

An Accumulation of Catastrophe: A Political Economy of Wildfire
in the Western United States

by

Sue Dockstader

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Dissertation Committee:

Dr. John Bellamy Foster, Chair

Dr. Richard York, Core Member

Dr. Matthew Norton, Core Member

Dr. Gregory Bothun, Institutional Representative

University of Oregon

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DISSERTATION ABSTRACT

Sue Dockstader

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This dissertation is an environmental sociological study of wildland fire in what is now the western United States. It examines wildfire management from roughly the 1900s to the present time employing a Marxist historical materialist analysis. The title of this work reflects the accumulated social and environmental effects of capitalism and the interconnected catastrophes of its development. Historically, Indigenous cultural burning shaped western landscapes that provided for human and nonhuman needs, while remaining resilient to environmental disturbances. Capitalist expansion effected a rift in the relationship between humans and fire through dispossession of Native Americans, commodity production, and fire exclusion. This metabolic rift is beset by economic crises, and human displacement enabled the U.S. to mobilize large groups of precarious workers to fight fires which it continues to do today. Rapid and complete fire elimination has left a legacy of unhealthy forests and grasslands that occasionally provide fuel for wildfires that threaten people, structures, and natural resources requiring suppression. This burn-fight-burn cycle, or wildfire paradox, exemplifies what Engels called the “revenge of nature” in which the supposed subjugation of nature exposes humans to unimagined vulnerability. Modern wildfire science evolved in relation to U.S. imperialist military and economic domination that increased global economic activity among Global North countries in the aftermath of World War II. This Great Acceleration increased carbon dioxide emissions responsible for climate change that, in turn has exacerbated wildfire activity as well as propelling human settlement in and near uninhabited, wild areas that spark fires. In recent decades an alliance of polluting industries, utilities, forest owners, and the

finance, insurance, and real estate (FIRE) sector, have been profiting from the continued CO₂ emissions that drive wildfires using carbon trading, third party liability arrangements and novel insurance products with disastrous results. This dissertation concludes with a discussion of possible avenues for changing the relationship between humans and wildland fire to avert further catastrophe.

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¹ Eorna March 2005 – 12 October 2015; Aife 27 September 2014 – 21 May 2017; Nuala ~ August 2007 – 16 September 2019. Sosa i Síocháin.

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² Verdie Dean Craighill, 11 March, 1953 – 12 November, 1996.

THIS WORK IS DEDICATED TO THE MEMORY OF

GERTRUDE E. DOCKSTADER

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PREFACE

The Other Bear

Before I left for college, my father³ gave me four battered paperbacks: Michael Harrington's *The Other America*, an edited collection called *Readings from Emile Durkheim*, Freud's *Civilization and Its Discontents* and C. Wright Mills' *The Sociological Imagination*. My dad was the son of a World War II Battle of the Bulge veteran and prisoner of war who coped by reading miniature Armed Services Edition books.⁴ After the soldier, bringing the news of Papa's⁵ capture left, my Irish immigrant great grandmother⁶ turned to my weeping Nana⁷ and said, "Doc will be alright if he has a book in his hand." Contrary to my father's expectations, I was a profligate student. I spent more time involved in anti-war, anti-apartheid and queer organizing, and even jail than I did on my studies. But I did occasionally leaf through those books, gaining a glancing understanding of their contents. They supplemented the learning I was doing as a firefighter – a job with long stretches of mind-numbing drudgery and exhaustion punctuated by infrequent but unforgettable moments of awe and terror.

My fire experience could easily be a queer ethnographical response to Desmond's (2007) *On the Fireline*. I certainly have the stories that make for interesting ethnography. I began fighting fire with a private contractor called Skookum Reforestation Inc. in 1986 as a 22-year old college student when a fellow gay activist suggested I come "work with the hippies." While the company was founded during the "environmental" time in forestry that birthed Eugene's legendary tree-planting co-op, the Hoedads,⁸ my experience was far from egalitarian and environmentally-friendly.

³ Dr. John Brian Dockstader, Aug. 2, 1943 – Mar. 19, 2021

⁴ Carrying on a family tradition, I had a miniature book of Emily Dickinson's poems in my web gear on the fireline that I read every morning before going to work.

