11cm long	8	114.6	45
34	Unit 3	Level 6	Medium Decking nails	Medium sized nails, approximately 6cm long on average	22	109.9	46
34	Unit 3	Level 6	Thick Sheet Metal	Single piece of .5cm thick sheet metal	1	9.8	47
34	Unit 3	Level 6	Small Siding Nails	3 small siding nails	3	4.9	48
34	Unit 3	Level 6	UID Wire Nail frags	33 small to large wire nail fragments	33	60	49
34	Unit 3	Level 6	Thin Sheet Metal Frags	252 thin medium to large fragments of sheet metal	252	352.4	50
55	Unit 3	Level 8	Thin Sheet metal frags	Three small fragments of sheet metal, w/ small rivet on one fragments	3	12.4	51
55	Unit 3	Level 8	Small Siding Nail	Small wire nail (Siding)	1	1.4	52
5	Unit 3	2	Nails		15	59.5	53

Table B.2 cont. Metal artifacts

5	Unit 3	2	Nails		2	21.4	54
8	Unit 3	3		Flat piece of thin metal	1	3.1	55
8	Unit 3	3	Nails		2	1.2	56
8	Unit 3	3	Nails		40	90.5	57
8	Unit 3	3	Nut	large nut (bolt)	1	51.7	58
8	Unit 3	3	Metal pin		1	28.5	59
8	Unit 3	3	Metal	Assorted pieces of broken metal	11	30.5	60
11	Unit 3	4	Metal Nut	Large metal nut	1	21.4	61
11	Unit 3	4	Metal	Thin pieces of metal	157	155.9	62
11	Unit 3	4	Nails	Broken rusted nails	65	113.3	63
11	Unit 3	4	Metal handle	Rusted metal drawer/cabinet handle	1	55.2	64
11	Unit 3	4	Pipe	Piece of rusted metal pipe	1	197	65
11	Unit 3	4	Staples	Construction staples	17	11.3	66
8	Unit 3	3	Nails	Broken rusted nails	24	62.9	67
8	Unit 3	3	Clinker		6	12.2	68
8	Unit 3	3	Thin	Thin strips of metal	5	5.8	69
8	Unit 3	3	Staple		1	0.4	70
15	Unit 3	5	Bullet Cartridges		15	59.7	71
34	Unit 3	6	Bullet Cartridges		122	445.1	72
55	Unit 3	8	Bullet Cartridges		3	15.3	73
3	Unit 3	1	Nails	Nail fragments, there is one fragment with a head on it	9	9.5	74
3	Unit 3	1	Flat	Flat rectangular piece of metal, also a small rectangular flake	2	10.7	75
3	Unit 3	1	Nut	Small square nut that is open at one end and has a round center cut out, spiral pattern for a screw on the inside of the inner circle	1	11.8	76
5	Unit 3	2	Nails	Nails with heads on them. Heads look round so might be more modern nails	70.5	19	77
5	Unit 3	2	Nail fragments	Pieces of nails, without the head	31	20	78

Table B.2 cont. Metal artifacts

5	Unit 3	2	Bolt	Large bolt, square head, has threading on the bottom of the nut	140	1	79
5	Unit 3	2	Metal	Flat metal flakes, thin	4.5	6	80
5	Unit 3	2	Metal	Bolt fragment with threading on one end, more rounded on that end as well	11.7	1	81
11	Unit 3	4	Pipe	Long metal pipe that might have been used for draining the blood into the creek,	594.3	1	82
11	Unit 3	4	Threaded bolt	Large bolt with long shaft and square head, threaded shaft almost all the way up to the head	180	1	83
11	Unit 3	4	Bolt	Large thick bolt with a round large head, unable to tell if there is threading on the shaft	567.6	1	84
11	Unit 3	4	Intertwined wire	A couple thin pieces of wire that are each twisted around themselves and looped together	10.2	1	85
11	Unit 3	4	Wire	Three thin strips of wire that are all different lengths	15	3	86
11	Unit 3	4	Nails with head	Nail with a head, head is rounded, and nail is long. There are two other small nails with round heads but much smaller. There is also a thicker nail with a round head that has a bend at the end	14.6	4	87
11	Unit 3	4	Nail fragments	Small broken pieces of nail with no heads attached	1.5	2	88
11	Unit 3	4	Metal	Large flat pieces of metal.	386.6	2	89
11	Unit 3	4	Flat flakes	Thin pieces of metal that look like they flaked off of some metal object.	70.6	53	90
11	Unit 3	4	Metal	Small square piece of metal, open at one end. What looks like wood chips on the open end	1	1	91
15	Unit 3	5	Nails with heads	There are a number of nails that have heads on them and some look like they have wood stuck to them as well. A number of them are curved too	252.4	29	92
15	Unit 3	5	Nail fragments	Nail fragments, none of these pieces have heads on them, some are long, some are just small pieces, a couple are really thin while some are thick	43.3	23	93
15	Unit 3	5	Metal handle	Bent into a small handle shape, long rectangle.	3.7	1	94
15	Unit 3	5	Rim of a can	The bottom of the can that we tried to remove from the south wall, very fragile, broken into pieces. There is a brim on some of the pieces	146.2	26	95
15	Unit 3	5	Metal flakes	Very small and thin metal flakes	57.1	120	96
15	Unit 3	5	Barrel rings	One complete (weight not recorded), several smaller fragments of barrel rings	8	794.5	97
15	Unit 3	5b	Nails	Nails and nail fragments	89	349	98
15	Unit 3	5b	Staples	Two large staples	2	5.8	99
15	Unit 3	5b	Wire		2	3.7	100
15	Unit 3	5b	Bucket handle	Wire bucket handle	1	33.5	101
15	Unit 3	5b		Metal eyelet?	1	2.7	102

Table B.2 cont. Metal artifacts

15	Unit 3	5b	Bolt	Large but short	1	40.5	103
15	Unit 3	5b	Metal	Thin sheet metal fragments	121	174.8	104
15	Unit 3	5b	Metal	Barrel ring fragments	7	277.1	105
11	Unit 3	4	UID	Length: 4 cm.	1	1.6	106
15	Unit 3	5	Metal	Thin, flat shards. Possibly broken bits of barrel rings.	21	29.5	107
15	Unit 3	5	Medium Nail	Length: 5 cm.	1	3.9	108
8	Unit 3	3	Wire	Long piece of metal wire	1	41.8	109
8	Unit 3	3	Small to Large Nails	2 large thick nails, 2 large thin nails, 12 medium nails, 16 small nails, 22 nail fragments	54	135.2	110
8	Unit 3	3	Metal Fragments	58 pieces of thin metal fragments	58	35	111
8	Unit 3	3	Barrel Rim Pieces	4 small pieces of sheet metal rims, likely from barrel	4	10.6	112
5	Unit 3	2	UID Metal Fragments	Large Metal Fragments	4	41.4	113
5	Unit 3	2	Small to Large Nails	5 large nails, 6 medium nails, 4 small nails, 11 nail fragments	26	55.6	114
5	Unit 3	2	UID Metal Fragments	Small Metal Fragment	1	0.4	115
23	Unit 4	2	iron	Small wire nail 5 cm	1	1.5	116
23	Unit 4	2	iron	Bolt 7cm long	1	28.7	117
22	Unit 4	1	Medium Nails	Two out of three nails are bent in an L shape	3	22.2	118
23	Unit 4	2	Medium Nail	Single medium sized decking nail	1	3.7	119
23	Unit 4	2	Small Nail	Small Siding nail	1	0.7	120
23	Unit 4	2	Nut	Chunky thick medium sized iron nut	1	6.5	121
23	Unit 4	2	Large Bolt	Large iron bolt with attached nut on its top. Still attached to thick sheet metal.	1	219.1	122
26	Unit 4	3	Bottle Cap	Crown Top Bottle Cap	1	5.6	123
26	Unit 4	3	UID Wire Frags	1 piece of UID wire fragment	1	6	124
26	Unit 4	3	Large Nails	6 large framing nails, 10.5cm long. Thick nails.	7	97.5	125
26	Unit 4	3	Medium Nails	10 medium sized, decking, nails. 7cm long.	10	54.2	126

Table B.2 cont. Metal artifacts

15	Unit 3	5b	Bolt	Large but short	1	40.5	103
15	Unit 3	5b	Metal	Thin sheet metal fragments	121	174.8	104
15	Unit 3	5b	Metal	Barrel ring fragments	7	277.1	105
11	Unit 3	4	UID	Length: 4 cm.	1	1.6	106
15	Unit 3	5	Metal	Thin, flat shards. Possibly broken bits of barrel rings.	21	29.5	107
15	Unit 3	5	Medium Nail	Length: 5 cm.	1	3.9	108
8	Unit 3	3	Wire	Long piece of metal wire	1	41.8	109
8	Unit 3	3	Small to Large Nails	2 large thick nails, 2 large thin nails, 12 medium nails, 16 small nails, 22 nail fragments	54	135.2	110
8	Unit 3	3	Metal Fragments	58 pieces of thin metal fragments	58	35	111
8	Unit 3	3	Barrel Rim Pieces	4 small pieces of sheet metal rims, likely from barrel	4	10.6	112
5	Unit 3	2	UID Metal Fragments	Large Metal Fragments	4	41.4	113
5	Unit 3	2	Small to Large Nails	5 large nails, 6 medium nails, 4 small nails, 11 nail fragments	26	55.6	114
5	Unit 3	2	UID Metal Fragments	Small Metal Fragment	1	0.4	115
23	Unit 4	2	iron	Small wire nail 5 cm	1	1.5	116
23	Unit 4	2	iron	Bolt 7cm long	1	28.7	117
22	Unit 4	1	Medium Nails	Two out of three nails are bent in an L shape	3	22.2	118
23	Unit 4	2	Medium Nail	Single medium sized decking nail	1	3.7	119
23	Unit 4	2	Small Nail	Small Siding nail	1	0.7	120
23	Unit 4	2	Nut	Chunky thick medium sized iron nut	1	6.5	121
23	Unit 4	2	Large Bolt	Large iron bolt with attached nut on its top. Still attached to thick sheet metal.	1	219.1	122
26	Unit 4	3	Bottle Cap	Crown Top Bottle Cap	1	5.6	123
26	Unit 4	3	UID Wire Frags	1 piece of UID wire fragment	1	6	124
26	Unit 4	3	Large Nails	6 large framing nails, 10.5cm long. Thick nails.	7	97.5	125
26	Unit 4	3	Medium Nails	10 medium sized, decking, nails. 7cm long.	10	54.2	126

Table B.2 cont. Metal artifacts

26	Unit 4	3	UID Wire Nail Frags	Fragments of small wire nails, one of them is skinny, two are fat.	3	8.7	127
26	Unit 4	3	“S” Hooks	2 ‘S’ shaped metal hooks made from thin metal wire. One complete, one partial.	2	44.2	128
26	Unit 4	3	Small Nails	2 small siding nails	2	2.9	129
29	Unit 4	4	‘S’ Hook	Single complete S shaped hook	1	34.6	130
29	Unit 4	4	Large Nails	Large, framing, nails. 11cm long.	5	68	131
29	Unit 4	4	Medium Nails	Four medium sized, decking, a range of thicknesses	4	12.7	132
29	Unit 4	4	Small Nails	2 small nails, siding nails, and potentially a small finishing nail.	2	2.1	133
29	Unit 4	4	UID Nail Frags	Varying sizes of 4 Nail frags	4	9.6	134
29	Unit 4	4	Thin Copper Wire	Thin coiled copper wire with light green rust on it.	1	1	135
29	Unit 4	4	UID Metal Frags	Thick rusted metal fragments, likely thin sheet metal folded upon itself.	2	7	136
39	Unit 4 Ext	1	Bucket Rim	2 large metal rims connected to thin sheet metal. Likely from some kind of metal bucket.	2	55.7	137
39	Unit 4 Ext	1	Large Nail	Large framing nail. 10.5cm long	1	11.4	138
39	Unit 4 Ext	1	Small Nails	2 small siding nails	2	2.2	139
39	Unit 4 Ext	1	UID Nail Frags	3 UID nail frags, in varying sizes and thicknesses.	3	9.3	140
39	Unit 4 Ext	1	Medium Nails	2 Medium nails, 6.5cm long	2	9.3	141
51	Unit 4 Ext 2	2	UID Wire	1 long piece of UID wire	1	6.9	142
51	Unit 4 Ext 2	2	Medium Nails	Medium sized, decking, nails. Fat. 7cm long.	4	22.2	143
51	Unit 4 Ext 2	2	‘S’ Hooks	2 complete ‘S’ shaped hooks	2	94	144
51	Unit 4 Ext 2	2	UID Nail Frag	A single fragment of UID nail	1	1.2	145
47	Unit 4 Ext2	1	‘S’ Hook	End of a ‘S’ shaped hook	1	13.4	146
47	Unit 4 Ext2	1	Medium Nails	2 medium sized (decking) nails.	2	8.6	147
41	Unit 4Ext	2	Thin sheet metal frags	2 curved pieces, folded over (like container rims?)	2	5.2	148
41	Unit 4Ext	2	S-Hook	1 large seemingly intact wire S-hook	1	27.1	149

Table B.2 cont. Metal artifacts

41	Unit 4Ext	2	Thick sheet metal	3 pieces of thick sheet metal; 2 are lighter and more eroded/rough edges than the third, which is quite square and heavier feeling	3	19.1	150
41	Unit 4Ext	2	Medium Square Nail	1 square nail between small and medium (but more medium)	1	6	151
41	Unit 4Ext	2	Large Nails	2 very large (long) wire nails	2	22.4	152
41	Unit 4Ext	2	UID Nail Frags	1 small nail fragment	1	0.6	153
41	Unit 4Ext	2	Barrel Hoop Fragments	2 pieces of barrel hooping, each with a nail embedded in it; large pieces	2	135.2	154
41	Unit 4Ext	2	Medium Nails	4 medium wire nails	4	20.2	155
41	Unit 4Ext	2	Small Nails	2 small wire nails	2	3.7	156
41	Unit 4Ext	2	Large Nails	2 large wire nails; one appears to have been thicker than the other, but maybe that is just erosion/rusting	2	7.4	157
24	Unit 5	1	Coin	Small rusted coin/approximately the size of a penny?	1	2.2	158
24	Unit 5	1	Nails and a bottle cap	Miscellaneous metal objects, including nails and a bottle cap	4	20.4	159
27	Unit 5	2	Nail fragments	One small, and one large nail fragment	2	13.1	160
31	Unit 5	3	Nails and other	Nails of varying sizes, one partial bottle cap	10	73.8	161
37	Unit 5	4	Nail fragments	Miscellaneous metal nails of varying sizes	7	24.3	162
38	Unit 5 Ext.	1	Nail	Large rusted nail	1	18	163
46	Unit 5 Ext.	2	Nail fragments	Rusted nails of varying sizes	3	24.4	164
25	Unit 6	1	Nail	Full Nail	1	4	165
28	Unit 6	2	Nails	Full Nail and Fragments	5	19.1	166
32	Unit 6	3	Nails	Nail fragments	3	4	167
40	Unit 6	4	Nails	Full and fragmented nails	16	85	168
42	Unit 6	5	Nails	Full and fragmented nails	24	144.7	169
Wall	Unit 6	N/A	UID Metal	1 chunk of rusted metal	1	2.1	170
Wall	Unit 6	N/A	Medium Nails	2 medium nails	2	13.8	171
52	Unit 6	7	UID Nail Frags	14 pieces of UID nail fragments	14	81.2	172
59	Unit 6 Ext	5	Sheet Metal	1 medium thick piece of sheet metal	1	0.8	173

Table B.2 cont. Metal artifacts

62	Unit 6 Ext	8	Medium Nail	Medium Sized Wire nail	1	4.2	174
64	Unit 6 Ext	10	UID Wire Nail	Single piece of wire nail	1	1.2	175
64	Unit 6 Ext	10	Small Nail	Single wire nail, 4.7cm long	1	2.7	176
58	Unit 6 Ext	4	Flat Band Metal	Single piece of thin metal band	1	5.9	177
58	Unit 6 Ext	4	UID Metal Frags	Varying thicknesses and shapes, likely corroded thick sheet metal	4	19.1	178
58	Unit 6 Ext	4	Large Nails	Very 2 Large, framing, nails, corroded, 12cm long	2	57.1	179
58	Unit 6 Ext	4	Solid Iron Weight	Large solid Iron rod, very heavy. 4.1cm in diameter, 20cm in length.	1	>2000	180
56	Unit 6Ext	3	UID Nail Frags	2 small nail fragments	2	1.6	181
56	Unit 6Ext	3	Iron Pipe	Thin, hollow and long iron pipe	1	120.4	182
56	Unit 6-Ext	3	Nails	One large Nail and two small fragments	2	68.5	183
56	Unit 6-Ext	3	Nails	One full large and one small fragment (two separate bags found later during cleaning)	2	14.5	184
58	Unit 6-Ext	4	Nails	Nail fragments	2	5.1	185

Table B.2 cont. Metal artifacts

Rubble

LRF	Unit	Level	Type	Description	Count	Weight	Artifact ID
1	Unit 1	1	Brick	Small-Med. Pieces	324	752.3	186
1	Unit 1	1	Concrete	Small-Med. Pieces	141	804	187
1	Unit 1	1	Clinker	Fragments	507	482.4	188
7	Unit 1	2	Modified wood	Fragments	3	23.7	189
7	Unit 1	2	Concrete	Small-Med. Pieces	134	1909.2	190
7	Unit 1	2	Brick	Small-Med. Pieces	276	1438.4	191
7	Unit 1	2	Brick	Small-Med. Pieces	338	1357.6	192

Table B.3 Rubble artifacts

7	Unit 1	2	Clinker	Small-Med. Pieces	494	1288.4	193
13	Unit 1	3	Brick	Small-Med. Pieces	103	494.6	194
13	Unit 1	3	Concrete	Small fragments	28	156.3	195
13	Unit 1	3	Clinker	Small pieces	33	60.5	196
16	Unit 1	4	Brick	Small fragment	1	0.2	197
16	Unit 1	4	Clinker	Small-Med. Pieces	27	35.4	198
17	Unit 1	5	Clinker	Small-Large Pieces	395	773.4	199
17	Unit 1	5	Clinker	Small pieces	5	15.8	200
17	Unit 1	5	Brick	Medium fragments	3	45.3	201
17	Unit 1	5	Concrete	Medium fragments	2	28.4	202
18	Unit 1	6	Brick	Small fragments	2	1.6	203
19	Unit 1	7	Clinker	Small pieces	10	14.2	204
19	Unit 1	7	Brick	Small fragment	1	0.3	205
20	Unit 1	8	Clinker	Small pieces	2	1	206
20	Unit 1	8	Concrete	Small fragment	1	1.1	207
2	Unit 2	1	Brick	Small and medium pieces	157	306.4	208
2	Unit 2	1	Concrete	Small pieces, one medium piece	32	253.2	209
2	Unit 2	1	Cement	Small pieces	79	91.7	210
2	Unit 2	1	Clinker	Small, dark-grey, black rounded pieces	52	37.8	211
4	Unit 2	2	Clinker	Dark, porous, and shiny	6	7.5	212
4	Unit 2	2	Cement	Pale solid paste with speckles	82	1099	213
4	Unit 2	2	Concrete	Dark colored conglomerate	21	561.3	214
4	Unit 2	2	Brick	Red fragments	495	4486	215
6	Unit 2	3	Brick	Small and medium fragments	57	807.9	216
6	Unit 2	3	Concrete	Small and medium fragments	17	340.3	217
6	Unit 2	3	Cement	Small, crumbly pieces	69	626.2	218
6	Unit 2	3	Clinker	Dark grey	6	45.2	219
10	Unit 2	4	Brick	Small fragments	32	223.1	220