⁵ John "Jack" Joseph Dockstader, Dec. 12, 1912 – Dec. 3, 1987, drafted (PFC, Serial#32748123) into the 10th Armored Infantry Battalion, captured during Hammelburg raid, interned at Moosburg Stalag VII-A, and liberated on 29 April 1945.

⁶ Theresa Mary (Finan) Flynn, born in Castlereagh Co. Roscommon May 18, 1881 – Jul. 3, 1962, Newburgh, NY.

⁷ Gertrude Elizabeth (Flynn) Dockstader, Dec. 16, 1917 – Feb. 16, 2014.

⁸ <https://around.uoregon.edu/oq/with-a-human-face-when-hoedads-walked-the-earth>

The work was backbreaking and monotonous most of the time. I was often ridiculed by my peers; I was sexually assaulted by a crew-boss, and I dealt with all kinds of discriminatory and demeaning treatment. For 17 years, usually as the only woman and/or queer on a 20-person crew, I rode in beat-up, cigarette smoke-filled crummies, consumed meals on hillsides, ate smoke, dug line, and slept on the ground with men who did not generally respect women or queers, express bourgeois environmental values, or have college degrees. My crewmates described our collective workforce as the “Other Bear,” a snarky reference to the United States Forest Service’s patriotic and paternal Smokey who, they assumed, wasn’t a regular visitor to drug rehab, jail, or the unemployment office.

During my time in the woods, I was struck continually by the intelligence, humor, and humanity of my coworkers in the face of real personal and economic challenges. Since most of them could not get jobs with the Forest Service because of convictions, immigration status, and the challenges posed the multi-page government application forms, they were on-call for minimum wage; and no fire call meant no money. But together, we marveled at the beauty of elks, rock formations, and shooting stars, prayed for overtime, played spades in the mess tent, and made jailhouse wine right under the USFS’s nose.

As one of the rare possessors of a valid drivers’ license, I usually drove the crew six-pack or crummy and even learned to pilot a 2,500-gallon water tender in a parking lot. Many of the old-timers respected me and selected me to carry a drip-torch on prescribed burns and command squads on fires, including on Bend’s Awbrey Hall Fire.⁹ I spent my 28th birthday on the 4,700-acre Pryor Fire in a locked down fire camp after a rookie¹⁰ in the crew next to mine was killed by a snag on the steep terrain outside Oakridge. Two years later on the 28,000-acre Rattlesnake Fire in the Chiricahua Mountains, my crew and I watched in horror as a helicopter making an equipment drop crashed, sending up a hellish fireball.¹¹ A week later, still sweltering in Arizona, we mourned the deaths of the Prineville Hotshots in the South

⁹ <https://www.bendfirehistory.org/home/awbrey-hall-fire/>

¹⁰ RIP James Shannon Campbell, 1963-1992.

¹¹ Jeffrey C. Carter was piloting a Bell 206B-III "Jet Ranger" in the Pusch Ridge Wilderness on the fire. He was burned over 57% of his body requiring two corneal transplants and over 100 surgeries.

Canyon Fire.¹² In my time in the woods, I rode trains, helicopters, and even boats to get to fires, usually before hours-long hikes to the fireline. I pulled 36-hour shifts, learned how to sleep on an incline and change a tampon with no concealment, and I sustained multiple bruises, some nasty lacerations, and a case of trenchfoot. In 2003 after a near-deployment situation on Montana's 37,700-acre Fish Creek Complex in which our terrified newbie bus driver raced us to our safety zone between walls of flames, I retired. Writing this dissertation made me realize why my dad possibly gave me those books – maybe he didn't want me to forget about where I came from. I hope this shows that I haven't. I will always be *The Other Bear*.

¹² RIP Kathi W. Beck, 1969-1994; Tamara J. Bickett, 1968-1994; Scott A. Blecha, 1967-1994; Levi Brinkley, 1971-1994; Robert E. Browning Jr., 1966-1994; Douglas M. Dunbar, 1971-1994; Terri A. Hagan, Onondaga Haudenosaunee, 1966-1994; Bonnie J. Holtby, 1973-1994; Rob Johnson, 1967-1994; Jon R. Kelso, 1967-1994; Don Mackey, 1960-1994; Roger Roth, Oneida Haudenosaunee, 1963-1994; Jim Thrash, 1950-1994; Richard K. Tyler 1961-1994. <https://www.southcanyonfire.com>

CHAPTER I

WILDFIRES: A POLITICAL ECONOMY APPROACH

The dominant question of this dissertation is: How has capitalism acted as a mediating force on wildfire suppression in the western United States? My aim is to show how the devastating wildfires we have been witnessing in recent years can be seen as the release of fire from its natural bounds by capitalist expansion and patterns of accumulation. In this sense, wildfire is not only a catastrophe of capitalist accumulation but also an accumulation of catastrophe as the modern economy, predicated on unending growth, treats social and natural limits as mere obstacles to be overcome in its relentless drive for profitability.

This dissertation applies Marxist analysis to wildfire along four main themes that deserve sociological examination on a wider scale. The first is how Marx's metabolic rift, a violation of the sustainable and nature-imposed relation between "human beings and the earth (Foster 2000, p. 142)," through bloody, forcible separation, played a role in fire exclusion during the mercantile and industrial phases of U.S. capitalist development. A second element, one integral to the metabolic rift, is the concurrent split between "town and country (Foster, 2000, p. 142) and the "exploitation of alienated but formally free labor (Foster, 2000, p. 173)," that provided the workforce necessary for the realization of formalized fire suppression. A third area of investigation is the technical advancement of fire suppression as a beneficiary of military Keynesianism, the mid-20th century economic program in which the systemic crises, unemployment, and overproduction of monopoly capital are alleviated by increased federal spending for the promotion and production war (Baran and Sweezy, 1966; Cypher 2015, 2022). Finally, the increased militarization of fire suppression coincided in the latter half of the 20th century with the rise of the finance insurance and real estate (FIRE) economy. The combination of guaranteed fire suppression and accelerated productive relations associated with the metabolic rift enables capital to take advantage of a "spatial fix (Harvey 2011)" or geographical expansion in order to maintain profitability (Napoletano et al. 2015) – which places communities in fire prone areas. Finally, as fire ecology research has revealed

the climate change connections it is affecting wildfire season length, severity, and growth (Prichard et al. 2021), capital is attempting to financialize solutions (Böhm et. al. 2012; Lohmann 2012; Foster 2022).

Past fire behavior and severity, or the effects of a fire on the environment such as tree mortality or soil combustion, can affect future fire behavior and intensity, or the amount of energy released in a fire and its residual impacts (Keeley, 2009). We know that fire is an integral component of human evolution and survival worldwide (Roos et al., 2016; Scherjon et al., 2015; Nikulina et al, 2022). Ecologists and Indigenous scholars tell us that throughout what is known as the western states of the U.S., fire's enduring presence has shaped the ecological, cultural, and economic relations of the region and it continues to travel through its primordial territory despite attempts to banish it (Pyne, 1982; Anderson and Moratto, 1996).

Historically, fire has been a regular part of Western inland forests which have become fire-dependent due to millennia of natural processes and indigenous cultural burning. Fires from lightning and Native burning of forests and grasslands produced mosaic ecosystems of differently-aged plants and trees that enhanced fire resilience and supported healthy ecosystems. However, the natural cycle of fire disturbances and widespread periodic burning by humans has been broken by social developments associated with capitalist accumulation. The first rupture was uneven burning and subsequent fire exclusion as a consequence of settler colonial nation-building and capitalist extraction; the second major development was the occupational formalization of fire suppression that absorbed various workers enabling a more robust program of wildfire elimination. The permanent war economy bolstered fire science and further extended mechanization and chemicalization wildfire suppression and enabled human expansion into more landscapes. Militarization of fire suppression was born during a period beginning after World War II, known to some climate scientists as the Great Acceleration which has been marked by rapid industrial production, unprecedented economic growth and extensive geographic expansion. The acceleration of economic activity, predicated on the burning of fossil fuels, has smashed through many of the planet's biophysical limits, including atmospheric CO₂, which had remained stable for the previous 12,000 years ushering a new human-influenced geological epoch known as the Anthropocene. A defining

feature of the Anthropocene is climate change which has resulted a warmer and more chaotic climate, sometimes referred to as a “hothouse Earth” which has contributed to earlier, longer, more severe, and unpredictable wildfires. Finally, a shift toward wildfire and environmental management as a means of limiting financial losses and tackling climate change has leveraged the financial system in various ways. Nearly every part of this scenario bears the fingerprints of capitalist accumulation’s catastrophic effects on people and nature. So, it is important that we apply sound and trenchant analysis to this serious environmental problem.