Table B.3 cont. Rubble artifacts

10	Unit 2	4	Concrete	Small fragments	18	204.9	221
10	Unit 2	4	Cement	Small, crumbly pieces	21	167.2	222
14	Unit 2	5	Cement/Concrete	Pale solid paste	1	9.3	223
14	Unit 2	5	Brick	Red fragments	2	8.3	224
3	Unit 3	1	Plastic	Small pieces, slightly yellow in color, edges of a plastic cup lid	3	0	225
3	Unit 3	1	Plastic	Clear	1	0	226
3	Unit 3	1	Plastic	White and thicker	1	0	227
3	Unit 3	1	Plastic	Small grey pieces, hard plastic	2	0	228
3	Unit 3	1	Plastic	White/grey, looks like a piece of tin foil	1	0	229
3	Unit 3	1	Plastic	Small black piece of plastic that has a slight ridge on one side	1	0	230
3	Unit 3	1	Plastic	White piece of plastic, might be a holder for a cigar that you smoke through, fatter at one end than the other and squished flat	1	0.8	231
3	Unit 3	1	Cloth	Compressed cloth into a rectangular shape, slightly squishy	1	2.9	232
3	Unit 3	1	Cardboard/Felt	Small circle that may be cardboard or felt	1	0	233
3	Unit 3	1	Clinker	Smaller pieces of clinker	296	580.2	234
3	Unit 3	1	Brick	Smaller pieces of brick, some small flakes	21	58.9	235
3	Unit 3	1	Plastic	Small square of blue plastic, has a rounded edge	1	0	236
5	Unit 3	2	Rubber		2	3.9	237
5	Unit 3	2	Brick	Thin small fragments	57	129.9	238
5	Unit 3	2	Cement		8	38.7	239
5	Unit 3	2	Clinker	Medium size pieces, dry and dull in texture. Looks like there is wood in some of the clinker pieces.	1233	4754.6	240
5	Unit 3	2	Clinker w/bone	Large pieces of clinker, a few pieces of bone burnt into them	10	80.4	241
5	Unit 3	2	Rubber	Flat donut shaped rubber, with flat back bottom	1	6.3	242
5	Unit 3	2	Concrete	Small almost square slab of concrete	1	93.1	243
5	Unit 3	2	Rubber	Octagon shape with square center cut out, flat	1	8.1	244
5	Unit 3	2	Fabric	7 pieces of rubbery fabric that make a ring	7	30.4	245
8	Unit 3	3	Cement		6	16.9	246
8	Unit 3	3	Brick		299	1213.1	247
8	Unit 3	3	Clinker		692	4568.4	248

Table B.3 cont. Rubble artifacts

8	Unit 3	3	UID red shiny material		3	2.2	249
8	Unit 3	3	Fabric	Very small pieces of fabric	3	0.1	250
8	Unit 3	3	Rubber	Small chunks of rubber	8	7.1	251
11	Unit 3	4	Brick	Piece of brick that has an “S” carved into the smooth side, and what looks like an “L” beside that “S”	1	30.2	252
11	Unit 3	4	Concrete	Small piece of concrete	1	2.7	253
11	Unit 3	4	Brick	Small brick fragments	78	162.5	254
11	Unit 3	4	Clinker	Small and vitreous pieces of clinker	66	244.6	255
11	Unit 3	4	Brick	Small to medium pieces	61	670.6	256
11	Unit 3	4	Brick	Two incised grooves running parallel to the edge of the brick	1	45.6	257
11	Unit 3	4	Clinker	Small to large pieces, some are vitreous	225	1,466	258
15	Unit 3	5	Clinker	Small pieces of clinker, some look like they have bone in them	199	212	259
15	Unit 3	5	Brick	One piece of brick and a small fragment	2	14.5	260
15	Unit 3	5	Clinker	Small pieces	16	23.8	261
34	Unit 3	6	Fire Brick	Whole	1	2000	262
34	Unit 3	6	Fire Brick w/ frog	Whole	1	2000	263
34	Unit 3	6	Burnt Concrete	Small fragments	7	3.5	264
34	Unit 3	6	Clinker	Small to medium fragments	53	203	265
34	Unit 3	6	Brick	Small to Medium Fragments	12	190	266
34	Unit 3	6	Leather Frags	Small fragments	8	1.3	267
34	Unit 3	6	Hair	Three clumps	3	0.7	268
48	Unit 3	7	Hair	Five clumps of Animal Hair	5	9.2	269
48	Unit 3	7	Brick	Three medium sized brick fragments with two tiny frags	5	395.2	270
48	Unit 3	7	Fire Brick	Single Fragment of Fire Brick	1	76	271
48	Unit 3	7	Burnt Wood	Two pieces of semi-burnt wood	2	7.7	272
48	Unit 3	7	Clinker	Small fragments of Clinker	62	177.1	273
55	Unit 3	8	Clinker	Single piece	1	1.3	274
55	Unit 3	8	Brick	Two pieces	2	21.4	275
15	Unit 3	5b	Leather		1	3.1	276

Table B.3 cont. Rubble artifacts

15	Unit 3	5b	Brick		68	206.4	277
15	Unit 3	5b	Cement		8	25.8	278
15	Unit 3	5b	Wood	24 chunks of wood	24	36.1	279
15	Unit 3	5b	Burnt concrete		17	32.5	280
15	Unit 3	5b	Clinker		284	519.4	281
22	Unit 4	1	Clinker	Dark, porous, and shiny	19	29.3	282
22	Unit 4	1	Cement	Pale speckled solidified paste	15	16.3	283
22	Unit 4	1	Brick	Red fragments	160	329.9	284
23	Unit 4	2	Brick		5	40.3	285
23	Unit 4	2	Clinker	Dark, porous, and shiny	8	35.7	286
23	Unit 4	2	Cement	Pale solidified speckled paste	26	94.3	287
23	Unit 4	2	Brick	Red fragments	32	204.4	288
23	Unit 4	2	Brick	Small to medium pieces of brick	568	2537	289
23	Unit 4	2	Clinker	Small pieces of clinker	130	407.8	290
23	Unit 4	2	Concrete	Small to medium pieces of concrete	283	844.3	291
23	Unit 4	2	Wood	Medium Sized chunk of solid wood	1	9.1	292
26	Unit 4	3	Brick	Two whole bricks w/ bits of mortar on them	2	4000	293
26	Unit 4	3	Concrete	Medium to Small pieces. Lots of inclusions in the concrete	7	40.5	294
26	Unit 4	3	Clinker	Medium to small pieces	359	1545.4	295
39	Unit 4 Ext	1	Concrete	Small piece	1	0.9	296
39	Unit 4 Ext	1	Clinker	Small piece	1	0.9	297
41	Unit 4 Ext	2	Brick	Small piece	1	0.2	298
41	Unit 4 Ext	2	Concrete	Small pieces: 2 more globular and 2 more planar	4	1.8	299
41	Unit 4 Ext	2	Burnt Coal	Light grey, planar flakes	5	2.4	300
41	Unit 4 Ext	2	Clinker	Small pieces	2	2.8	301
47	Unit 4 Ext2	1	Clinker	Small piece	1	1.1	302

Table B.3 cont. Rubble artifacts

47	Unit 4 Ext2	1	Plastic	Hard white plastic	1	0.2	303
24	Unit 5	1	Concrete	Cement conglomerate	17	248.8	304
24	Unit 5	1	Brick	Reddish stone fragments	132	388.4	305
24	Unit 5	1	Clinker	Coal by-product	59	77.6	306
24	Unit 5	1	Burnt brick	White/burnt orange fragments	2	30.9	307
27	Unit 5	2	Clinker	Coal by-product	25	47.8	308
27	Unit 5	2	Concrete	Cement conglomerate	127	862.4	309
27	Unit 5	2	Burnt brick	White/burnt orange fragments	2	27.6	310
31	Unit 5	3	Burnt brick	White/burnt orange fragments	2	43.3	311
31	Unit 5	3	Brick	Reddish stone fragments	8	57.6	312
31	Unit 5	3	Clinker	Coal by-product	76	196.7	313
31	Unit 5	3	Concrete	Cement conglomerate	73	787.8	314
37	Unit 5	4	Clinker	Coal by-product	2	2.4	315
37	Unit 5	4	Brick	Reddish stone fragments	4	7.9	316
38	Unit 5 Ext.	1	Brick	Reddish stone fragments	51	334.7	317
38	Unit 5 Ext.	1	Clinker	Coal by-product	1	1.3	318
38	Unit 5 Ext.	1	Concrete	Cement conglomerate	6	91.4	319
46	Unit 5 Ext.	2	Brick	Reddish stone fragment	1	9.6	320
25	Unit 6	1	Clinker	Small fragments	3	2.1	321
25	Unit 6	1	Concrete	Small Fragments	8	35.4	322
25	Unit 6	1	Brick	Small Fragments	54	134.4	323
28	Unit 6	2	Brick	Small and medium sized fragments	276	1410	324
28	Unit 6	2	Clinker	Small Fragments	9	48.4	325
32	Unit 6	3	Clinker	Small Fragments	69	149.1	326
32	Unit 6	3	Concrete	Small fragments	64	13.6	327
32	Unit 6	3	Brick	Small Fragments	366	1197.1	328
32	Unit 6	3	Cement	Medium piece of bubbly cement, goopy and doesn't cohese.	1	48.6	329

Table B.3 cont. Rubble artifacts

32	Unit 6	3	Clinker	Small fragments of clinker	6	10.2	330
32	Unit 6	3	Brick	Small to medium sized fragments of brick, with some pieces of fire brick mixed in	307	1756.9	331
40	Unit 6	4	Brick	Large Chunks	3	1154.9	332
42	Unit 6	5	Clinker	Small fragments	6	8.8	333
54	Unit 6 Ext	2	Brick	Small to large pieces. One very large piece.	103	823	334
54	Unit 6 Ext	2	Concrete	Medium pieces with stone	8	241.1	335
54	Unit 6 Ext	2	Clinker	2 pieces of clinker	2	4	336
58	Unit 6 Ext	4	Clinker	Medium chunks of clinker	8	66.1	337
59	Unit 6 Ext	5	Clinker	Small Pieces	109	150.5	338
59	Unit 6 Ext	5	Concrete	Small Piece	1	0.1	339
59	Unit 6 Ext	5	Brick	3 small pieces	3	4.1	340
60	Unit 6 Ext	6	Brick	Small piece of Brick	1	1.6	341
60	Unit 6 Ext	6	Concrete	Mostly small pieces with one medium	1	46.9	342
60	Unit 6 Ext	6	Clinker	4 small pieces of clinker, glassy	4	5.8	343
61	Unit 6 Ext	7	Brick	Small UID piece, maybe brick	1	3.6	344
61	Unit 6 Ext	7	Clinker	Large medium and small pieces	55	282.2	345
61	Unit 6 Ext	7	Concrete	Small pieces	12	29	346
63	Unit 6 Ext	9	Wood	Small piece of mechanically lumbered wood.	1	1.9	347
64	Unit 6 Ext	10	Brick	Single Piece of Brick	1	1.6	348
56	Unit 6Ext	3	Fire Brick	40 pieces of fire brick	40	1055	349
56	Unit 6Ext	3	Brick	One large brick piece along with many small and medium fragments	618	2237.1	350
56	Unit 6Ext	3	Clinker	Medium and small fragments	57	141.4	351
56	Unit 6Ext	3	Concrete and Concrete w/ stone	Medium to large frags	72	1485.4	352
64	Unit 6ext	10	Brick	Partial Whole brick (2 pieces) with a hole running through it	2	1001.6	353

Table B.3 cont. Rubble artifacts

64	Unit 6Ext	10	Brick	Partial Whole brick, roughly 2/3 of a brick, has a hole running through it.	1	1171.8	354
64	Unit 6ext	10	Brick	Whole brick, two holes running through it, long concave line running across the bottom	1	1760.5	355
64	Unit 6ext	10	Brick	Partial Brick, one hole running through it, small concave line running across bottom.	1	1177.6	356
56	Unit 6-Ext	3	Brick	Small Fragment painted Green	1	1.1	357
56	Unit 6-Ext	3	Wood	Small piece	1	2.7	358
56	Unit 6-Ext	3	Wood	Small piece direction of wood crosses	1	10.3	359
56	Unit 6-Ext	3	Clinker	Small Fragments	12	28.2	360
56	Unit 6-Ext	3	Concrete	Small to medium sized fragments	3	97.5	361
56	Unit 6-Ext	3	Brick	Small to medium fragments	165	614.7	362

Table B.3 cont. Rubble artifacts

Glass

LRF	Unit	Level	Colour	Type	Portion	Sherd Count	Weight	Artifact ID
1	Unit 1	1	Clear	Pane Glass	N/A	1	0.8	363
1	Unit 1	1	Pale blue/green	Pane Glass	N/A	2	1.1	364
1	Unit 1	1	Amber	Container Glass	Body	2	1.6	365
1	Unit 1	1	Emerald green	Curved	Body	1	4.7	366
1	Unit 1	1	Clear	Pane Glass	N/A	1	0.3	367
7	Unit 1	2	Olive	Container	Body, Edge	2	2.3	368
7	Unit 1	2	Clear	Curved	Body	5	8.3	369
7	Unit 1	2	Milk	Curved	Body	1	1	370
7	Unit 1	2	PBG	Paned Glass	N/A	5	3.5	371
7	Unit 1	2	Amber	Container	Body	11	14.9	372
7	Unit 1	2	Clear/ W Amethyst	Container	Shoulder and neck	1	9.6	373
7	Unit 1	2	Clear	Curved	Rim/Lip	1	4.2	374
7	Unit 1	2	Clear	Thin Glass	Body	2	0.3	375

Table B.4 Glass artifacts

13	Unit 1	3	Amber	Container	Body	1	0.2	376
2	Unit 2	1	PBG	Pane Glass	N/A	4	6.1	377
2	Unit 2	1	Colourless	Container	Body	35	18.8	378
2	Unit 2	1	Amber	Container	Finish	1	4.3	379
2	Unit 2	1	Amber	Container	Body	1	0.3	380
4	Unit 2	2	PBG	Window Glass	N/A	6	3.1	381
4	Unit 2	2	Amber	Bottle Glass	Body, and shoulder	25	107.3	382
4	Unit 2	2	Clear	Window Glass	N/A	3	0.9	383
6	Unit 2	3	PBG	Pane Glass	N/A	1	0.7	384
10	Unit 2	4	PBG	Pane Glass	N/A	2	2.6	385
3	Unit 3	1	PBG	Pane	N/A	3	2.2	386
3	Unit 3	1	PBG	Pane	N/A	4	5.1	387
3	Unit 3	1	Amber	Container	Body	1	1.3	388
3	Unit 3	1	Amber	UID Burnt Sherd	N/A	1	0.7	389
3	Unit 3	1	Dark Emerald	Container	Body	7	31.6	390
3	Unit 3	1	Light olive green	Container	Base	25	71.4	391
3	Unit 3	1	Dark Olive Green	Container	Base	1	2.2	392
3	Unit 3	1	Dark olive green	Container		13	41.9	393
5	Unit 3	2	Clear w/ Amethyst	Container	Body	9	44.4	394
5	Unit 3	2	Dark Olive	Container	Body	163	595.2	395
5	Unit 3	1	Dark Emerald Green	Container	Body	16	38.6	396
5	Unit 3	2	Dark Emerald Green	Container	Finish	1	6.5	397
5	Unit 3	2	Amber	Container	Base	8	44.6	398
5	Unit 3	2	PBG	Pane Glass	N/A	18	131.5	399
5	Unit 3	2	Clear	Container	Body	1	0.7	400
5	Unit 3	2	Amber	Container		24	71.6	401
5	Unit 3	2	PBG	Pane Glass	N/A	15	14.8	402
5	Unit 3	2	Clear	Container	Base + Body	2	0.8	403

Table B.4 cont. Glass artifacts

5	Unit 3	2	Clear	Container	Body+ potentially a piece of base	4	6.5	404
5	Unit 3	2	Clear	Curved	Body	1	0.8	405
5	Unit 3	2	PBG	Pane Glass	N/A	30	55.2	406
5	Unit 3	2	Dark Olive	Container		1	76.2	407
5	Unit 3	2	Clear	Curved Thin Glass	N/A	1	0.1	408
8	Unit 3	3	Clear	Square Bottle	Finish and Shoulder	1	62.5	409
8	Unit 3	3	Colourless	Container	Body	13	4.6	410
8	Unit 3	3	Dark Emerald	Container	Body	1	8	411
8	Unit 3	3	PBG	Pane glass	N/A	21	48.6	412
8	Unit 3	3	PBG	Pane glass	N/A	11	17	413
8	Unit 3	3	PBG	Melted	N/A	1	0.7	414
8	Unit 3	3	Amber	Container	Body	3	26	415
8	Unit 3	3	Dark Olive	Container	Body	3	6.4	416
8	Unit 3	3	Amber	Container	Base	1	1.5	417
8	Unit 3	3	Clear w/ Amethyst	Square Bottle	Body	2	46.8	418
11	Unit 3	4	PBG	Glass tube		3	33.1	419
11	Unit 3	4	Solarized selenium	Bottle glass	Base and Body	1	87	420
11	Unit 3	4	Clear	Container	Body	9	13.1	421
11	Unit 3	4	Amber	Container	Body	3	6.5	422
11	Unit 3	4	PBG	Window Pane		28	38.8	423
11	Unit 3	4	Amber	Bottle	Whole	2	684.6	424
11	Unit 3	4	PBG	Container	Body	2	29.5	425
11	Unit 3	4	PBG	Window Pane		4	44.1	426
11	Unit 3	4	PBG	Window Pane		2	9.1	427
11	Unit 3	4	PBG	Window Pane		10	60.4	428
11	Unit 3	4	Clear	Square Bottle	Base and Body	1	99.6	429
11	Unit 3	4	Clear/slight yellowish green color	Container	Body	1	4	430
11	Unit 3	4	Curved	Very, very thin glass that might be lightbulb		1	0.1	431