Background of the Problem

This dissertation will examine the capitalist mediation of wildfire in the western United States. In the United States, wildfires have increased from an annual average of about 5 million acres in 1980 to about 10 million acres in 2020 with the largest, most destructive fires concentrated in the last 15 years. The average direct cost of fighting fire is rising into the billions of dollars representing about \$4 billion in 2021 and \$3.7 billion in 2022, not including loss of personal property and other factors. This is described by fire managers as the wildfire paradox. Long term fire suppression to protect economically and socially important resources and other human activities such as building in fire-prone landscapes have changed historic fire regimes and created a fire deficit in many parts of the West. When fires do start, they grow rapidly and require a quick response that mobilizes large numbers of people to fight them with machines, chemicals, and other tools characteristic of a war. Because these wildfires are emergencies threatening peoples’ homes as well as valuable natural resources, a lot time, effort, and money is devoted to them rather than to fuels management to prevent them from starting in the first place creating a positive feedback loop of destruction-response-destruction that is very difficult to exit (Arno and Brown, 1991; Calkin et al., 2015; Ingalsbee, 2017). The issue is not who or what starts the fires. The problem has to do with the landscapes on which they start.

Within forest management circles, a common explanation for the historic fire deficit is that land-use policies and aggressive protection of forests through legislation and other measures has resulted in an

overaccumulation of biomass. This argument attributes the buildup to overgrazing and aggressive fire suppression during the late 19th through the 20th century that reduced surface fires while extensive logging followed by a resurgence of young trees in late 19th century restructured forest leading to a buildup of small diameter trees and other light fuels that burn fast and hot contributing to devastating crown fires during periods of drought and high temperatures (Calkin et al., 2015; Hagsmann et al., 2021).

The effects of the Anthropocene such as prolonged, increased temperatures, alterations in precipitation amounts and timing and other climate-change related factors has rendered the fire regime a danger not only to humans but also to the ecosystems it burns. According to forest ecologists, there is some convergence between land-use and climate in certain forests, but the increase in wildfire frequency across the West has been driven primarily by human-caused climate change. The resulting lower snowpacks, early spring thaws, and additional days of high summer temperatures signaled a shift in wildfire frequency that “was nearly four times the average of 1970 to 1986, and the total area burned by these fires was more than six and a half times its previous level (Westerling et al., 2006, p. 941)” and a lengthening of the fire season by seventy-eight days due to earlier ignitions and later control.

Not only do fuel accumulation, the fire deficit, and climate change present dangers to people and humans. There is another, perhaps more complicated factor. The expansion of human occupation into what is known as the wildland urban interface (WUI), the zone between wildlands and human communities. Power stations, houses, roads industrial facilities and other human infrastructure increases the incidence of wildfire ignitions, human and nonhuman deaths and injuries, property destruction, infrastructure damage and other losses. This scenario demands immediate and complete fire suppression deepening the wildfire paradox.

Research Overview

How has capitalism acted as a mediating force in the context of fire and fire suppression? This research entails a broad scope of investigation into the changing nature of human-fire relation in the US West and specifically its embedment in commodified, industrialized, and financialized form. I argue that capitalism

has played a central role in reasons for its exclusion, factors of its formalization and militarization, and the financialized causes and effects of its management. The strength of materialism or Marxist analysis is its comprehensive recognition of the historical context of human interdependence with the natural world, but also of the independence of non-human nature. In the context of the materialist tradition, humans realize themselves materially, culturally, spiritually, and economically through their relations with the natural world, but they do not produce it (Foster, 2016).

Historical Analysis

Given that it is a historical materialist analysis of wildfire, I had to avoid giving a simple historical account, which fire historian Stephen J. Pyne does superiorly in his many books on wildland fire. The term wildfire points to how fires that are not controlled by humans are viewed by most people in modern society, reflecting particular historical eco-social changes. Wildfire marks the transformation from essential, culturally-directed fire used for land management, hunting and cultivation, travel facilitation, and ceremony to uncontrolled fire that threatens homes, people, and economic assets. This condition is a product of particular historical material developments and changes.

The historical method is arguably the basis of sociology's foundational documents such as DuBois's (1896) *The Suppression of the African Slave Trade to the United States of America 1638-1870*, Durkheim's (1897) *Suicide*, Weber's (1905) *The Protestant Ethic and the Spirit of Capitalism*, and Marx's *The Eighteenth Brumaire of Louis Bonaparte* (1852) and *Capital* (1867). Comparative-historical sociology comprises a diversity of approaches, however there are general theoretical points and methodological structures that guide the use of historical method. According to Babbie (2016), historical analysis entails a combination of techniques including evaluation of historical accounts, statistics, and natural scientific research to show patterns that point to alternative explanations to social phenomena. Within Marxist analysis these are considered somewhat arbitrary categories as Marx and Engels

(1975[1845]) argued that there is a dialectic unity between humans and nature. In *The German Ideology*, they wrote

We know of only a single science, the science of history. One can look at history from two sides and divide it into the history of nature and the history of men. The two sides are, however, inseparable; the history of nature and the history of men are dependent on each other so long as men exist (Marx and Engels, 1975 [1845], p. 28).

The heart of this dissertation is historical analysis grounded in archival research and using specific cases that exemplify the main argument. According to Mahoney and Rueschmeyer (2003), historical analysis is defined by three specific features – “a concern with causal analysis, the exploration of temporal processes, and the use of systemic and contextualized comparison (p. 14).” Historical analysis enables me to propose a central tendency that organizes this research and focuses analysis on the historical developments of wildfire management in detail. A key strength of historical research is its ability to explicitly evaluate the timing of specific events as part of the mediating effect of the central tendency. An example of this within the dissertation is the differential use of fires by settlers versus Native people and the subsequent unequal application of fire exclusion. Moreover, historical inquiry fosters a “dialogue between theory and evidence (Mahoney and Rueschmeyer, 2003, p. 13)” that is often not as clear in quantitative or ethnographical research. Additionally, close examination of specific cases (Yin, 2018) allows for possible application of various elements of the findings to similar situations. For instance, in the context of the rise of financialized attempts to use wildfire management as a tool for carbon sequestration in the US, would we find a similar dynamic playing out in other countries?

The breadth of the subject points to the utility of archival material (Yin, 2018). I have chosen case studies as the most prominent component of this research, because unlike statistical analysis or ethnographic study, it is particularly amenable to using multiple sources of data. This process, known as triangulation enhances generalizability, precision, and authenticity of context (Turner et al., 2017; Yin, 2018). This dissertation achieves these aims by selecting specific topics, places, processes, and time periods for each chapter. The material presented in this research consists mainly of archival records such as historical documents, newspaper stories and interviews, but also some images obtained from internet

sources, and author-generated graphs based on statistics available online. All of the materials presented here strengthen this paper's analysis, because they provide linkages between the theoretical argument and the historical record.

Materials and Methods

I used three main sources and an auxiliary one for my research. I downloaded the entire archived pdf collection of the USFS's *Fire Management Today* which began as *Fire Control Notes* in 1936. *Fire Management Today* acts as a channel for sharing information, research, and techniques for the wildland fire community; it is *the* primary research tool for studying wildfire, as it contains articles by Forest Service (hereafter referred to as Forest Service, FS, or USFS) employees and others involved in fire. The second major source was *Wildfire Today*, a news outlet that covers wildfire policy and legislation, contains links to wildfire-specific research and reports, including *InciWeb*, which is an interagency website created in 2004 providing standardized reporting for public consumption. I also accessed the USFS's online research collection *Treesearch* houses archived and current research papers and other documents related to Forest Service programs. Additionally, I joined the *Forest History Society* to gain access to their collection of historic documents such as downloadable books, biographies, and films. My secondary sources included government reports, interviews, agency histories, fire histories, congressional testimonies and legislation, personal biographies, and articles by other social scientists on the topic.