Table B.4 cont. Glass artifacts

15	Unit 3	5	Very light blue/green	Large sherds of flat Pane glass, 2.6mm thick.	N/A	13	242.1	432
15	Unit 3	5	Clear/white	Curved	UID	3	2.3	433
15	Unit 3	5	Clear	Very thin, slight curve, very large lightbult?	UID	1	0.1	434
15	Unit 3	5b	PBG	Pane Glass	N/A	31	93.1	435
15	Unit 3	5b	Clear	Container- Jar	Finish	1	10.7	436
15	Unit 3	5b	Clear	Container	Body	3	4	437
15	Unit 3	5b	PBG	Container	Body-Shoulder	1	4.7	438
15	Unit 3	5b	PBG	Container	Body	1	2.4	439
15	Unit 3	5b	Amber	Container	Body	1	15.5	440
15	Unit 3	5B	Clear	Thin Glass	N/A	1	0.1	441
34	Unit 3	6	PBG	Pane Glass	N/A	11	76.7	442
34	Unit 3	6	Clear	Container	Base	1	144.8	443
34	Unit 3	6	Amber	Container	Body	1	0.8	444
34	Unit 3	6	Clear	Curved	Body	4	5.3	445
48	Unit 3	7	PBG	Pane	N/A	15	40.8	446
48	Unit 3	7	Clear	Container	Body	2	2.8	447
48	Unit 3	7	Clear	Container	Body	1	1.6	448
48	Unit 3	7	PBG	Container	Body	1	0.5	449
48	Unit 3	7	Amber	Container	Whole	1	707.6	450
N/A	Unit 3	Wall Cleaning	Amber	Container	Whole	1	708.2	451
N/A	Unit 3	Wall Cleaning	PBG	Container	Finish	1	33.8	452
N/A	Unit 3	Wall Cleaning	Clear w Amethyst	Square Container	Base	1	63.6	453
N/A	Unit 3	Wall Cleaning	PBG	Square Container	Base	1	15	454
N/A	Unit 3	Wall Cleaning	Clear	Curved	NA	1	2.3	455
N/A	Unit 3	Wall Cleaning	Clear w Amethyst	Curved	NA	1	0.4	456
N/A	Unit 3	Wall Cleaning	Clear	Square Container	Finish and Shoulder	1	40.9	457

Table B.4 cont. Glass artifacts

N/A	Unit 3	Wall Cleaning	PBG	Pane	NA	1	20.9	458
N/A	Unit 3	Wall Cleaning	Clear	Pane	NA	5	4.2	459
N/A	Unit 3	Wall Cleaning	PBG	Pane	NA	2	10.1	460
22	Unit 4	1	Medium Amber	Container		2	4.2	461
22	Unit 4	1	Clear	Unknown	N/A	1	0.4	462
23	Unit 4	2	7 Up Green	Container	Body and Base	8	41.7	463
23	Unit 4	2	PBG	Pane Glass	N/A	9	14.6	464
23	Unit 4	2	Clear	Container	Body	10	31.2	465
23	Unit 4	2	Amber	Container	Body	14	47.9	466
23	Unit 4	2	PBG	Curved	N/A	1	1.1	467
23	Unit 4	2	Clear	Curved	N/A	1	0.1	468
26	Unit 4	3	PBG	Pane Glass	N/A	32	36	469
26	Unit 4	3	Clear w/ Amethyst	Curved	N/A	1	0.6	470
26	Unit 4	3	PBG	Curved	N/A	4	5.6	471
26	Unit 4	3	PBG	Pane Glass	N/A	1	1.9	472
26	Unit 4	3	Milk	Flat	Rim	1	0.9	473
26	Unit 4	3	Clear	Square Bottle	Body	1	2.6	474
26	Unit 4	3	Amber	Container	Body	1	1.2	475
29	Unit 4	4	PBG	Pane	N/A	10	17.8	476
39	Unit 4 Ext	1	Amber	Bottle	Body and Shoulder	5	7.9	477
39	Unit 4 Ext	1	PBG	Pane		9	5.7	478
41	Unit 4 - ext	2	PBG	Pane Glass	N/A	29	26.7	479
41	Unit 4 – ext	2	Clear	Pane Glass	N/A	9	3.2	480
41	Unit 4 – ext	2	PBG	Curved	Body	1	1.1	481
41	Unit 4 – ext	2	Clear	UID	N/A	1	0.4	482
41	Unit 4 – ext	2	PBG	Pane Glass	N/A	1	2.4	483

Table B.4 cont. Glass artifacts

47	Unit 4 Ext2	1	Amber	Container	Body	1	1.2	484
47	Unit 4 Ext2	1	Milk	Curved	Body	1	0.3	485
47	Unit 4 Ext2	1	PBG	Pane	N/A	5	3.8	486
51	Unit 4 ext2	2	PBG	Pane	N/A	22	24.4	487
24	Unit 5	1	Clear	Curved	Body	1	0.4	488
27	Unit 5	2	Clear	Curved	UID	1	0.4	489
27	Unit 5	2	PBG	Paned		1		490
27	Unit 5	2	DarkAmber	Square	Base	1	10.9	491
31	Unit 5	3	Olive green	Curved		1	0.5	492
31	Unit 5	3	Royal blue	Curved		1	0.6	493
31	Unit 5	3	Amber	Container		4	2.6	494
31	Unit 5	3	PBG	Pane Glass		37	68.2	495
37	Unit 5	4	Clear	Thin Glass	UID	1	0.1	496
38	Unit 5 Ext.	1	Amber	Curved	UID	1	0.1	497
46	Unit 5 Ext.	2	Amber	Container	Body	2	2.3	498
46	Unit 5 Ext.	2	Opaque white	Curved	UID	1	0.1	499
46	Unit 5 Ext.	2	PBG	Paned	N/A	3	3.9	500
46	Unit 5 Ext.	2	Clear	Curved	N/A	1	0.1	501
46	Unit 5 Ext.	2	PBG	Curved	UID	1	0.1	502
28	Unit 6	2	Opaque	Curved	UID	1	0.1	503
28	Unit 6	2	Light Amber	Container	Body	1	0.9	504
28	Unit 6	2	Amber	Container	Body	2	1.9	505
28	Unit 6	2	PBG	Curved	UID	1	1.4	506
28	Unit 6	2	PBG	Pane Glass	N/A	2	1	507
32	Unit 6	3	Amber	Container	Body	1	0.7	508
32	Unit 6	3	PBG	Container	Body	1	0.5	509

Table B.4 cont. Glass artifacts

32	Unit 6	3	Clear	Pane	UID	1	0.1	510
40	Unit 6	4	Clear	Paned	UID	1	0.5	511
40	Unit 6	4	PBG	Curved	UID	1	0.2	512
42	Unit 6	5	Clear	Curved	UID	1	0.2	513
54	Unit 6 Ext	2	PBG	Curved		1	1.9	514
56	Unit 6-Ext	3	Amber	Container: Bottle	Body	4	2.3	515
56	Unit 6-Ext	3	Clear	Curved	UID	1	0.1	516
58	Unit 6 Ext	4	Olive	Flat	Body	1	2	517
58	Unit 6-Ext	4	Amber	Container	Finish	1	1.3	518
58	Unit 6-Ext	4	Clear	Thin Glass	UID	1	0.1	519
58	Unit 6-Ext	4	PBG	Pane	N/A	2	4	520
60	Unit 6 Ext	6	Amber	Container	Body	1	1.9	521

Table B.4 cont. Glass artifacts

Ceramic

LRF	Unit	Level	Paste	Type	Sub-Type	Portion	Weight	Count	Design	Artifact ID
56	Unit 6-Ext	3	Ceramic	Stoneware	-	-	0.7	1	N/A	522
34	Unit 3	6	Semi-Porcelenous Stoneware (Fine China)	Clear Glaze		Body	1.1	1	N/A	523
41	Unit 4 Ext	2	Stoneware	Grey Salt-Glazed		Body	1.7	1	Grey Salt-Glazed	524
23	Unit 4	2	Stoneware	Salt-Glazed	Grey glazed on inside, white glazed on outside.	Base	2.3	1	White and grey salt glazed	525
26	Unit 4	3	Stoneware	Salt-glazed	White salt-glazed	Lip/ handle, or spout	7.5	1	White salt glazed inside and outside.	526
23	Unit 4	2	Semi-Porcelenous Stoneware (Fine China)	Clear Glaze			2.5	1	Clear Glaze	527
5	Unit 3	2	Semi-Porcelenous Stoneware (Fine China)	Clear Glaze		Fragment	1.9	1	No design all white	528

Table B.5 Ceramic artifacts

Personal and Oddities

LRF	Unit	Level	Description	Material	Count	Weight	Artifact ID
1	Unit 1	1	Thin clear plastic fragment	Plastic	1	0.3	529
1	Unit 1	1	Small piece of plastic twine	Plastic	1	0.1	530
7	Unit 1	2	Hard white plastic fragment	Plastic	1	0.1	531
7	Unit 1	2	Small patterned ceramic fragment. White with blue/green pattern.	Ceramic	1	0.8	532
7	Unit 1	2	Worn paper fragments	Paper	5	1.7	533
13	Unit 1	3	Worn circular button	Unknown	1	5.4	534
13	Unit 1	3	Electrical plug	Rubber/plastic/wire	1	28.6	535
4	Unit 2	2	Brown in colour, squishy, but rough in texture	Burlap	4	2.4	536
2	Unit 2	1	Long, thin, black wire, Yellow fragment, 2 white pieces- 1 with hole in top	Hard plastic	4	1.8	537
2	Unit 2	1	Incomplete, frayed edges	Foam	1	0.1	538
2	Unit 2	1	Flattened and cracking, small incomplete piece	Styrofoam	1	0.1	539
2	Unit 2	1	Small, crinkled piece	Tinfoil	1	0.1	540
2	Unit 2	1	White drinking straw with red stripes	Plastic	1	0.5	541
2	Unit 2	1	Light blue, very thin soft plastic	Soft plastic	2	0.5	542
2	Unit 2	1	Mother of pearl, four-hole shank button,	Mother of pearl	1	0.2	543
2	Unit 2	1	Modified stoneware, rectangular, raised lettering: “BRUNT”, broken notch on one side with iron deposits	Ceramic and Iron	1	14.5	544
6	Unit 2	3	Brown and brownish orange fiber	Fiber	2	0.1	545
6	Unit 2	3	Small, flower, one-hole bead	Plastic	1	0.2	546
34	Unit 3	6	Single wooden singed pipe bowl	Wood	1	11.2	547
34	Unit 3	6	One small copper cartridge and small copper fragments	Copper	4	4.6	548
48	Unit 3	7	Long shiny and thin whetstone with divets from use. 1 cm thick, 4.3cm wide and 25cm long.	Stone	1	289.2	549
48	Unit 3	7	One whole unfired bullet and cartridge along with two spent bullets. Cartridge 1.5cm in diameter.	Copper, Lead and Gunpowder	3	44.1	550
48	Unit 3	7	The remains of two pipe stems. Two pieces of the thin shiny hard mouth piece, and four pieces of thick pipe wood with holes running through it. The pieces would have been connected through a screw mechanism.	Wood, metal, and some kind of resin/horn or tortoiseshell, a pre-plastic mouth piece material.	6	22.5	551

Table B.6 Personal and Oddities artifacts

48	Unit 3	7	114 of assorted sized spent bullet cartridges. From .5cm in diameter to 2cm in diameter. A few have writing on the base, including one that say "DC Co" A bullet manufacturer in Montreal Quebec.	Copper	114	357.9	552
5	Unit 3	2	Small pieces of fabric	Fabric?	3	0.1	553
5	Unit 3	2	Insulated wire	Wire	1	6.8	554
8	Unit 3	3	Small strips of leather/fabric	Leather/fabric	6	4.4	555
8	Unit 3	3	Small piece of white plastic	Plastic	1	0.9	556
11	Unit 3	4	Small pieces of fabric	Fabric	5	1.5	557
11	Unit 3	4	Small pieces of white shell	Shell	3	1.8	558
11	Unit 3	4	Piece of white porcelain mug	Porcelain	1	12.2	559
8	Unit 3	3	Shell (seed?)	Shell	1	0.3	560
11	UNIT 3	4	GWG button from a pair of jeans, Edmonton brand of jeans	Metal	2	4.3	561
11	UNIT 3	4	Broken up bottle cap that is pretty rusted, rim still attached	Metal	3	4.3	562
11	UNIT 3	4	Large button, looks like it has cloth on the top of it. Some white cloth material on bottom side of the button as well	Metal?	1	3.7	563
15	Unit 3	5b	Metal eyelets with plant fibers – basket fragment?	Metal/plant	26	25.2	564
15	Unit 3	5b	Button backings and fronts; includes two GWG buttons	Metal	12	30.3	565
15	Unit 3	5b	Four partial bullet casings and two small fragments	Metal	6	15.2	566
15	Unit 3	5b	Partial, thin leather strap (harness fragment?)	Leather	1	6.1	567
15	Unit 3	5b	Very small (<1 cm x 1cm) fragment of metal screen	Metal	1	0	568
15	Unit 3	5b	Two fragments of a leather belt or harness	Leather	2	3.1	569
15	Unit 3	5b	String	Textile		0.4	570
15	Unit 3	5b	Two thin pieces of leather	Leather	2	3.8	571
15	Unit 3	5b	Very soft, fragmentary pieces of textile/fabric	Textile		67.4	572
15	Unit 3	5b	Two large button? Fragments	Metal	2	1.8	573

Table B.6 cont. Personal and Oddities artifacts

23	Unit 4	2	Toy car	plastic	1	31	574
22	Unit 4	1	Almost leather-like texture	Leather?	1	0.3	575
22	Unit 4	1	Various pieces of unknown plastic	Plastic	5	0.2	576
23	Unit 4	2	Large metal grommet, likely from a boot.	Metal, likely steel.	1	0.2	577
29	Unit 4	4	1 large porcelain insulator, screw marks running through it. Evidence of rust.	Porcelein	1	6.1	578
29	Unit 4	4	Thin metal button	Metal (iron)	1	1.8	579
24	Unit 5	1	Small mirror fragment	Glass	1	0.1	580
24	Unit 5	1	Small red hard plastic fragment	Plastic	1	0.1	581
27	Unit 5	2	Flat stone fragments of uniform thickness	Stone	3	9.1	582
31	Unit 5	3	Strand of frayed string	String	1	0.1	583
31	Unit 5	3	Piece of clay with central hole	Clay	1	2.2	584
31	Unit 5	3	Assortment of plastic pieces	Plastic	3	1.5	585
38	Unit 5 Ext.	1	Modified wood fragments	Wood	2	1.1	586
38	Unit 5 Ext.	1	Yellow tent peg	Plastic	1	19.1	587
28	Unit 6	2	Plastic Wrap	Plastic	1	0	588
28	Unit 6	2	Marble	Glass	1	4.8	589
32	Unit 6	3	Yellow plastic with a white ribbon along the straighter edge	Plastic	1	0	590
56	Unit 6-Ext	3	Plastic Styrofoam with green lines on half the piece	Plastic. Styro combo	1	0	591
56	Unit 6-Ext	3	White piece with two blue ribbons	Plastic	1	0	592
56	Unit 6-Ext	3	Leather piece	Leather	1	1.7	593
56	Unit 6-Ext	3	Green foil pieces (gum wrapper)	Foil	2	0	594

Table B.6 cont. Personal and Oddities artifacts

Faunal

LRF	Unit	Level/Feature	Element	Animal Size Class	Taxon	Common Name	NISP	Weight (g)	%comp	Butcher Marks	Notes on Age or Size	Artifact ID
1	1	1	Fragments	UID	UID	UID	139	51.5	UID	n		595
7	1	2	teeth, incisor, left center	large	bos taurus	cow	1	3.9	100	n		596
7	1	2	tooth, incisor, right	large	bos taurus	cow	1	1	100	n		597
7	1	2	talus, right	large	bos taurus	cow	1	13	95	n		598
7	1	2	fragment	UID	UID	UID	510	186.1	UID	n		599
7	1	2	tooth, upper 2nd incisor, right	large	sus scrofa	pig	1	0.7	100	n		600
7	1	2	fragments	UID	UID	UID	11	9.1	UID	n		601
7	1	2	fragment	large	UID	UID	1	7	UID	y-sawcut cutmarks		602
7	1	2	orbital fragment	large	UID	UID	1	3.2	UID	n	immature	603
7	1	2	skull fragments	UID	UID	UID	5	3.8	UID	n		604
7	1	2	tooth fragments	UID	UID	UID	1	1.4	UID	n		605
7	1	2	rib	medium	capra hireus/ ovis aries	goat/sheep	1	0.2	5	y-knife cuts		606
7	1	2	metacarpal, left, digits IV or V	small	felis domestica	cat	2	0.6	100	n		607
13	1	3	fragment	UID	UID	UID	411	124.8	UID	n		608
13	1	3	rib fragment	medium	capra hireus/ ovis aries	goat/sheep	8	9.7	30	y- 3 sawcut		609
13	1	3	phalanx, intermediate	large	sus scrofa	pig	1	3.2	100	n		610
16	1	4	metapodial	UID	UID	UID	2	1.2	100	n	likely fetal	611
17	1	5	Fragments	UID	UID	UID	1	13.2	UID	n		612
17	1	5	rib fragment	Medium	UID	UID	2	2.3	100	n		613
18	1	6	scapula, right	Medium	UID	UID	5	28	UID	n		614
20	1	8	scapula	UID	UID	UID	2	3.2	5	n		615
2	2	1	rib fragment	medium	UID	UID	1	2.7	UID	y-chopped		616
2	2	1	long bone fragment	small	UID	UID	1	1.2	UID	n		617
2	2	1	fragments	UID	UID	UID	24	6.4	UID	n		618
2	2	1	coracoid, left	small	gallus gallus	chicken	1	1.2	100	n		619

Table B.7 Faunal

4	2	2	mandible, right	small	felis domestica	cat	1	2.4	100	n		620
4	2	2	mandible, left	small	felis domestica	cat	1	2.2	90	n		621
4	2	2	Maxilla, Left	small	felis domestica	cat	1	1.4	75	n		622
4	2	2	maxilla, right	small	felis domestica	cat	1	1.3	75	n		623
4	2	2	skull, temporal, left	small	felis domestica	cat	1	2.5	90	n		624
4	2	2	skull, frontal, right	small	felis domestica	cat	1	1.4	100	n		625
4	2	2	skull, frontal, left	small	felis domestica	cat	1	1.3	100	n		626
4	2	2	Cranial Fragment	small	felis domestica	cat	1	1.2	UID	n		627
4	2	2	vertebrae	small	felis domestica	cat	2	0.9	90	n		628
4	2	2	fragment	small	felis domestica	cat	20	19.4	UID	n		629
4	2	2	fragments	UID	UID	UID	5	13.2	UID	n		630
4	2	2	metatarsul	large	sus scrofa	pig	3	14.2	95	n	immature (infant)	631
4	2	2	metacarpels	large	sus scrofa	pig	4	8.3	95	n	immature (infant)	632
4	2	2	innominate, right	small	felis domestica	cat	1	3.6	100	n		633
4	2	2	humerous, left	small	felis domestica	cat	1	4.7	100	n		634
4	2	2	tibia, right, fragment	small	felis domestica	cat	1	2.3	40	n		635
4	2	2	vertebrae, 3rd cervical	small	felis domestica	cat	1	0.6	95	n		636
4	2	2	fragment	UID	UID	UID	1	0.2	95	n	immature (infant)	637
4	2	2	fragments	UID	UID	UID	7	4.4	UID	n	immature	638
4	2	2	phalanx	medium	UID	UID	1	0.3	30	n		639
4	2	2	2 scapula, 2 tibia, 1 humerous, 1 long bone	small	mammalia	mammal	6	1.2	75	n	immature, infant	640
4	2	2	phalanx, proximal, front	small	felis domestica	cat	1	0.1	100	n		641
4	2	2	tibia, right, distal portion	small	felis domestica	cat	1	0.9	20	n		642
4	2	2	mandible, left, coronid process	small	felis domestica	cat	1	0.2	5	n		643