I obtained my primary materials in pdf format and arranged them in nested, labeled folders with headings. For example, USFS --> Histories ---> Interviews. Using a master set of keywords, for instance, I used "labor" or "industrial" as well as a subset of dates such as 1850 or 1945, I searched the histories and identified patterns that pointed to geographic areas, specific practices, discrete time frames, particular organizations or groups of people. I then formatted the findings in rough outlines and used the results to generate another set of search words such as the names of fires, projects, people, or concepts such as "scientific forestry." I then refined my search using the new words or concepts and searched

through each folder for references to the new words and noting any relevant details to my main keyword search.

For instance, for the chapter on militarization, I used the keyword “military” in my USFS folder and discovered a list of projects with military and corporate cooperators. From there, I isolated a project called *Firestop* which was a joint exercise among military, the USFS, law enforcement, and corporations that tested fire equipment. I glanced over all documents covering *Firestop* and compared them, evaluating how much information was included and developing a subset of components to include in the chapter. If there was only a brief mention, I looked over other parts of the document to determine how the keyword was situated. If my search uncovered a large cache of material, I used randomly selected 3-4 documents from several separate time periods. I maintained (not very well) a codebook in an Excel spreadsheet with labeled tabs that contained notes, numerical data, and links to useful websites.

In order to analyze the data, I used the triangulation previously mentioned whereby I gathered primary data such as interviews, Congressional testimony, maps, and technical reports. I compared this data against scholarly research by more accomplished historians in specific fields. I set historical accounts against historic economic indicators from the Census Bureau, the Federal Reserve, and the Bureau of Labor Statistics in order to understand political and economic trends affecting fire suppression. Without using multiple datasets and other pieces of information such as interviews, simple ethnography or content analysis would not sufficiently capture the historical changes that occurred in the human-fire relationship.

I want to emphasize the importance of looking not only at historical, political (discursive and legal), and economic factors but also to advocate for the inclusion of reports, biographies, and testimony that relate to international developments with regard to wildfire. Without some examination of international factors such as the firebombing of Axis countries in World War 2 and the subsequent Cold War focus on “mass fire” (Broido and McMasters, 1960), one gets an incomplete picture. Up to the current time, sociological examinations of wildfire have not sufficiently employed three elements: historic, economic, and scientific research. Often the focus has been on particular type of analysis, such

as ethnography. What makes the work of Marxist and realist-materialist scholars associated with *Monthly Review* particularly robust is dedication to dialectical method. Additionally, scholarship associated with *MR* draw on a rich tradition of viewing the fusion between capitalism and imperialism as a global phenomenon affecting people worldwide (Baran and Sweezy, 1966; Amin, 2014). Holleman (2015) argues that Marx's dialectical method possesses the capability to penetrate "much more deeply into the heart of ecological and social crises of the current period than traditional green thought." Because it is a methodology anchored in a historical materialist conception of social relations and natural processes and dedicated to identifying transformation of those systems. Moreover, it is dedicated to highlighting the processes and obstacles to surpassing the current brutal and anti-ecological social order in which we find ourselves.

Overview of Chapters

The following chapter examines the various theoretical orientations within social science studies of wildfire. The extensive record of the conception of wildfire as friend or foe, its embeddedness in national development, intimate association with forestry, and subjection to the global effects of climate change, calls for a broad theoretical discussion. Chapter II evaluates the theories within social sciences and environmental sociology and provides interventions derived from Marxist historic materialism. Historical materialism simply means that the way in which humans interact with nature to provide for their material needs, called the mode of production, influences their social relations over time. The basic building block of historical materialism is historicity, the understanding that human and nonhuman conditions of existence tend to change over time and in relation to various environmental and social developments. In this chapter, I center Marx's ecological argument as the foundation of my approach to historical developments in wildfire exclusions, suppression, and management.

I begin Chapter III by introducing the 2021 Caldor Fire and situating it geographically in the area where the Gold Rush occurred in California. I employ a Marxist theoretical perspective which recognize the historic role of settler colonial fire exclusion in the region as constituent of the overall capital