Table B.7 cont. Faunal

6	2	3	skull fragment	large	UID	UID	1	5.4	UID	n	immature	644
6	2	3	fragments	small	UID	UID	9	1.9	UID	n	7 immature infant bones, limb bones, skull bones	645
10	2	4	scapula, right	small	procyon lotor	raccoon	1	2.9	100	n		646
10	2	4	humerous, right	small	procyon lotor	raccoon	1	4.6	100	n		647
10	2	4	ulna, left	small	procyon lotor	raccoon	1	2.5	100	n		648
10	2	4	ulna, right	small	procyon lotor	raccoon	1	2.1	90	n		649
10	2	4	radius	small	procyon lotor	raccoon	1	2	100	n		650
10	2	4	fibula	small	procyon lotor	raccoon	1	0.5	100	n		651
10	2	4	fragments	UID	UID	UID	6	3.4	UID	n	immature, possibly fetal, with humerous	652
10	2	4	vertebrae, caudal	small	UID	UID	1	0.2	90	n	immature	653
10	2	4	humerous, left	large	sus scrofa	pig	1	0.3	100	n	immature- possibly fetal, very small	654
10	2	4	fragment	UID	UID	UID	1	0.3	UID	n		655
14	2	5	fragment	medium/large	UID	UID	1	1.5	UID	y-saw cut	immature	656
3	3	1	talus, right	large	sus scrofa	pig	1	5.8	80	n	immature, small	657
3	3	1	mandible, left w/ molars and premolars	Medium	capra hireus/ ovis aries	goat/sheep	7	30	90	n		658
3	3	1	Fragments	UID	UID	UID	7	4.8	UID	n		659
3	3	1	Fragments	UID	UID	UID	1	2.1	UID	n		660
3	3	1	tooth fragment	Medium	capra hireus/ ovis aries	goat/sheep	1	1.5	UID	n		661
5	3	2	fragments	UID	UID	UID	119	63.9	UID	n		662
5	3	2	fragments	UID	UID	UID	4	5.8	UID	n		663
5	3	2	skull fragments	UID	UID	UID	3	5.6	UID	n		664
5	3	2	vertebral, caudal	medium	capra hireus/ ovis aries	goat/sheep	1	1.5	70	n	immature	665
5	3	2	fragment	large	UID	UID	1	2.4	UID	y-sawcut		666
5	3	2	fragments	UID	UID	UID	4	2.2	UID	n		667
5	3	2	phalanx, intermediate, III digit	large	sus scrofa	pig	1	1.8	UID	n	immature	668

Table B.7 cont. Faunal

5	3	2	phalanx, proximal, II digit	large	sus scrofa	pig	1	0.6	UID	n	immature	669
5	3	2	vertebrae, cervical	large	bos taurus	cow	1	50.6	40	y-saw cut	immature	670
5	3	2	fragment, possible phalange	UID	UID	UID	2	1.5	UID	N		671
5	3	2	teeth, upper premolar 3	large	bos taurus	cow	1	9.4	90	n		672
5	3	2	skull fragments	UID	UID	UID	3	6.6		n		673
5	3	2	fragment	UID	UID	UID	1	0.9		n	immature	674
5	3	2	fragment- possible footbone	UID	UID	UID	1	2.5		y-chopped		675
5	3	2	metacarpal, left, III	large	sus scrofa	pig	1	7	100	n	immature	676
8	3	3	fragments	UID	UID	UID	42	48.9	UID	n		677
8	3	3	fragments	UID	UID	UID	10	6.3	UID	n		678
8	3	3	mandible fragments	UID	UID	UID	3	9.8	UID	n		679
8	3	3	fragments, small	UID	UID	UID	852	340.3	UID	n		680
8	3	3	fragment	UID	UID	UID	1	1	UID	y-saw cut		681
8	3	3	metacarpal, right, II	large	sus scrofa	pig	1	1.8	100	n	immature	682
8	3	3	metatarsul, right, IV	large	sus scrofa	pig	1	3.9	65	n	immature	683
8	3	3	phalanx, distal, diaphysis, III or IV	medium	capra hireus/ ovis aries	goat/sheep	4	3.3	60	n		684
8	3	3	phalanx, intermediate, III or IV	large	sus scrofa	pig	1	3.4	100	n		685
8	3	3	phalanx, intermediate, III or IV	large	sus scrofa	pig	1	1.7	95	n		686
8	3	3	phalanx, intermediate, III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	1.6	100	n	Huge	687
8	3	3	phalanx, intermediate, III or IV	large	sus scrofa	pig	1	0.6	20	n		688
8	3	3	phalanx, proximal, III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	1.1	45	n		689
8	3	3	phalanx, intermediate, III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.7	40	n		690

Table B.7 cont. Faunal

8	3	3	phalanx, proximal, diaphysis II or V	large	sus scrofa	pig	2	1.9	100	n	immature	691
8	3	3	phalanx, proximal, epiphysis III or IV	large	sus scrofa	pig	1	1.2	100	n	immature	692
8	3	3	phalanx	medium/large	artiodactyla	ungulate	1	0.5	25	n		693
8	3	3	phalanx, intermediate, III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.5	20	n		694
8	3	3	phalanx III/IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.6	40	n		695
8	3	3	phalanx, proximal, III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.8	30	n		696
8	3	3	phalanx, intermediate, III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.9	100	n		697
8	3	3	phalanx, intermediate III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.5	25	n		698
8	3	3	phalanx, intermediate III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.7	35	n		699
8	3	3	phalanx, intermediate III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	0.7	35	n		700
8	3	3	metapodial	medium	capra hireus/ ovis aries	goat/sheep	1	0.6	10	n		701
8	3	3	phalanx, intermediate III or IV	medium	capra hireus/ ovis aries	goat/sheep	1	1.6	25	n		702
8	3	3	rib	medium	capra hireus/ ovis aries	goat/sheep	1	2.1	10	n		703
8	3	3	radius fragment	medium	capra hireus/ ovis aries	goat/sheep	1	3.8	10	y-saw		704
8	3	3	fragments	UID	UID	UID	2	1.2	UID	n		705
8	3	3	fragments	UID	UID	UID	2	1	UID	n	immature	706
8	3	3	fragments	UID	UID	UID	2	3.7	UID	y-saw	immature	707
8	3	3	rib	medium	UID	uid	1	1.6	10	n	immature	708
8	3	3	tooth	UID	UID	uid	1	0.3	20	n		709
8	3	3	teeth, incisor, IV	large	bos taurus	cow	1	3.1	100	n		710
8	3	3	tooth fragment	UID	UID	UID	1	0.6	UID	n		711
8	3	3	teeth, upper premolar II, left	large	bos taurus	cow	1	10.5	95	n		712
8	3	3	teeth, upper premolar II, right	large	bos taurus	cow	1	7.5	95	n		713
8	3	3	tooth fragment	large	bos taurus	cow	1	1.7	UID	n		714
8	3	3	UID	small	fish	fish	3	0.8	80	n		715

Table B.7 cont. Faunal

11	3	4	metapodial, left, III	large	sus scrofa	pig	1	7.5	100	n	huge	716
11	3	4	metacarpal, right, II	large	sus scrofa	pig	1	1.4	100	n		717
11	3	4	tibia, left, medial malleolus	large	sus scrofa	pig	1	2.7	60	n	immature	718
11	3	4	metapodial, distal epiphysis	large	sus scrofa	pig	1	1.8	100	n	immature	719
11	3	4	fragments	UID	UID	UID	102	60.5	UID	n		720
11	3	4	fragments	UID	UID	UID	47	10.8	UID	n		721
11	3	4	fragments	UID	UID	UID	3	2.9	UID	n		722
11	3	4	fragments	UID	UID	UID	7	3.4	UID	n		723
11	3	4	fragments	UID	UID	UID	44	16.4	UID	n		724
11	3	4	vertebral cap	medium	UID	UID	1	0.2	UID	n	immature	725
11	3	4	phalanx	medium	capra hireus/ ovis aries	goat/sheep	1	1.7	65	n		726
11	3	4	rib	medium	capra hireus/ ovis aries	goat/sheep	1	3.1	UID	n		727
11	3	4	fragment	large	UID	UID	1	3.1	UID	y- sawcut		728
11	3	4	cranium, fragment	large	UID	UID	1	19.2	UID	n		729
11	3	4	skull fragments	UID	UID	UID	20	51.5	UID	n		730
11	3	4	cranium, fragments	large	UID	UID	1	15.3	UID	n		731
11	3	4	skull fragments	UID	UID	UID	7	33.3	UID	N		732
11	3	4	fragments	UID	UID	UID	7	2.9	UID			733
11	3	4	fragment	large	UID	UID	1	4.8	UID	y-chopped	immature	734
11	3	4	cranial fragments	UID	UID	UID	2	0.5	UID	N		735
11	3	4	sesamoid	large	bos taurus	cow	1	2.7	100	n		736
11	3	4	rib	large	sus scrofa	pig	1	0.9	5	n	immature	737
11	3	4	rib	UID	UID	UID	3	7.8	5	n		738
11	3	4	vertebrae, thoracic	large	sus scrofa	pig	1	0.8	10	y-chopped	immature, small	739
11	3	4	tooth, premolar 2	large	bos taurus	cow	1	5.6	85	n		740
11	3	4	tooth, upper premolar	large	bos taurus	cow	1	8	60	n		741
11	3	4	tooth, premolar left	large	bos taurus	cow	1	5.3	95	n		742
11	3	4	tooth, upper incisor	large	sus scrofa	pig	1	0.3	85	n		743

Table B.7 cont. Faunal

11	3	4	tooth, incisor	large	bos taurus	cow	1	1.9	100	n		744
11	3	4	tooth, canine	UID	UID	UID	1	1	95	n		745
11	3	4	foot bone fragments	UID	UID	UID	2	2.4	UID	y-sawcut		746
11	3	4	phalanges	small	small mammal	cat?	2	0.1	100	n		747
11	3	4	metapodials	small	UID	UID	4	1	UID	n		748
15	3	5	prespheroid	large	bos taurus	cow	1	22.6	40	n		749
15	3	5	skull fragment	large	bos taurus	cow	1	7	UID	n		750
15	3	5	tooth, lower incisor	large	sus scrofa	pig	1	0.2	30	n		751
15	3	5	phalanx diaphysis	medium	artiodactyla	ungulate	1	0.8	100	n	immature	752
15	3	5	vertebrae, caudal, distal	medium	capra hireus/ ovis aries	goat/sheep	1	0.5	100	n		753
15	3	5	phalanx, V	large	bos taurus	cow	1	2	100	n		754
15	3	5	tooth, maxilla, premolar 2, right	large	bos taurus	cow	1	5	85	n		755
15	3	5	tooth, mandible, incisor 1, right	large	bos taurus	cow	1	3.5	100	n		756
15	3	5	tooth, mandible, incisor 2, left	large	bos taurus	cow	1	2.5	95	n		757
15	3	5	tooth, premolar 2, left	large	bos taurus	cow	1	6.2	95	n		758
15	3	5	tooth, premolar 1, left and right	large	bos taurus	cow	2	15.2	95	n		759
15	3	5	tooth fragment	large	bos taurus	cow	1	0.3	5	n		760
15	3	5	skull, incisive, right	large	bos taurus	cow	1	16	80	n	huge	761
15	3	5	skull, nasal, left	large	bos taurus	cow	1	17.3	75	n	huge	762
15	3	5	skull, incisive, right	large	bos taurus	cow	1	10.1	80	n		763
15	3	5	skull, incisive, right	large	bos taurus	cow	1	13.2	60	n	large	764
15	3	5	skull, incisive, left	large	bos taurus	cow	1	17.7	60	n	robust	765
15	3	5	skull, incisive, left	large	bos taurus	cow	1	1.5	35	n	narrow portion	766
15	3	5	skull, incisive, right	large	bos taurus	cow	1	12.2	40	n		767
15	3	5	skull, incisive, right	large	bos taurus	cow	1	1.1	30	n	narrow portion	768
15	3	5	skull, incisive, left	large	bos taurus	cow	1	2.2	30	n	big proportion	769
15	3	5	skull, nasal, left	large	bos taurus	cow	1	6.7	30	n	huge	770

Table B.7 cont. Faunal

15	3	5	skull, incisive, right	large	bos taurus	cow	1	10	25	n	huge		771
15	3	5	phalanx 2, epiphysis	large	bos taurus	cow	1	2.2	60	y-chopped	immature		772
15	3	5	phalanx 1	large	bos taurus	cow	1	40.8	100	n	huge		773
15	3	5	skull, incisive	large	bos taurus	cow	1	1	10	n	huge		774
15	3	5	metacarpal, right	large	bos taurus	cow	1	14.2	20	y-chopped	shaft portion		775
15	3	5	skull, nasal, left	large	bos taurus	cow	1	4.6	10	n			776
15	3	5	skull, incisive	large	bos taurus	cow	1	1.3	10	n			777
15	3	5	metacarpal, right, epiphysis	large	bos taurus	cow	1	47.9	100	n	huge		778
15	3	5	metatarsul, epiphysis	large	bos taurus	cow	1	28.3	50	n	huge		779
15	3	5	metatarsul, epiphysis	large	bos taurus	cow	1	24.3	50	n	huge		780
15	3	5	metatarsul, left, epiphysis	large	bos taurus	cow	1	41.9	100	n			781
15	3	5	vertebrae, caudal	medium	UID	UID	3	1.4	100	n	not, goat or sheep		782
15	3	5	tooth, incisor 2, left	large	bos taurus	cow	1	1.2	100	n			783
15	3	5	tooth, premolar 1, left	large	bos taurus	cow	2	12.8	95	n			784
15	3	5	tooth, premolar, right	large	bos taurus	cow	1	2.3	95	n			785
15	3	5	tooth, incisor	medium	capra hireus/ ovis aries	goat/sheep	1	0.6	60	n			786
15	3	5	tooth, 3rd upper molar	large	bos taurus	cow	1	9.7	95	n			787
15	3	5	phalanx	small	lepus townsendii	white tailed jack rabbit	1	0.1	100	n			788
15	3	5	vertebrae, caudal	small	mammalia	mammal	1	0.3	100	n			789
15	3	5	metapodial	small	mammalia	mammal	3	0.4	100	n			790
15	3	5	skull, nasal, left	large	bos taurus	cow	1	20.3	95	n			791
15	3	5	skull, left temporal, zygomatic process	large	bos taurus	cow	1	42.6	40	n			792
15	3	5	occipital	large	bos taurus	cow	1	34.4	40	n			793
15	3	5	metapodial, epiphysis	large	bos taurus	cow	1	60.5	100	n	immature, huge		794
15	3	5	metapodial, epiphysis	large	bos taurus	cow	1	56.1	100	n	immature, huge		795
15	3	5	tooth, incisor, right	large	bos taurus	cow	1	14.7	70	n			796
15	3	5	skull, temporal	large	bos taurus	cow	1	43.5	50	n			797

Table B.7 cont. Faunal

15	3	5	skull, nasal, left	large	bos taurus	cow	1	8.8	60	n	huge	798
15	3	5	skull, left temporal, zygomatic process	large	bos taurus	cow	1	27.5	30	n		799
15	3	5	fragments	UID	UID	UID	8	2.4	UID	n		800
15	3	5	skull fragments	UID	UID	UID	3	9.4	UID	n		801
15	3	5	skull, temporal, right	large	bos taurus	cow	1	9.2	20	n		802
15	3	5	skull fragments	large	UID	UID	1	11.6	UID	n	immature	803
15	3	5	fragments	UID	UID	UID	147	101.2	UID	n		804
15	3	5	fragment	UID	UID	UID	1	2.3	UID	n		805
15	3	5	fragments	UID	UID	UID	21	3.9	UID	n		806
15	3	5	skull fragments	large	UID	UID	23	35.2	UID	n		807
15	3	5	skull, nasal, left	large	bos taurus	cow	1	3.9	20	n		808
15	3	5	fragment	UID	UID	UID	1	3.7	UID	y-chopped		809
15	3	5	fragment	large	UID	UID	1	8.1	UID	n		810
15	3	5	fragment	large	UID	UID	7	18.4	UID	n		811
15	3	5	hyoid, right	large	bos taurus	cow	1	1.4	5	n	immature	812
15	3	5	hyoid	large	bos taurus	cow	1	1.2	UID	n		813
15	3	5	tooth, 2nd incisor, left	large	bos taurus	cow	2	2.2	100	n		814
15	3	5	tooth, 2nd incisor, right	large	bos taurus	cow	1	2.6	90	n		815
15	3	5	tooth, incisor	large	bos taurus	cow	1	1.5	80	n		816
15	3	5	tooth, incisor	large	bos taurus	cow	1	0.3	20	n		817
15	3	5	tooth, 1st incisor, right	large	bos taurus	cow	1	3.4	100	n		818
15	3	5	tooth, 2nd incisor, right	large	bos taurus	cow	1	2.6	95	n		819
15	3	5	tooth, 3rd upper premolar, right	large	bos taurus	cow	1	7.4	95	n		820
15	3	5	tooth, 2nd upper premolar, left	large	bos taurus	cow	1	4.8	100	n		821
15	3	5	tooth, 3rd upper molar	large	bos taurus	cow	2	11.7	100	n		822
15	3	5	tooth, upper canine	large	bos taurus	cow	1	0.8	85	n		823
15	3	5	fragments	UID	UID	UID	100	76.6		n		824

Table B.7 cont. Faunal

15	3	5	nasal cavity fragments	UID	UID	UID	4	6		n		825
15	3	5	skull fragments	UID	UID	UID	18	79.9		n		826
15	3	5	fragments	UID	UID	UID	1	1.1		n		827
15	3	5	fragment	UID	UID	UID	1	1	5	n	immature	828
15	3	5	metatarsul, right	large	bos taurus	cow	1	293.1	100	n		829
15	3	5	metatarsul, left	large	bos taurus	cow	1	283.7	100	n		830
15	3	5	metacarpal, right, diaphysis	large	bos taurus	cow	1	147	100	n	immature, gracile	831
15	3	5	metacarpal, right, diaphysis	large	bos taurus	cow	1	263.7	100	n	immature, huge	832
15	3	5	metatarsul, right, diaphysis	large	bos taurus	cow	1	306.2	100	n	immature, huge	833
15	3	5	metatarsul, right, diaphysis	large	bos taurus	cow	1	97.5	100	n	immature, small, gracile	834
15	3	5	metatarsul, left	large	bos taurus	cow	1	255.1	100	n		835
15	3	5	metatarsul, left, diaphysis	large	bos taurus	cow	1	262.5	100	n	immature, huge	836
15	3	5	metatarsul, right, diaphysis	large	bos taurus	cow	1	360.4	100	n	immature, huge	837
15	3	5	metatarsul, left, diaphysis	large	bos taurus	cow	1	342.2	100	n	immature, huge	838
15	3	5	skull, nasal, left	large	bos taurus	cow	1	23.3	100	n	Huge	839
15	3	5	metacarpal, left, diaphysis	large	bos taurus	cow	1	232.8	100	n	immature, huge	840
15	3	5	metacarpal, left	large	bos taurus	cow	1	218.6	100	n	long, slender	841
15	3	5	metacarpal, left	large	bos taurus	cow	1	274.1	100	n	huge	842
15	3	5	metacarpal, right, diaphysis	large	bos taurus	cow	1	184.5	100	n	immature	843
15	3	5	metacarpal, left, diaphysis	large	bos taurus	cow	1	234.2	100	n	immature, huge	844
15	3	5	metatarsul, left, epiphysis	large	bos taurus	cow	1	54.9	100	n	huge	845
15	3	5	metatarsul right, epiphysis	large	sus scrofa	pig	1	50.9	100	n	huge	846
15	3	5	metatarsul III, right	large	bos taurus	cow	1	6.9	100	n		847
15	3	5	mandible, right	large	bos taurus	cow	1	500	100	n	w/ five teeth	848
15	3	5	mandible, right	large	bos taurus	cow	1	500	100	n	w/ six teeth	849
15	3	5	occipital	large	bos taurus	cow	1	144	70	n		850
15	3	5	skull, frontal and cornual eminence	large	bos taurus	cow	1	500	40	n		851
15	3	5	skull, incisive, left	large	bos taurus	cow	1	13	35	n		852

Table B.7 cont. Faunal

15	3	5	fragments	UID	UID	UID	4	3.7	UID	n	2 nasal cavity	853
15	3	5	tooth, upper 3rd premolar	large	bos taurus	cow	1	22.3	100	n	huge	854
15	3	5	fragments	UID	UID	UID	11	8.4	UID	n		855
15	3	5	tooth, maxillary molar, right	large	bos taurus	cow	1	7.6	100	n		856
15	3	5	fragments	UID	UID	UID	5	5.9	UID	n		857
15	3	5	long bone fragments	medium	UID	UID	1	16.9	40	y-sawcut longways		858
15	3	5	cranial fragments	large	bos taurus	cow	4	114	UID	y-sawcut		859
34	3	6	basi-occipital	large	bos taurus	cow	1	126.8	90	y-chop mark at base of condyle	immature	860
34	3	6	basi-occipital, right side	large	bos taurus	cow	1	70.1	50	y-possibly sawed through at base	immature	861
34	3	6	metacarpal, right	large	bos taurus	cow	1	239.1	100	n		862
34	3	6	metatarsul, left	large	bos taurus	cow	1	243.9	100	n		863
34	3	6	metatarsul, left	large	bos taurus	cow	1	360.2	100	y-chop marks on proximal and distal epiphysis		864
34	3	6	scapula, right	Medium	sus scrofa	pig	1	63.7	60	y- groups of striations		865
34	3	6	zygomatic process, left	large	bos taurus	cow	1	42.7	100	y-possible cut mark on orbital	immature	866
34	3	6	metacarpal, right	medium	capra hireus/ ovis aries	goat/sheep	1	27	100	y- possible striations mid shaft		867
34	3	6	metacarpal, right	medium	capra hireus/ ovis aries	goat/sheep	1	15.1	80	n	immature	868
34	3	6	metacarpal, right	medium	capra hireus/ ovis aries	goat/sheep	1	20.1	100	n		869
34	3	6	metacarpal, left	large	bos taurus	cow	1	251	90	y- transverse chop marks on proximal metaphysis and ephiphysis	immature	870
34	3	6	metatarsul, left	large	bos taurus	cow	1	294.9	90	y- transverse chop marks on proximal metaphysis	immature	871
34	3	6	metacarpal, right	large	bos taurus	cow	1	252.5	100	n		872
34	3	6	metatarsul, right	large	bos taurus	cow	1	236.6	100	n		873
34	3	6	metacarpal, left	large	bos taurus	cow	1	229.3	100	n		874
34	3	6	metatarsul, left	large	bos taurus	cow	1	242.7	90	n	immature	875
34	3	6	metacarpal, left	large	bos taurus	cow	1	343.6	100	y-oblique chop mark on mid shaft	very large	876

Table B.7 cont. Faunal

34	3	6	metatarsul, right	large	bos taurus	cow	1	92.9	90	y- transverse chop marks on proximal epiphysis	immature	877
34	3	6	metatarsul, left	large	bos taurus	cow	1	125.7	90	y-transverse chop marks on proximal epiphysis	immature	878
34	3	6	metatarsul, left	large	bos taurus	cow	1	355.2	100	n	huge	879
34	3	6	metatarsul, right	large	bos taurus	cow	1	208.9	90	y-chop marks on proximal plateau	immature	880
34	3	6	metatarsul, right	large	bos taurus	cow	1	309.4	90	n	immature and huge	881
34	3	6	metacarpal, left	large	bos taurus	cow	1	175.3	90	n	immature	882
34	3	6	metatarsul, right	large	bos taurus	cow	1	105.6	90	n	immature	883
34	3	6	metacarpal, left	large	bos taurus	cow	1	47.3	90	n	immature	884
34	3	6	metacarpal, right	large	bos taurus	cow	1	236.9	90	n	immature	885
34	3	6	metatarsul, right	large	bos taurus	cow	1	274.6	90	n	immature and huge	886
34	3	6	Metacarpal, right	large	bos taurus	cow	1	221.3	100	possible chop on proximal end		887
34	3	6	Metacarpal, right	large	bos taurus	cow	1	66.7	90	n	immature	888
34	3	6	Metacarpal, Left	large	bos taurus	cow	1	194.2	90	y-chop on proximal plateau	immature	889
34	3	6	Metacarpal, Left	medium	capra hireus/ ovis aries	goat/sheep	1	26.6	100	n		890
34	3	6	Metacarpal, Left	medium	capra hireus/ ovis aries	goat/sheep	1	41.1	100	n		891
34	3	6	phalanx, proximal	large	bos taurus	cow	1	52.5	100	n	huge	892
34	3	6	phalanx, proximal	large	bos taurus	cow	1	45.9	100	n	huge	893
34	3	6	phalanx, proximal	large	bos taurus	cow	1	35.6	100	n	huge	894
34	3	6	phalanx, proximal	large	bos taurus	cow	1	37.2	100	n	huge	895
34	3	6	phalanx, proximal	large	bos taurus	cow	1	42.4	100	n	huge	896
34	3	6	phalanx, proximal	large	bos taurus	cow	1	40.9	100	n	huge	897
34	3	6	phalanx, proximal	large	bos taurus	cow	1	30.2	100	n		898
34	3	6	phalanx, proximal	large	bos taurus	cow	1	28.3	100	n		899
34	3	6	phalanx, proximal	large	bos taurus	cow	1	37.5	100	n	huge	900
34	3	6	phalanx, proximal	large	bos taurus	cow	1	22.7	100	n	large	901
34	3	6	phalanx, intermediate	large	bos taurus	cow	1	27.4	100	n	large	902
34	3	6	phalanx, intermediate	large	bos taurus	cow	1	19.6	100	n	large	903

Table B.7 cont. Faunal

34	3	6	phalanx, intermediate	large	bos taurus	cow	1	22.7	100	n	large	904
34	3	6	phalanx, intermediate	large	bos taurus	cow	1	23	100	n	large	905
34	3	6	phalanx, intermediate	large	bos taurus	cow	1	26.7	100	n	huge	906
34	3	6	phalanx, intermediate	large	bos taurus	cow	1	24.7	100	n	huge	907
34	3	6	phalanx, distal	large	bos taurus	cow	1	20.9	95	n		908
34	3	6	phalanx, distal	large	bos taurus	cow	1	24.3	100	n		909
34	3	6	phalanx, distal	large	bos taurus	cow	1	16.9	100	n		910
34	3	6	phalanx, distal	large	bos taurus	cow	1	16.9	100	n		911
34	3	6	phalanx, distal	large	bos taurus	cow	1	21.2	100	n		912
34	3	6	phalanx, distal	large	bos taurus	cow	1	16	100	n	immature	913
34	3	6	phalanx, distal	large	bos taurus	cow	1	17.4	95	n		914
34	3	6	phalanx, distal	large	bos taurus	cow	1	14.5	95	n		915
34	3	6	sesamoid	large	bos taurus	cow	33	116.4	100	N		916
34	3	6	sesamoid	S	UID	UID	6	1.5	100	N		917
34	3	6	phalanx, distal	large	bos taurus	cow	2	36	100	N		918
34	3	6	phalanx, distal	Medium	capra hireus/ ovis aries	goat/sheep	7	9.8	100	N		919
34	3	6	phalanx, distal	UID	UID	UID	2	10	100	N		920
34	3	6	Fragments	large	bos taurus	cow	2	27.1	UID	N		921
34	3	6	Fragments	UID	UID	UID	4	12.4	UID	Y-Chop		922
34	3	6	Fragments	UID	UID	UID	61	94.3	UID	N		923
34	3	6	Phallenges, proximal and intermediate	large	bos taurus	cow	2	49.1	100	n		924
34	3	6	Phalanx, proximal	Medium	capra hireus/ ovis aries	goat/sheep	4	14.2	100	n		925
34	3	6	Phalanx, proximal	Medium	capra hireus/ ovis aries	goat/sheep	8	12.4	100	n		926
34	3	6	Phalanx, proximal epiphysis	Medium	capra hireus/ ovis aries	goat/sheep	2	3.7	100	n	immature	927
34	3	6	Phalanx, proximal	Medium	capra hireus/ ovis aries	goat/sheep	1	3.3	100	n	immature	928
34	3	6	phalanx, intermediate	Medium	capra hireus/ ovis aries	goat/sheep	4	5.7	100	n	immature	929
34	3	6	phalanx, intermediate	Medium	sus scrofa	pig	1	3.4	100	n		930

Table B.7 cont. Faunal

34	3	6	phalanx, intermediate	Medium	sus scrofa	pig	1	1.8	100	n	immature	931
34	3	6	phalanx, intermediate epiphysis	Medium	capra hireus/ ovis aries	goat/sheep	2	1.1	100	n		932
34	3	6	Phalanx, proximal epiphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	1.9	100	n		933
34	3	6	metacarpal epiphysis	Medium	capra hireus/ ovis aries	goat/sheep	2	10.8	100	n		934
34	3	6	phalanx	UID	UID	UID	2	1.4	100	n	immature	935
34	3	6	Vertebrae caudal	large	bos taurus	cow	12	13.6	100	n		936
34	3	6	teeth, permanent lower I1, I2, I3	large	bos taurus	cow	22	67.1	100	n		937
34	3	6	teeth, anterior teeth deciduous	large	bos taurus	cow	4	2.6	100	n		938
34	3	6	Teeth, premolar deciduous lower P2	large	bos taurus	cow	2	2.2	100	n		939
34	3	6	teeth, upper permanent premolar	large	bos taurus	cow	1	6.9	100	n		940
34	3	6	teeth, 3rd molar	large	bos taurus	cow	1	7	50	n		941
34	3	6	teeth, upper premolar	large	bos taurus	cow	1	17	100	n		942
34	3	6	teeth, upper molar	large	bos taurus	cow	4	21.5	75	n		943
34	3	6	phalanx, intermediate epiphysis	large	bos taurus	cow	1	1.4	100	n	immature	944
34	3	6	teeth, P3	large	bos taurus	cow	3	6.4	100	n		945
34	3	6	tooth fragment	UID	UID	UID	1	1.8	UID	n		946
34	3	6	fragments	UID	UID	UID	5	1.6	UID	n		947
34	3	6	fragment	small-medium	UID	UID	1	0.3	UID	y-chopped	immature	948
34	3	6	phalanx, intermediate, epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	0.5	100	n	immature	949
34	3	6	phalanx, intermediate, epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	0.5	100	n		950
34	3	6	vestigial metapodial	large	bos taurus	cow	1	2.3	90	n		951
34	3	6	tooth, right molar and first incisor	large	sus scrofa	pig	1	0.7	30	n		952
34	3	6	vertebrae, cervical	small	gallus gallus	chicken	1	0.3	80	n		953
34	3	6	sesamoid	medium	capra hireus/ ovis aries	goat/sheep	1	0.3	100	n		954
34	3	6	fragment	UID	UID	UID	1	3.8	UID	y-sawcut		955

Table B.7 cont. Faunal

34	3	6	skull, nasal, left	large	bos taurus	cow	2	9	80	n		956
34	3	6	skull, incisive, right	large	bos taurus	cow	1	5.3	10	n		957
34	3	6	skull, frontal, left	large	bos taurus	cow	1	12.7	15	n		958
34	3	6	skull, incisive, left	large	bos taurus	cow	1	15.1	40	n		959
34	3	6	jugular process, right and occipital	large	bos taurus	cow	1	15.7	30	n		960
34	3	6	phalanx, intermediate and diaphysis	large	bos taurus	cow	1	9.2	100	n		961
34	3	6	maxilla, left with teeth	large	sus scrofa	pig	1	46.7	45	n		962
34	3	6	skull, incisive, left	large	bos taurus	cow	1	15.5	40	n		963
34	3	6	metapodial, epiphysis	large	bos taurus	cow	6	302.6	100	n	immature, huge	964
34	3	6	vertebrae, caudal, 1st or 2nd	large	bos taurus	cow	1	16.5	90	n	immature	965
34	3	6	fragments	UID	UID	UID	3	4.7	UID	n	1 tooth, temporal bone	966
48	3	7	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.5	100	n		967
48	3	7	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.4	100	n		968
48	3	7	phalanx, intermediate	medium	capra hireus/ ovis aries	goat/sheep	1	1.5	100	n		969
48	3	7	phalanx, intermediate	medium	capra hireus/ ovis aries	goat/sheep	1	1.4	100	n	immature	970
48	3	7	phalanx, intermediate	medium	capra hireus/ ovis aries	goat/sheep	1	1.4	90	n		971
48	3	7	phalanx, proximal diaphysis	medium	capra hireus/ ovis aries	goat/sheep	1	2.4	100	n	immature	972
48	3	7	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.7	100	n		973
48	3	7	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.7	100	n		974
48	3	7	phalanx, proximal diaphysis	medium	capra hireus/ ovis aries	goat/sheep	1	3.1	100	n	immature	975
48	3	7	phalanx, proximal	medium	capra hireus/ ovis aries	goat/sheep	1	3.8	100	n		976
48	3	7	talus, left	medium	capra hireus/ ovis aries	goat/sheep	1	5.4	100	n		977
48	3	7	phalanx, intermediate	medium	capra hireus/ ovis aries	goat/sheep	1	1.6	100	n		978
48	3	7	phalanx, intermediate	medium	capra hireus/ ovis aries	goat/sheep	1	2	100	n		979
48	3	7	phalanx, intermediate diaphysis	medium	capra hireus/ ovis aries	goat/sheep	1	1	100	n	immature	980

Table B.7 cont. Faunal

48	3	7	phalanx, proximal	medium	capra hireus/ ovis aries	goat/sheep	1	3.6	100	n		981
48	3	7	metapodial, epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	5.6	100	n	immature	982
48	3	7	phalanx, proximal diaphysis	medium	capra hireus/ ovis aries	goat/sheep	1	3.4	100	n	immature	983
48	3	7	phalanx, proximal diaphysis	medium	capra hireus/ ovis aries	goat/sheep	1	2.7	100	n	immature	984
48	3	7	phalanx, distal	medium	UID	UID	1	3.6	100	n		985
48	3	7	phalanx, distal	medium	UID	UID	1	2.4	90	n		986
48	3	7	phalanx, intermediate diaphysis	medium	capra hireus/ ovis aries	goat/sheep	1	1.3	100	n	immature	987
48	3	7	phalanx, intermediate	large	bos taurus	cow	1	16.5	100	n		988
48	3	7	phalanx, proximal	large	bos taurus	cow	2	3.1	95	n	immature,	989
48	3	7	phalanx, proximal immature epiphysis	large	bos taurus	cow	1	2.3	95	n	immature,	990
48	3	7	phalanx, proximal immature epiphysis	large	bos taurus	cow	1	2.6	98	n	immature,	991
48	3	7	phalanx, intermediate diaphysis	large	bos taurus	cow	1	6.7	100	n	immature	992
48	3	7	phalanx, proximal immature epiphysis	large	bos taurus	cow	1	2.1	95	n	immature,	993
48	3	7	phalanx, proximal	medium	capra hireus/ ovis aries	goat/sheep	1	3.8	100	n		994
48	3	7	phalanx, proximal	medium	capra hireus/ ovis aries	goat/sheep	1	3.4	90	n		995
48	3	7	vertebrae, 4th caudal	large	bos taurus	cow	1	11.7	85	n	immature	996
48	3	7	vertebrae, caudal	large	bos taurus	cow	1	3.8	95	n		997
48	3	7	vertebrae, caudal	large	bos taurus	cow	2	5.4	100	n		998
48	3	7	phalanx, proximal, unfused epiphysis	large	bos taurus	cow	1	4.5	95	n	immature,	999
48	3	7	phalanx, proximal, unfused epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	1.1	95	n	immature	1000
48	3	7	phalanx, proximal, unfused epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	1	100	n	immature	1001
48	3	7	phalanx, proximal, unfused epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	1.2	100	n	immature	1002
48	3	7	phalanx, intermediate, unfused epiphysis	large	bos taurus	cow	1	1.8	100	n	immature	1003
48	3	7	phalanx, intermediate, unfused epiphysis	large	bos taurus	cow	1	1.5	100	n	immature	1004
48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	7	100	n	immature	1005

Table B.7 cont. Faunal

48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	7.3	100	n	immature	1006
48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	7	100	n	immature	1007
48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	7.3	95	n	immature	1008
48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	3.3	100	n	immature	1009
48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	5.9	95	possible butcher cut	immature	1010
48	3	7	phalanx, proximal, unfused diaphysis	large	bos taurus	cow	1	11.1	95	n	immature	1011
48	3	7	phalanx, proximal, unfused diaphysis	large	bos taurus	cow	1	5.3	80	n	immature	1012
48	3	7	phalanx, intermediate, unfused epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	0.6	95	n	immature	1013
48	3	7	phalanx, intermediate, unfused epiphysis	medium	capra hireus/ ovis aries	goat/sheep	1	0.3	100	n	immature	1014
48	3	7	phalanx, proximal, unfused diaphysis	large	sus scrofa	pig	1	1.7	95	n	immature	1015
48	3	7	phalanx, proximal, unfused diaphysis	large	sus scrofa	pig	1	1.9	85	n	immature/baby	1016
48	3	7	phalanx, proximal, unfused diaphysis	large	bos taurus	cow	1	4.9	80	n	immature	1017
48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	3	95	n	immature	1018
48	3	7	phalanx, proximal, unfused epiphysis	large	bos taurus	cow	1	4.3	100	n	immature	1019
48	3	7	phalanx, intermediate, unfused diaphysis	large	bos taurus	cow	1	3.9	100	n	immature	1020
48	3	7	metapodial, distal epiphysis	large	bos taurus	cow	1	10.8	50	n	immature	1021
48	3	7	metapodial, distal epiphysis	large	bos taurus	cow	1	5.8	40	n	immature	1022
48	3	7	metapodial, distal epiphysis, MC	large	bos taurus	cow	1	8.8	50	n	immature	1023
48	3	7	metapodial, distal epiphysis	large	bos taurus	cow	1	6.2	45	n	immature	1024
48	3	7	metapodial, distal epiphysis	large	bos taurus	cow	1	11.5	50	n	immature	1025
48	3	7	metapodial, distal epiphysis	large	bos taurus	cow	2	6.8	45	n	immature	1026
48	3	7	metapodial, distal epiphysis, MC	large	bos taurus	cow	1	10.9	50	n	immature	1027
48	3	7	metacarpal, distal epiphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	3.9	100	n	immature, large	1028
48	3	7	metacarpal, distal epiphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	5.4	100	n	immature, large	1029
48	3	7	metapodial, distal epiphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	1.5	50	n	immature	1030

Table B.7 cont. Faunal

48	3	7	sesamoid	large	bos taurus	cow	6	17.3	100	n		1031
48	3	7	sesamoid	Medium	capra hireus/ ovis aries	goat/sheep	2	0.6	100	n		1032
48	3	7	tarsal, fused 2+3	large	bos taurus	cow	1	10.3	90	n	huge, comparable in size to Bison	1033
48	3	7	phalanx, proximal	Medium	capra hireus/ ovis aries	goat/sheep	1	3.8	100	n		1034
48	3	7	phalanx, proximal	Medium	capra hireus/ ovis aries	goat/sheep	2	7	95	n		1035
48	3	7	phalanx, proximal	Medium	capra hireus/ ovis aries	goat/sheep	1	3.3	100	n		1036
48	3	7	phalanx, proximal, diaphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	2.6	100	n	immature	1037
48	3	7	phalanx, proximal, diaphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	3.2	100	n	immature	1038
48	3	7	phalanx, intermediate	Medium	capra hireus/ ovis aries	goat/sheep	4	6.4	100	n		1039
48	3	7	phalanx, intermediate	Medium	capra hireus/ ovis aries	goat/sheep	2	3	95	n		1040
48	3	7	phalanx, intermediate, diaphysis	large	sus scrofa	pig	1	4.3	100	n	immature, unusual bone growth	1041
48	3	7	vertebrae, cap	large	bos taurus	cow	3	3.8	95	n	immature	1042
48	3	7	Vertebrae, caudal	large	sus scrofa	pig	2	1.8	100	n	immature	1043
48	3	7	Vertebrae, caudal	large	sus scrofa	pig	1	0.4	85	y- diagonally sawed		1044
48	3	7	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.6	80	n		1045
48	3	7	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.4	100	n		1046
48	3	7	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	5	7.5	100	n	robust	1047
48	3	7	phalanx, distal	Medium	capra hireus/ ovis aries	goat/sheep	1	1	95	n		1048
48	3	7	phalanx, distal	Medium	capra hireus/ ovis aries	goat/sheep	1	1.4	100	n		1049
48	3	7	phalanx, distal	large	sus scrofa	pig	1	1.1	100	n	immature, small	1050
48	3	7	Fragments	UID	UID	UID	40	26.1	UID	n		1051
48	3	7	Fragments	UID	UID	UID	4	2.5	UID	n		1052
48	3	7	Fragments	UID	UID	UID	4	1.8	UID	n		1053
48	3	7	vertebral cap	large	UID	UID	1	1	70	n		1054
48	3	7	Fragments	UID	UID	UID	1	0.8	UID	y-cut marks		1055

Table B.7 cont. Faunal

48	3	7	Fragments	large	UID	UID	1	5.2	UID	n		1056
48	3	7	Fragments	large	UID	UID	1	10.1	UID	n		1057
48	3	7	vertebrae, spinous process	large	bos taurus	cow	1	42.8	20	N		1058
48	3	7	calcaneous, right	large	bos taurus	cow	2	36.5	15	y-saw cuts	immature, Huge	1059
48	3	7	Fragments	large	UID	UID	2	3.5	UID	y-saw cuts		1060
48	3	7	Fragments	large	UID	UID	3	32.5	UID	y-saw cuts	immature, large	1061
48	3	7	phalanx, distal	large	sus scrofa	pig	1	6.3	95	y-saw cuts		1062
48	3	7	vertebral cap	large	UID	UID	1	3.5	90	n	immature	1063
48	3	7	sesamoid	medium	capra hireus/ ovis aries	goat/sheep	1	0.2	100	n		1064
48	3	7	sternal bone	UID	UID	UID	1	1	30	n	immature	1065
48	3	7	vertebral cap	large	UID	UID	1	3.4	40	n	immature, large	1066
48	3	7	Vertebrae caudal	medium	UID	UID	1	0.9	50	n	immature, small	1067
48	3	7	metatarsul (left)w/proximal, intermediate, distal phallanges	large	bos taurus	cow	7	568.3	100	n	huge	1068
48	3	7	phallanges, proximal, intermediate, distal	large	bos taurus	cow	6	130	100	n	large	1069
48	3	7	metatarsul, left	large	bos taurus	cow	1	354	95	n	huge	1070
48	3	7	metatarsul, right	large	bos taurus	cow	1	79.8	95	n	immature, baby	1071
48	3	7	metacarpal, right	large	bos taurus	cow	1	42.8	100	n	immature, baby	1072
48	3	7	sesamoid	large	bos taurus	cow	4	10.4	100	n		1073
48	3	7	sesamoid	large	bos taurus	cow	1	1.4	100	n		1074
48	3	7	UID	UID	UID	UID	1	1.3	100	n		1075
48	3	7	rib	large	UID	UID	1	3.5	5	n	immature	1076
48	3	7	phalanx, proximal	Medium	capra hireus/ ovis aries	goat/sheep	2	6.7	100	n		1077
48	3	7	phalanx, proximal, diaphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	3.2	100	n	immature	1078
48	3	7	phalanx, proximal	large	bos taurus	cow	1	28.6	100	n		1079
48	3	7	phalanx, proximal	large	bos taurus	cow	1	33.5	100	n	Huge	1080
48	3	7	talus, left	large	sus scrofa	pig	1	9.9	95	n	small, maybe immature	1081

Table B.7 cont. Faunal

48	3	7	phalanx, intermediate	Medium	capra hireus/ ovis aries	goat/sheep	2	2.6	100	n		1082
48	3	7	phalanx, intermediate	Medium	capra hireus/ ovis aries	goat/sheep	1	1.9	100	n	huge	1083
48	3	7	phalanx, intermediate, diaphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	1.3	100	n	immature	1084
48	3	7	phalanx, proximal, epiphysis	large	bos taurus	cow	1	3.6	100	n	immature	1085
48	3	7	phalanx, proximal, diaphysis	large	bos taurus	cow	1	9.4	100	n	immature, robust	1086
48	3	7	phalanx, proximal, diaphysis	large	bos taurus	cow	1	5.9	100	n	immature, gracile	1087
48	3	7	phalanx, intermediate, diaphysis	large	bos taurus	cow	2	7.6	95	n	immature	1088
48	3	7	phalanx, intermediate, epiphysis	large	bos taurus	cow	1	1	80	n	immature	1089
48	3	7	phalanx, intermediate	large	bos taurus	cow	2	52.2	100	n	immature	1090
48	3	7	phalanx, intermediate	large	bos taurus	cow	1	21.7	100	n	huge	1091
48	3	7	phalanx, intermediate	large	bos taurus	cow	1	16.8	100	n	huge, robust, but not as big as ID#294	1092
48	3	7	metatarsul, left, diaphysis	large	sus scrofa	pig	1	4.6	75	n	immature	1093
48	3	7	humerous, left	large	bos taurus	cow	1	65.1	5	n	huge	1094
48	3	7	sesamoid	large	bos taurus	cow	2	7.1	100	n		1095
48	3	7	metacarpal, left diaphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	23	100	n	immature, Huge	1096
48	3	7	metacarpal, right	Medium	capra hireus/ ovis aries	goat/sheep	1	28.6	100	n	immature, Huge	1097
48	3	7	metacarpal, right, diaphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	16.9	100	n	immature	1098
48	3	7	metacarpal, left	Medium	capra hireus/ ovis aries	goat/sheep	1	25.1	100	n		1099
48	3	7	metacarpal, left, diaphysis	Medium	capra hireus/ ovis aries	goat/sheep	1	15.5	100	n	immature	1100
48	3	7	vertebrae, caudal	large	bos taurus	cow	1	2.5	100	n		1101
48	3	7	vertebrae, caudal	large	bos taurus	cow	1	4.7	95	n		1102
48	3	7	Fragments	UID	UID	UID	8	8.5	UID	n		1103
48	3	7	vertebrae, caudal, proximal	large	bos taurus	cow	1	17.1	75	n	immature	1104
48	3	7	phalange, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.8	100	n		1105
48	3	7	phalange, distal	medium	capra hireus/ ovis aries	goat/sheep	2	2.7	100	n		1106
48	3	7	phalange, distal	large	sus scrofa	pig	1	2.4	90	n		1107

Table B.7 cont. Faunal

48	3	7	phalange, distal	large	bos taurus	cow	1	29.2	100	n	huge	1108
48	3	7	vertebrae, caudal, proximal	large	bos taurus	cow	1	14.2	70	n	immature	1109
48	3	7	phalange, distal	large	bos taurus	cow	1	16.5	100	n		1110
48	3	7	Metapodial, condyle	large	bos taurus	cow	1	5.7	90	n	immature	1111
48	3	7	Metacarpal II	large	bos taurus	cow	1	2.3	100	n		1112
48	3	7	vertebral cap	large	bos taurus	cow	2	2.4	95	n	immature	1113
48	3	7	vertebral cap	UID	UID	UID	1	2.8	100	n	immature	1114
48	3	7	Fragment	large	UID	UID	1	5.2	UID	n		1115
48	3	7	zygomatic, left	large	sus scrofa	pig	1	11	UID	n		1116
48	3	7	phalanx intermediate	medium	capra hireus/ ovis aries	goat/sheep	1	2	90	N		1117
48	3	7	metatarsul V, right	large	sus scrofa	pig	1	1.1	95	n		1118
48	3	7	metatarsul V, right	large	sus scrofa	pig	1	2.5	100	n		1119
48	3	7	tooth, premolar 2	large	bos taurus	cow	1	7.6	80	n		1120
48	3	7	tooth, premolar 1	large	sus scrofa	pig	1	0.2	95	n		1121
15	3	5a	skull, nasal bone, left	large	bos taurus	cow	1	15.1	100	n	huge	1122
15	3	5a	skull, incisive, right	large	bos taurus	cow	1	17.6	70	n	huge	1123
15	3	5a	skull, nasal bone, right	large	bos taurus	cow	1	7.3	30	n	huge	1124
15	3	5a	skull, incisive, right	large	bos taurus	cow	1	14.7	45	n	huge	1125
15	3	5a	skull, incisive, left	large	bos taurus	cow	1	13.4	35	n	huge	1126
15	3	5a	skull, incisive, left	large	bos taurus	cow	1	1.4	20	n		1127
15	3	5a	mandible, ascending ramus	large	bos taurus	cow	1	7	5	n		1128
15	3	5a	skull, incisive, fragment	large	bos taurus	cow	1	0.9	10	n		1129
15	3	5a	skull, nasal, left	large	bos taurus	cow	1	10.5	40	n	huge	1130
15	3	5a	skull, nasal, left	large	bos taurus	cow	1	2.3	10	n		1131
15	3	5a	fragments				157	160	UID	n		1132
15	3	5a	sesamoid	large	bos taurus	cow	1	2.5	100	n		1133
15	3	5a	skull, fragment	large	bos taurus	cow	1	18.3	UID	n		1134
15	3	5a	metapodial I, II, or V	large	bos taurus	cow	1	1.9	100	n		1135

Table B.7 cont. Faunal

15	3	5A	skull, nasal, left	large	bos taurus	cow	1	16	95	n		1136
15	3	5A	skull, nasal, right	large	bos taurus	cow	1	13.2	95	n		1137
15	3	5A	skull, incisive, right	large	bos taurus	cow	1	12.8	75	n		1138
15	3	5A	skull, incisive, left	large	bos taurus	cow	1	10.6	75	n		1139
15	3	5A	skull, incisive, left	large	bos taurus	cow	1	2.3	25	n		1140
15	3	5A	skull, incisive, right	large	bos taurus	cow	1	1.6	25	n		1141
15	3	5A	skull, temporal bone, zygomatic process, left	large	bos taurus	cow	1	12.1	90	n		1142
15	3	5A	skull, occipital, left	large	bos taurus	cow	1	54.3	95	n		1143
15	3	5A	sphenoid	large	bos taurus	cow	1	21	80	n		1144
15	3	5A	phalanx, intermediate	large	bos taurus	cow	1	20.9	100	n		1145
15	3	5A	phalanx, distal	large	bos taurus	cow	1	19	100	n		1146
15	3	5A	sesamoid	large	bos taurus	cow	1	1.3	100	n		1147
15	3	5A	phalanx	large	bos taurus	cow	1	2.1	100	n		1148
15	3	5B	metacarpal, right	large	bos taurus	cow	1	194	100	n	gracile	1149
15	3	5B	metacarpal, right	large	bos taurus	cow	1	294.1	100	n		1150
15	3	5B	metacarpal, right	large	bos taurus	cow	1	194.5	100	n	immature	1151
15	3	5B	metacarpal, right	large	bos taurus	cow	1	236.1	100	n		1152
15	3	5B	metacarpal, left	large	bos taurus	cow	1	271.4	100	n		1153
15	3	5B	metacarpal, right	large	bos taurus	cow	1	216.5	100	n	immature	1154
15	3	5B	metatarsul, right	large	bos taurus	cow	1	251.1	100	n	immature	1155
15	3	5B	metatarsul, right	large	bos taurus	cow	1	242	100	n	immature	1156
15	3	5B	Mandible, left	large	bos taurus	cow	1	550	100	n		1157
15	3	5B	metacarpal, right	large	bos taurus	cow	1	170.3	100	n	immature, gracile	1158
15	3	5B	metacarpal, left	large	bos taurus	cow	1	233.9	100	n	immature	1159
15	3	5B	metacarpal, left	large	bos taurus	cow	1	207.2	100	n	immature, gracile	1160
15	3	5B	metatarsul, right	large	bos taurus	cow	1	279.3	100	n		1161
15	3	5B	metatarsul, right	large	bos taurus	cow	1	313.9	100	Possible Chop Mark		1162

Table B.7 cont. Faunal

15	3	5B	metatarsul, right	large	bos taurus	cow	1	343.8	100	n		1163
15	3	5B	Occipital	large	bos taurus	cow	1	157.8	60	n	immature	1164
15	3	5B	Maxilla (Left)	large	bos taurus	cow	1	265.9	50	n		1165
15	3	5B	Maxilla	large	bos taurus	cow	1	30.2	25	n		1166
15	3	5B	Maxilla (Right)	large	bos taurus	cow	1	266.4	75	n		1167
15	3	5B	Right Occipital condyle	large	bos taurus	cow	1	37.4	25	n		1168
15	3	5B	Right Mandible	large	bos taurus	cow	1	491.5	100	Y		1169
15	3	5B	Maxilla, Left Zygomatic	large	bos taurus	cow	1	421.8	75	n	partial maxilla with complete zygomatic process	1170
15	3	5B	Mandible, left	large	bos taurus	cow	1	514.1	100	n	possible permanent eruption	1171
15	3	5B	Metapodial, distal end	large	bos taurus	cow	1	57.3	100	n	immature- small to medium	1172
15	3	5B	Metapodial, distal end	large	bos taurus	cow	1	37.7	100	n	immature	1173
15	3	5B	Metapodial, distal end	large	bos taurus	cow	1	58.1	100	n	immature	1174
15	3	5B	Metapodial, distal end	large	bos taurus	cow	1	41.6	100	n	immature	1175
15	3	5B	Metapodial, unfused epiphysis	large	bos taurus	cow	1	57	100	n	immature	1176
15	3	5B	Metapodial, unfused epiphysis	large	bos taurus	cow	1	47.4	100	n	immature	1177
15	3	5B	zygomatic, right	large	bos taurus	cow	1	42.9	100	n		1178
15	3	5B	zygomatic, left	large	bos taurus	cow	1	42.8	100	n		1179
15	3	5B	Cranial Fragment	large	bos taurus	cow	1	61.7	UID	y-butcher chop		1180
15	3	5B	Frontal, right, pedicle	large	bos taurus	cow	1	88.1	75	n		1181
15	3	5B	mandible, right	large	bos taurus	cow	1	235.8	100	n	immature	1182
15	3	5B	mandible, left	large	bos taurus	cow	1	550	100	n	immature	1183
15	3	5B	mandible, left	large	bos taurus	cow	1	550	100	n		1184
15	3	5B	fragments	UID	UID	UID	4	3.2	UID			1185
15	3	5B	Teeth, Lower Permanent, I1, I2, I3, C	large	bos taurus	cow	58	170.2	100	n		1186
15	3	5B	Teeth, Upper permanent, PM 2-4	large	bos taurus	cow	16	143.1	100	n		1187
15	3	5B	Teeth, deciduous lower, I1, I2, I3, C.	large	bos taurus	cow	16	10.4	100	n		1188
15	3	5B	Teeth, deciduous lower P2	large	bos taurus	cow	6	6.6	100	n		1189

Table B.7 cont. Faunal

15	3	5B	Teeth, deciduous lower P3	large	bos taurus	cow	10	21.9	100	n		1190
15	3	5B	Teeth, permanent upper, M1	large	bos taurus	cow	6	29.2	100	n		1191
15	3	5B	Teeth, permanent upper M2	large	bos taurus	cow	7	59.1	100	n		1192
15	3	5B	Teeth, permanent lower PM 3-4	large	bos taurus	cow	2	14.5	100	n		1193
15	3	5B	Teeth, enamel fragments	large	UID	UID	1	0.1	UID	n		1194
15	3	5B	Vertebrae, caudal	large	UID	UID	1	0.2	100	n	immature	1195
15	3	5b	metapodial epiphysis	large	bos taurus	cow	1	54.2	100	n	immature	1196
15	3	5b	zygomatic, right	large	bos taurus	cow	1	34.5	100	n	huge	1197
15	3	5b	skull, temporal bone, left	large	bos taurus	cow	1	17.2	UID	n	immature	1198
15	3	5b	skull, temporal bone, left	large	bos taurus	cow	1	52.4	UID	n	immature	1199
15	3	5b	ribs	large	bos taurus	cow	8	92.3	30	n	immature	1200
15	3	5b	skull, temporal bone, right	large	bos taurus	cow	1	10.8	40	n		1201
15	3	5b	phalanx, epiphysis	large	bos taurus	cow	1	3.9	100	y	immature	1202
15	3	5b	skull fragments	large	bos taurus	cow	9	89.8	UID	y	immature (some unfused)	1203
15	3	5b	fragments	UID	UID	UID	59	69.1	UID	n		1204
15	3	5b	fragments	UID	UID	UID	8	9.2	UID	n		1205
15	3	5b	phalanx, proximal, left	large	bos taurus	cow	1	32.9	100	n	robust	1206
15	3	5b	occipital, condyle, left	large	bos taurus	cow	1	37.7	90	y		1207
15	3	5b	skull, temporal, right	large	bos taurus	cow	1	7.9	75	n		1208
15	3	5b	metapodial, epiphysis	large	bos taurus	cow	1	57.3	100	n	immature, Huge	1209
15	3	5b	phalanx, epiphysis	large	bos taurus	cow	1	1.7	100	n	immature	1210
15	3	5b	teeth, molars	large	bos taurus	cow	4	17.1	75	n		1211
15	3	5b	teeth, incisors	large	bos taurus	cow	4	12.4	90	n		1212
15	3	5B	skull, frontal, cornual process, right	large	bos taurus	cow	1	49	25	n		1213
15	3	5B	zygomatic, left	large	bos taurus	cow	1	40.5	90	n		1214
15	3	5B	occipital, right portion	large	bos taurus	cow	1	52.7	25	n		1215
15	3	5B	zygomatic, left	large	bos taurus	cow	1	17.7	30	n		1216

Table B.7 cont. Faunal

15	3	5B	basioccipital, right, jugular process	large	bos taurus	cow	1	10	20	n	immature	1217
15	3	5B	basioccipital, right, jugular process	large	bos taurus	cow	1	18.4	20	n	immature, huge, robust	1218
15	3	5B	Cranial Fragment	large	UID	UID	3	13.5	UID	n		1219
15	3	5B	cranium spheroid, partial	large	bos taurus	cow	1	407.8	25	n	immature	1220
15	3	5B	occipital	large	bos taurus	cow	1	182.6	90	n	immature	1221
15	3	5B	phalanx, proximal, III or IV	large	bos taurus	cow	1	31.8	100	n		1222
15	3	5B	cranium fragment, cornual process	large	bos taurus	cow	1	159.4	10	n		1223
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	20.6	40	n		1224
15	3	5B	skull, incisive and maxilla, right	large	bos taurus	cow	1	10.4	30	n		1225
15	3	5B	skull, incisive and maxilla, right	large	bos taurus	cow	3	15.5	30	n		1226
15	3	5B	skull, incisive, left	large	bos taurus	cow	3	36.6	50	n		1227
15	3	5B	skull, incisive, right	large	bos taurus	cow	6	48.1	50	n		1228
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	79.9	40	n		1229
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	13.7	30	n		1230
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	5.1	20	n		1231
15	3	5B	skull, nasal, left	large	bos taurus	cow	1	28.2	85	n	huge	1232
15	3	5B	skull, nasal, left	large	bos taurus	cow	1	17.5	95	n		1233
15	3	5B	skull, nasal, left	large	bos taurus	cow	1	17.1	85	n	huge	1234
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	16.6	70	n	huge	1235
15	3	5B	skull, nasal, left	large	bos taurus	cow	1	14.9	50	n		1236
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	8	30	n	huge	1237
15	3	5B	metadpodial, epiphysis, unfused	large	bos taurus	cow	1	59	100	n	immature, huge	1238
15	3	5B	metacarpal, IV digit, left	large	sus scrofa	pig	1	7.6	100	n	immature, huge	1239
15	3	5B	metacarpal, III or IV digit, right	medium	capra hireus/ ovis aries	goat/sheep	1	14.8	100	n		1240
15	3	5B	phalanx, distal	large	bos taurus	cow	1	24.3	100	n	huge	1241
15	3	5B	phalanx, proximal	large	bos taurus	cow	1	14.4	100	n		1242
15	3	5B	hyoid, left	large	bos taurus	cow	1	7.8	35	y-cutmark		1243

Table B.7 cont. Faunal

15	3	5B	skull, nasal, right	large	bos taurus	cow	1	9.5	50	n	huge	1244
15	3	5B	skull, temporal, right	large	bos taurus	cow	1	13.3	25	n	huge	1245
15	3	5B	skull, frontal, left	large	bos taurus	cow	1	19	20	n	huge	1246
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	7.3	30	n		1247
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	5.3	30	n	huge	1248
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	9.2	60	n	huge	1249
15	3	5B	skull, nasal, left	large	bos taurus	cow	1	20	100	n	huge	1250
15	3	5B	tooth, incisor 4, left	large	bos taurus	cow	1	0.6	100	n		1251
15	3	5B	tooth, incisor 4, right	large	bos taurus	cow	2	1.2	100	n		1252
15	3	5B	tooth, incisor 1, right	large	bos taurus	cow	3	10.1	100	n		1253
15	3	5B	tooth, incisor 1, right	large	bos taurus	cow	1	3.2	90	n		1254
15	3	5B	tooth, incisor 2, right	large	bos taurus	cow	3	9	100	n		1255
15	3	5B	tooth, incisor 3, right	large	bos taurus	cow	2	5.1	95	n		1256
15	3	5B	tooth, incisor 3, right	large	bos taurus	cow	1	1.8	85	n		1257
15	3	5B	tooth, incisor 1,left	large	bos taurus	cow	2	3.8	75	n		1258
15	3	5B	tooth, incisor 1,left	large	bos taurus	cow	3	3.9	100	n		1259
15	3	5B	tooth, incisor 2, left	large	bos taurus	cow	3	10.3	100	n		1260
15	3	5B	tooth, incisor, right	large	bos taurus	cow	1	2.3	85	n		1261
15	3	5B	palatine bone, right and left	large	bos taurus	cow	2	40.2	85	n	huge	1262
15	3	5B	skull, left temporal, petrous part	large	bos taurus	cow	1	72.9	70	n		1263
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	16.1	100	n	huge	1264
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	7.4	50	n	huge	1265
15	3	5B	skull, nasal, left	large	bos taurus	cow	1	7.3	40	n	huge	1266
15	3	5B	metacarpal, epiphysis	large	bos taurus	cow	1	68.8	100	n	immature, huge	1267
15	3	5B	zygomatic, right	large	bos taurus	cow	1	43.4	95	n	huge	1268
15	3	5B	skull, temporal, left	large	bos taurus	cow	1	8.8	20	n		1269
15	3	5B	metacarpal, left	large	bos taurus	cow	1	218	100	n	immature, huge	1270
15	3	5B	metacarpal, right	large	bos taurus	cow	1	229.5	100	y-cut mark	immature, huge	1271

Table B.7 cont. Faunal

15	3	5B	metatarsul, right	large	bos taurus	cow	1	329.9	100	n	immature, huge	1272
15	3	5B	metatarsul, left	large	bos taurus	cow	1	199.9	100	n	immature	1273
15	3	5B	metatarsul, right	large	bos taurus	cow	1	293.7	100	n	huge	1274
15	3	5B	metatarsul, right	large	bos taurus	cow	1	385.8	100	n	huge	1275
15	3	5B	phalanx, proximal, digit III or IV	large	bos taurus	cow	1	21.7	100	n	huge	1276
15	3	5B	metatarsul, right	large	bos taurus	cow	1	127.3	100	n	immature	1277
15	3	5B	metatarsul, left	large	bos taurus	cow	1	324.8	100	n	huge	1278
15	3	5B	basioccipital, left, condyle	large	bos taurus	cow	1	33.9	40	n	immature	1279
15	3	5B	skull, left temporal, zygomatic process	large	bos taurus	cow	1	50.2	60	n	immature, huge	1280
15	3	5B	metacarpal, right	large	bos taurus	cow	1	209.3	100	n	immature	1281
15	3	5B	metatarsul, right	large	bos taurus	cow	1	355.3	100	n	huge, robust, super sized	1282
15	3	5B	metatarsul, left	large	bos taurus	cow	1	251	100	n		1283
15	3	5B	metacarpal, left	large	bos taurus	cow	1	300.7	100	n	huge	1284
15	3	5B	metacarpal, right	large	bos taurus	cow	1	203.8	100	n	large	1285
15	3	5B	metatarsul, right	large	bos taurus	cow	1	289.1	100	n	immature, huge	1286
15	3	5B	metacarpal, left	large	bos taurus	cow	1	21.2	100	n	immature, huge	1287
15	3	5B	metacarpal, right	large	bos taurus	cow	1	204.9	100	n	immature, huge	1288
15	3	5B	metatarsul, right	large	bos taurus	cow	1	304.9	100	n	large	1289
15	3	5B	metatarsul, right	large	bos taurus	cow	1	91.5	95	n	immature, huge	1290
15	3	5B	metacarpal, right	large	bos taurus	cow	1	316.5	100	n	huge	1291
15	3	5B	metatarsul, right	large	bos taurus	cow	1	349.7	100	n	huge	1292
15	3	5B	tooth, lower premolar 1, left	large	bos taurus	cow	1	1.3	95	n		1293
15	3	5B	tooth, lower premolar 2, right	large	bos taurus	cow	1	2.1	75	n		1294
15	3	5B	tooth, lower molar 3, right	large	bos taurus	cow	1	7.3	75	n		1295
15	3	5B	tooth, maxilla molar, left	large	bos taurus	cow	1	8.8	90	n		1296
15	3	5B	tooth, maxilla molar 3, left	large	bos taurus	cow	1	11.6	95	n		1297
15	3	5B	tooth, maxilla molar, left	large	bos taurus	cow	2	11.8	95	n		1298
15	3	5B	tooth, maxilla molar 3, right	large	bos taurus	cow	1	8.6	100	n		1299

Table B.7 cont. Faunal

15	3	5B	tooth, maxilla molar, left	large	bos taurus	cow	1	5.2	85	n		1300
15	3	5B	tooth, maxilla molar, right	large	bos taurus	cow	1	7.4	95	n		1301
15	3	5B	phalanges II or V	large	bos taurus	cow	2	5.5	100	n		1302
15	3	5B	skull, incisive right	large	bos taurus	cow	1	3.5	25	n		1303
15	3	5B	skull, incisive right	large	bos taurus	cow	1	1.8	25	n		1304
15	3	5B	tooth, maxilla premolar, left	large	bos taurus	cow	1	1.4	50	n		1305
15	3	5B	sesamoid	large	bos taurus	cow	1	3.2	100	n		1306
15	3	5B	sesamoid	large	bos taurus	cow	1	3	100	n		1307
15	3	5B	skull fragments	UID	UID	UID	4	11.1	UID	n		1308
15	3	5B	fragments	UID	UID	UID	134	53.6	UID	n		1309
15	3	5B	metatarsul, right	large	bos taurus	cow	1	247.8	100	n		1310
15	3	5B	metatarsul, right	large	bos taurus	cow	1	357.4	100	n	huge	1311
15	3	5B	metatarsul, left	large	bos taurus	cow	1	235	100	n	immature	1312
15	3	5B	metatarsul, right	large	bos taurus	cow	1	302.8	100	n		1313
15	3	5B	metatarsul, right	large	bos taurus	cow	2	290.6	100	n	immature, huge	1314
15	3	5B	metapodial, epiphysis	large	bos taurus	cow	1	109.5	100	n	immature, huge	1315
15	3	5B	metapodial, epiphysis	large	bos taurus	cow	2	49.1	100	n	immature, huge	1316
15	3	5B	metapodial, epiphysis	large	bos taurus	cow	1	74	100	n	immature	1317
15	3	5B	tarsul 2 & 3, right	large	bos taurus	cow	1	9.8	100	n		1318
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	8	40	n	huge	1319
15	3	5B	maxilla, left	large	bos taurus	cow	1	22.8	30	n	huge	1320
15	3	5B	skull, temporal, left	large	bos taurus	cow	1	23.6	30	y-chopped	huge	1321
15	3	5B	parietal	large	bos taurus	cow	1	14	20	n		1322
15	3	5B	skull fragments	large	bos taurus	cow	8	115.7	UID	n		1323
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	2.5	35	n	huge	1324
15	3	5B	fragments	UID	UID	UID	750	416.5	UID	n		1325
15	3	5B	phalanx, proximal, 3 or 4.	large	sus scrofa	pig	1	2.2	100	n	immature	1326
15	3	5B	vertebrae, caudal	large	bos taurus	cow	3	3.4	95	n	immature	1327

Table B.7 cont. Faunal

15	3	5B	vertebrae, caudal	large	bos taurus	cow	2	1.2	100	n	immature	1328
15	3	5B	phalanx, intermediate epiphysis	large	sus scrofa	pig	1	0.4	100	n	immature	1329
15	3	5B	vertebral cap	large	bos taurus	cow	4	0.5	100	n	immature	1330
15	3	5B	vertebrae, caudal	large	bos taurus	cow	1	0.3	75	n	immature	1331
15	3	5B	skull, nasal	large	bos taurus	cow	1	3.4	20	n		1332
15	3	5B	sesamoid	large	bos taurus	cow	1	2.8	100	n		1333
15	3	5B	sesamoid	medium	capra hireus/ ovis aries	goat/sheep	1	0.2	100	n		1334
15	3	5B	metapodial	UID	UID	UID	1	0.7	90	n	possible cattle sternal bone	1335
15	3	5B	sesamoid	large	bos taurus	cow	4	7.8	100	n		1336
15	3	5B	phalanx 3 or 4, distal	large	sus scrofa	pig	1	1.1	100	n	fused, but immature size	1337
15	3	5B	phalanx 3 or 4, distal	large	sus scrofa	pig	1	1.7	100	n		1338
15	3	5B	phalanx 3 or 4, distal	large	sus scrofa	pig	1	1.4	100	n		1339
15	3	5B	metacarpal/metatarsul I,II or V	large	bos taurus	cow	4	8	100	n		1340
15	3	5B	metacarpal/metatarsul I,II or V	large	bos taurus	cow	1	2.4	100	y-cut marks at proximal ends		1341
15	3	5B	cuboid, right	large	bos taurus	cow	1	4.3	100	n		1342
15	3	5B	skull, incisive, left	large	bos taurus	cow	1	1.6	30	n		1343
15	3	5B	skull, incisive, left	large	bos taurus	cow	1	1.7	45	n	huge	1344
15	3	5B	skull, nasal, left	large	bos taurus	cow	1	5.1	40	n	huge	1345
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	1.2	35	n		1346
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	0.7	15	n		1347
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	1.5	40	n	huge	1348
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	1.7	30	n	huge	1349
15	3	5B	long bone, distal end	large	UID	UID	1	1.5	10	n	immature	1350
15	3	5B	fragment	large	UID	UID	1	0.5	5	y-chopped	immature	1351
15	3	5B	fragment	UID	UID	UID	1	0.1	20	n		1352
15	3	5B	skull, incisive, right	large	bos taurus	cow	1	0.8	30	n		1353
15	3	5B	nasal cavity fragments	UID	UID	UID	9	10.4	UID	n		1354
15	3	5B	fragments	UID	UID	UID	3	1.3	UID	n		1355

Table B.7 cont. Faunal

15	3	5B	skull, incisive, left	large	bos taurus	cow	1	0.8	30	n		1356
15	3	5B	cranial fragments	UID	UID	UID	11	48.2	UID	n		1357
15	3	5B	fragment	large	UID	UID	1	7.6	UID			1358
15	3	5B	fragment	large	UID	UID	1	2.1	UID			1359
15	3	5B	fragment	UID	UID	UID	1	4.1	UID			1360
15	3	5B	fragment	UID	UID	UID	1	0.5	UID		immature	1361
15	3	5B	skull, nasal, right	large	bos taurus	cow	1	0.2	5			1362
15	3	5B	fragment	UID	UID	UID	13	23.3	UID			1363
15	3	5B	fragment	UID	UID	UID	11	2.7	UID			1364
15	3	5B	fragment	UID	UID	UID	3	4.5	UID			1365
15	3	5B	fragment	UID	UID	UID	2	2.2	UID			1366
15	3	5B	fragment	large	bos taurus	cow	9	5	UID			1367
15	3	5B	tooth fragment	UID	UID	UID	2	0.2	UID	n		1368
22	4	1	fragment	UID	UID	UID	5	1.9	UID	N		1369
22	4	1	metapodial, epiphysis	medium	sus scrofa	pig	1	1.8	UID	n	immature	1370
22	4	1	fragment	UID	UID	UID	1	0.5	UID	n		1371
23	4	2	Fragments	UID	UID	UID	2	3.1	UID	n		1372
23	4	2	Fragments	UID	UID	UID	1	0.5	UID			1373
23	4	2	phalanx, intermediate	Medium	capra hireus/ ovis aries	goat/sheep	1	1.6	95	n		1374
26	4	3	Fragments	UID	UID	UID	7	9.5	UID	N		1375
26	4	3	Metapodial, unfused epiphysis	s/m	Castor	Beaver	1	0.1	100	n	immature	1376
26	4	3	rib	Medium	sus scrofa	pig	1	10.1	40	y-cut marks		1377
26	4	3	rib fragment	Medium	UID	UID	5	4.2	UID	n		1378
26	4	3	humerous, right, unfused	Medium	sus scrofa	pig	1	50	100	n	immature	1379
26	4	3	carpal	Medium	sus scrofa	pig	1	2.9	100	n		1380
26	4	3	phalanx, first	Medium	capra hireus/ ovis aries	goat/sheep	1	2.5	50	n		1381
26	4	3	Fragments	UID	UID	UID	6	3.4	UID	n		1382
29	4	4	rib	Medium	UID	UID	1	3.2	UID	n		1383

Table B.7 cont. Faunal

47	4	1 ext 2	Fragments	UID	UID	UID	1	1	UID			1384
47	4	1 ext 2	Fragments	UID	UID	UID	1	1.9	UID	surface sheered off		1385
47	4	1 ext 2	Cranial Fragment	Medium	UID	UID	1	5.8	UID	n		1386
47	4	1ext2	calcaneous, left	large	bos taurus	cow	1	134.8	100	n	immature, huge	1387
51	4	2 ext 2	spinous process of cervical vertebrae	large	UID	UID	3	6.5	70	y-sheered off side		1388
51	4	3 ext 2	rib fragment	Medium	UID	UID	1	1.4	UID	n		1389
51	4	4 ext 2	tooth, single root	UID	UID	UID	1	0.4	50	n		1390
51	4	5 ext 2	phalanx, intermediate	small	UID	UID	1	0.4	50	n		1391
24	5	1	fragments	UID	UID	UID	4	5	UID	n		1392
24	5	1	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	0.1	95	n	immature, very small	1393
46	5	2	fragment	UID	UID	UID	1	0.01	UID	n		1394
27	5	2	fragments	UID	UID	UID	33	14.9	UID	n		1395
31	5	3	fragment	UID	UID	UID	21	5.6	UID	n		1396
31	5	3	astrageles	large	sus scrofa	pig	1	4.3	UID	n		1397
37	5	4	fragments	UID	UID	UID	8	10.6	UID	n		1398
37	5	4	rib, right	large	sus scrofa	pig	1	5.8	10	n	immature	1399
37	5	4	metapodial epiphysis III or IV	large	sus scrofa	pig	1	1.4	100	n	immature	1400
37	5	4	rib, right	large	sus scrofa	pig	1	4.3	10	n		1401
37	5	4	hyoid, right	large	bos taurus	cow	1	14.6	95	n	immature	1402
37	5	4	fragment	UID	UID	UID	1	0.6	UID	n		1403
25	6	1	fragments	UID	UID	UID	1	0.7	UID	n		1404
28	6	2	rib	large	bos taurus	cow	1	22.7	UID	y-cutmarks, chopped		1405
28	6	2	fragments	UID	UID	UID	4	1.5	UID	n		1406
28	6	2	fragments	UID	UID	UID	2	1.2	UID	n		1407
32	6	3	fragments	UID	UID	UID	25	9	UID	n		1408
32	6	3	skull fragments	medium/large	UID	UID	1	4.1	UID	n		1409
32	6	3	fragments	UID	UID	UID	2	0.5	UID	n		1410

Table B.7 cont. Faunal

40	6	4	fragments	UID	UID	UID	13	6.5	UID	n		1411
40	6	4	fragments	UID	UID	UID	13	6.5	UID	n		1412
42	6	5	fragments	UID	UID	UID	20	5.5	UID	n		1413
42	6	5	fragments	UID	UID	UID	1	0.4	UID	y-sliced	immature	1414
42	6	5	fragments	UID	UID	UID	4	2.4	UID	n		1415
39	4ext	1	phalanx, distal	medium	capra hireus/ ovis aries	goat/sheep	1	1.3	80	n		1416
39	4ext	1	rib fragment	large	UID	UID	1	2.4	5	y-chopped		1417
39	4ext	1	fragments	UID	UID	UID	2	1.5	UID	n		1418
39	4ext	1	fragments	UID	UID	UID	2	0.9	UID	n		1419
39	4ext	1	sesamoid	medium	UID	UID	1	0.4	100	n		1420
41	4ext	2ext	metapodial	Medium	sus scrofa	pig	1	3	50	n		1421
41	4ext	2ext	Fragments	UID	UID	UID	11	4.6	UID	n		1422
41	4ext	2ext	Fragments	UID	UID	UID	1	0.3	UID	n		1423
38	5ext	1	fragments	UID	UID	UID	1	0.4	UID	n		1424
38	5ext	1	fragments	UID	UID	UID	3	1.1	UID	n		1425
38	5ext	1	mandible, left	large	sus scrofa	pig	1	15.1	10	n		1426
38	5ext	1	mandible, left	large	sus scrofa	pig	1	4.3	5	n		1427
46	5ext	2	fragments	UID	UID	UID	9	3.5	UID	n		1428
46	5ext	2	fragments	UID	UID	UID	2	2.4	UID	n		1429
46	5ext	2	tooth, third molar	large	sus scrofa	pig	1	6.6	UID	n		1430
46	5ext	2	phalanx, intermediate	large	bos taurus	cow	1	3.8	30	n		1431
46	5ext	2	fragments	UID	UID	UID	1	1.5	UID	n		1432
56	6ext	3	Fragments	UID	UID	UID	25	10	UID	n		1433
56	6ext	3	fragments	UID	UID	UID	88	27.8	UID	n		1434
56	6ext	3	fragments	UID	UID	UID	4	2	UID	n		1435
56	6ext	3	tooth, maxillary 1st molar, right	large	bos taurus	cow	1	4.7	50	n		1436

Table B.7 cont. Faunal

56	6ext	3	skull fragment	UID	UID	UID	1	3	UID	n		1437
58	6ext	4	fragment	UID	UID	UID	54	17.1	UID	n		1438
58	6ext	4	fragments	UID	UID	UID	2	2	UID	n		1439
58	6ext	4	tooth, incisor	large	sus scrofa	pig	1	0.5	100	n		1440
59	6ext	5	Fragments	UID	UID	UID	7	2.1	UID	n		1441
61	6ext	7	Fragments	UID	UID	UID	5	1.5	UID	n		1442
63	6ext	9	mandible, right	small	rodent	rodent	1	0.5	100	n		1443

Table B.7 cont. Faunal

Faunal Analysis

Strata Dates		Cattle	Pigs	Sheep
1902-1908	Identified Bone Count	198	17	109
	MNI	11 (8 juvenile)	3 (1 juvenile)	8 (2 juvenile)
1908-1914	Identified Bone Count	490	8	4
	MNI	22 (11 juvenile)	2	1

Table B.8 Faunal MNI

Chemical Analysis

CCIM Sample #	Year	LRF				**Be**	**Ni**	**As**	**Se**	**Cd**	**Sb**	**Pb**
1	2016	57	Unit 4, Feat. 1	Yes	1	1.7	15.4	4.00	0.6	0.36	1.65	93.0
2	2017	17	Unit 1, Level 5	Yes	2	0.8	12.2	2.94	<DL	0.09	0.44	11.7
3	2017	8	Unit 3, Level 3	Yes	3	2.5	27.0	5.09	0.7	0.94	2.85	218
4	2017	48	Unit 3, Level 7	Yes	4	1.1	18.9	6.22	<DL	0.20	1.09	25.1
5	2017	26	Unit 4, Level 3	Yes	5	1.7	21.7	5.21	<DL	0.37	1.09	61.9
6	2017	42	Unit 6, Level 5	Yes	6	1.6	17.3	4.62	1.0	1.85	1.48	37.8
7	2017	31	Unit 5, Level 3	Yes	7	1.3	24.4	8.44	0.7	0.27	1.33	29.7
8	2017	15	Unit 3, Level 5	Yes	8	1.5	23.2	6.26	0.5	0.31	1.94	74.7
9	2017	10	Unit 2, Level 4	Yes	9	0.8	18.2	5.58	0.4	0.33	1.03	79.7
10	2017	5	Unit 3, Level 2	Yes	10	1.4	20.2	4.56	0.5	0.58	1.37	68.2
11	2017	64	Unit 6x, Level 10	Yes	11	0.5	9.74	3.01	<DL	0.21	0.57	11.8

Table B.9 Heavy Metal analysis of soil from Fjpi-173

Maps

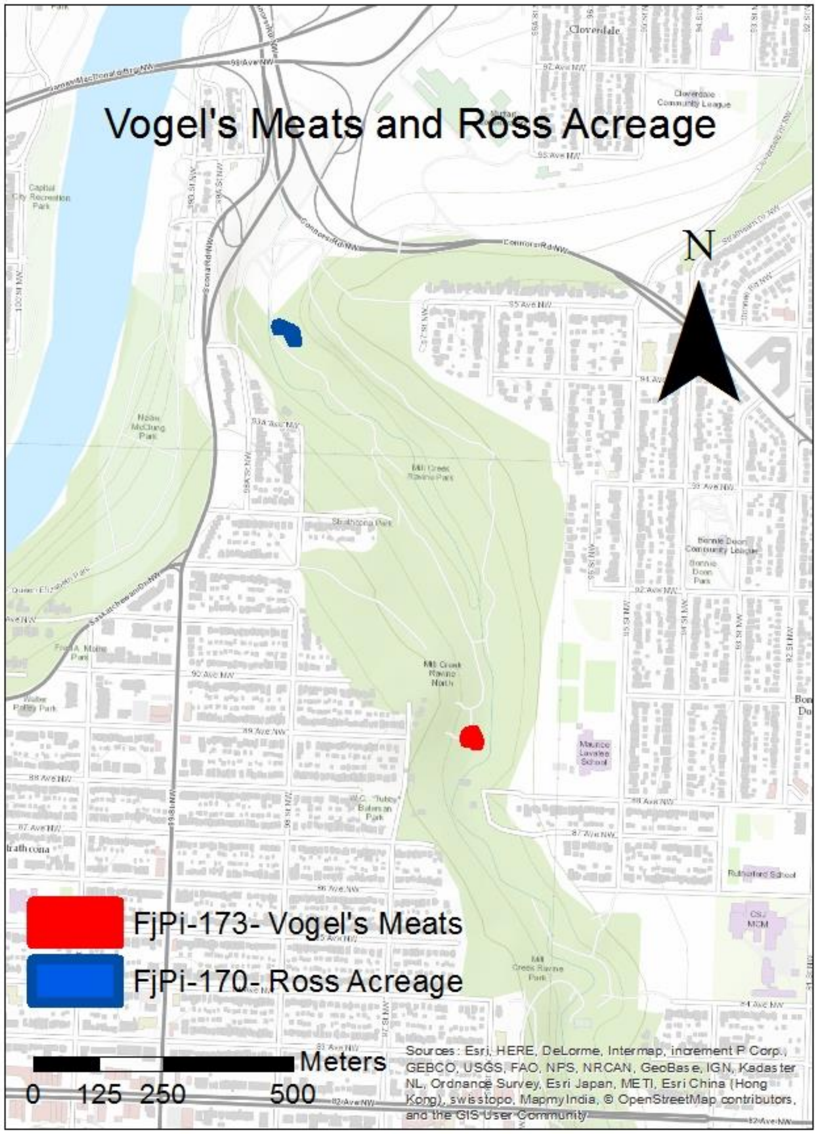

Image B.1 The extent of FjPi-170 in relation to FjPi-173. Map by Author.

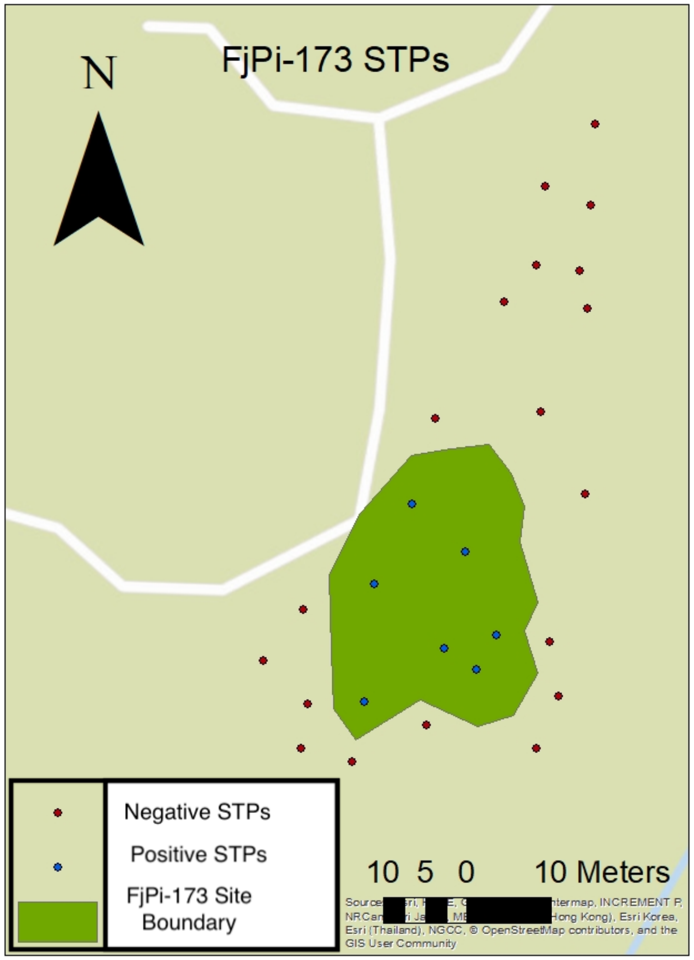

Image B.2 Shovel Tests at FjPi-173. Map by Author.

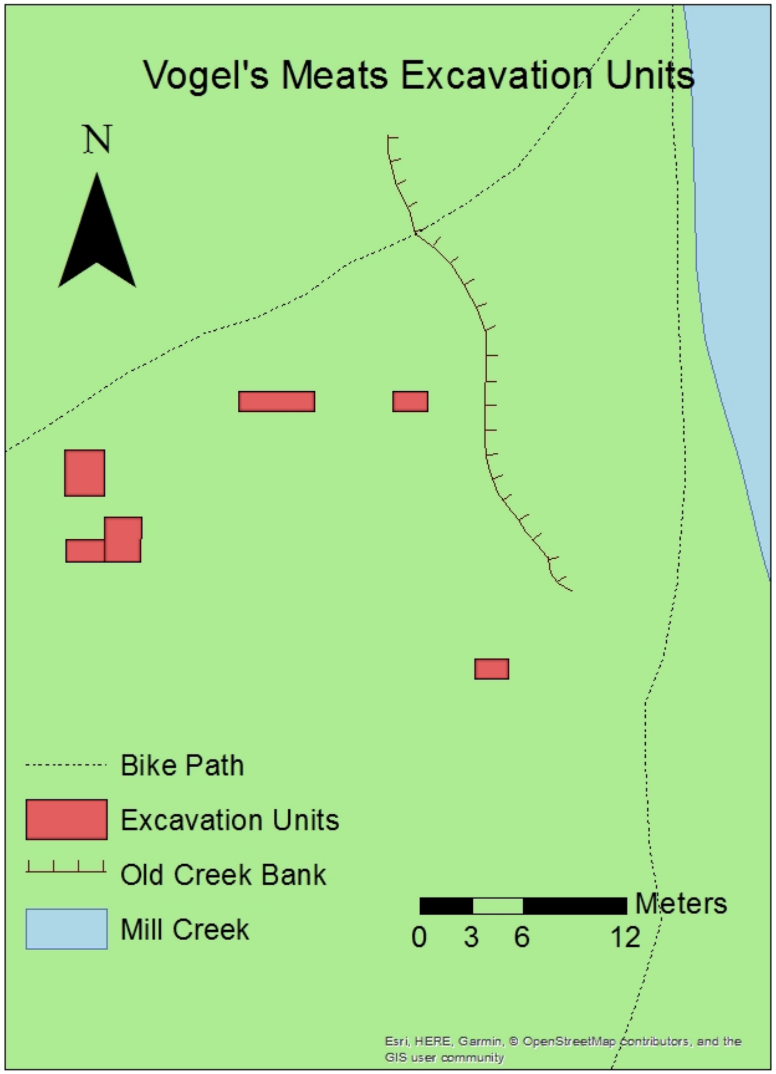

Image B.3 Units Excavated at Vogel's Meats. Map by Author.

Images

Image B.4 Unit 3, Level 5, Top. The top of a 30cm thick layer of bone. Photo taken by Author.

Image B.5 Unit 3, Level 5 mid. Note the high concentration of lower limb bones and mandibles. Photo Taken by Author.


Image B.6 Unit 3. Level 8, the Bottom of the Bone Layer. note the bottle. Its production can be tightly dated to 1900-1904. Photo Taken by Author.

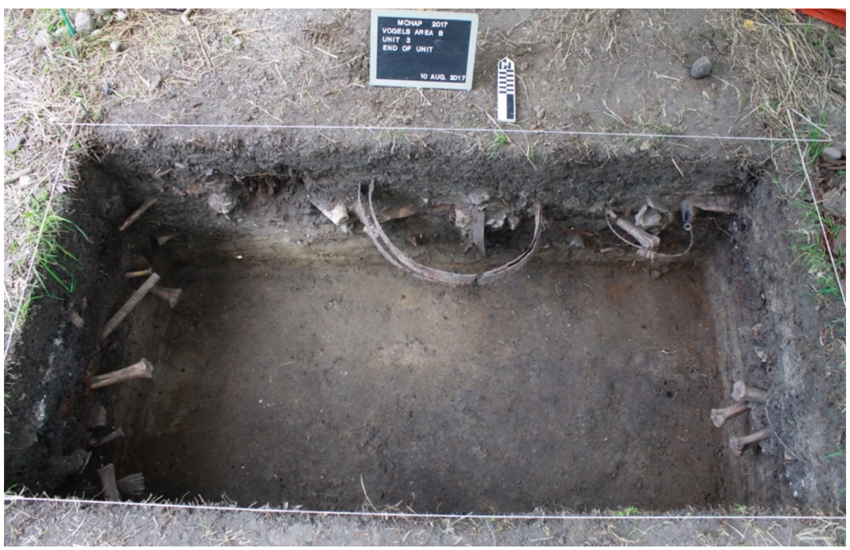

Image B.7 Unit 3, End of Unit. Photo Taken by Author.

Image B.8 Unit 1, North Profile. Note the thick double layer of clinker above the lightbrown sand. Photo Taken by Author.

Image B.9 Unit 6. The Broken Floor of the Main Meat-Packing Building in Vogel's Meats, note the piping for water/steam. Photo Taken by Author.

Image B.10 Units 1, 6 & 5. Remains of Main Building. Note the 1m thick concrete foundation running between units. Photo Taken by Author.

Image B.11 Unit 4. The floor of an outbuilding (likely smokehouse). Note the residual marks of bricks that were salvaged from the floor. Photo Taken by Author.

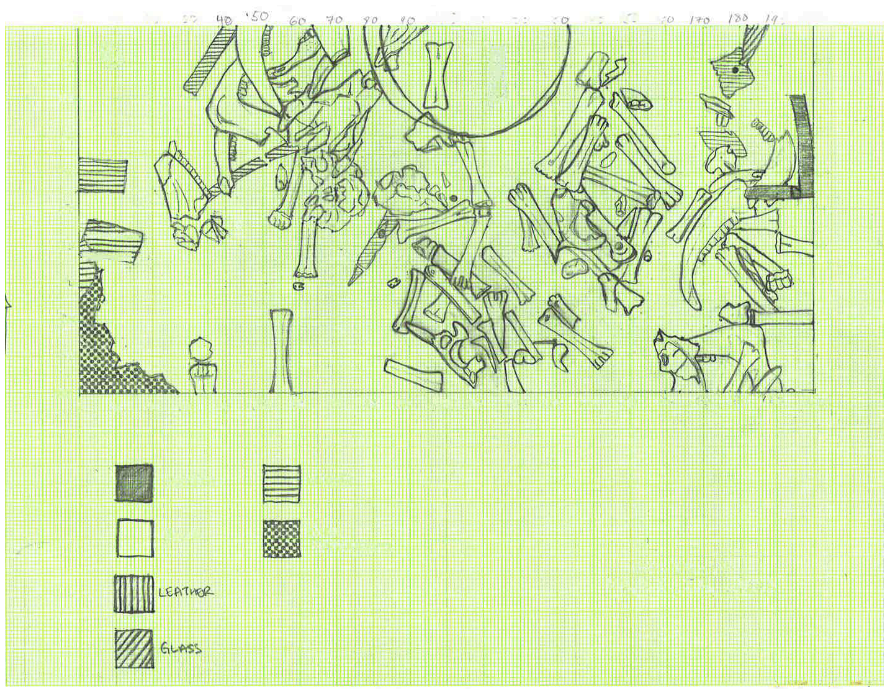

Image B.12 Unit 3, Level 5, Plan Drawing. Drawing by Johanna Pacyga.