accumulation process of state-building. This is congruent with Settler Colonial Studies (SCS) which positions land as the foundation of settler project by way of theft, occupation and despoiling of Native land (Coulthard, 2016). I use ethnobotanical and historical accounts that show Native Sierrans used of fire was a key part of the production of use values prior to and contemporaneously with settler invasion (Anderson, 2005). Their fire knowledge is the culmination of thousands of years of scientific inquiry coupled with an ethic of care and responsibility. Kimmerer (2017) has called this coevolution, a covenant of reciprocity that recognizes humans' embeddedness and responsibility to non-human nature and corresponds with Marx's (1991[1894]) concept of *boni patres familias*, or caring land stewards, to whom "private property of particular individuals in the earth will appear just as absurd as the private property of one man in other men (p. 911)." With this understanding the chapter proceeds to reveal how settler invasion and Native dispossession and a change in the fire regime forced the landscape and people on it produce exchange values. The imposition of asymmetrical fire use and laws was part of a metabolic rift that occurred as part of the consequence of increasing surplus accumulation with respect to timber extraction which was also supported by a "botany of mechanization (Ergas and York, 2021)." In contrast to Vinyeta (2021) and Norgaard (2019) who suggest that these transitions were seamless and uniform, I show that they were chaotic and contradictory, including the conflict on light burning in which advocates and opponents used Clementsian scientific arguments to bolster their claims. Above all, this chapter is dedicated to showing how the material change in labor transformed the political and economic relations of humans and fire.

In Chapter IV, I outline the contradictions inherent in the rapid development of the early monopoly capitalist system whereby firms merged and dramatically increased production while at the same time mechanizing. The increase of banking and other industries contributed to the precarity of workers in the timber, mining, and other industries as capitalist speculation threw the companies into crises of decline and stagnation (Weinberg 2003; Stricker 2020). The policy of wildland fire suppression grew in tandem with the displacement of these workers through casual labor arrangements. Additionally, capital took advantage of discrimination and exclusion of workers based on ascribed and/or material

social status to develop fire suppression tools, techniques, and structure. Poverty and displacement during the great Depression provided the U.S. with enough labor to formalize wildland firefighting. The social sciences played a role in assisting fire managers maximize production, discipline the labor force, and inculcate in its employees and the public obedience to the state, an emphasis on middle class-inflected conservation and unquestioning fire prevention (Piven and Cloward, 1971; Braverman 1974).

Additionally, in Chapter V, I recognize war as a natural extension of monopoly capitalism's growth through military expenditures (Baran and Sweezy 1966; Cypher 2015). I examine wildfire suppression as a beneficiary of military Keynesianism, policies that were part of the post-World War 2 economic program in which "government devotes large amounts of spending to the military in order to foster economic growth" with the aim of "generating additional demand in society as a whole (Custers 2010, p. 79, 83)." Following the firebombing of Japan and Germany suppression, the control of "mass fire" relied on war-time science and technology and the permanent war economy. This was achieved through collaboration with the military and defense contractors on research and development projects of mutual benefit and direct involvement in the war in Vietnam. Using USFS reports and declassified documents from the Defense Technical Information Center, I examine the cases of *Operation Firestop*, *Project Skyfire*, and *Operation Ranch Hand*. The three operations represent a continuation of U.S. imperial relations in which the collaboration of Big Science and the USFS developed techniques and products to make war on people as well as nature. The Forest Service collaborated with the military and airline industry during *Operation Firestop* which normalized aerial bombardment, chemical drops, and radio technology use in suppression. In cooperation with General Electric, Forest Service employees developed cloud-seeding techniques (*Project Skyfire*) that were subsequently used by the Air Force in Vietnam to create floods. During *Operation Ranch Hand*, USFS fire technicians directed ecocide of pro-communist peasants' fields and forest in a campaign of defoliation and firebombing. As Foster, Holleman, and McChesney (2008) and Inger Stole (2012, 2021) recognize media is a component of the permanent war economy, because it wastes money on advertising campaigns and superfluous production,

as exemplified by the popular Smokey Bear campaign initiated in 1950 by the Advertising Council which provided effective war propaganda and normalized patriotic voluntarism. The

In Chapter VI, I introduce the Bootleg, Camp, and Marshall as examples of how financialization intensifies the contradictions of capitalism with terrible environmental and social consequences. This analysis extends Marxist environmental scholarship by showing that climate-change driven wildfires are a manifestation of capitalism's ecological rift (Foster, Clark, and York, 2011) and illustrate the FIRE economy's influence on fueling fires and managing them. This theoretical approach to financialization is grounded in the understanding of the financialization of nature defined by scholars associated with *Monthly Review*. Using information from *Wildfire Today*, I describe the overall impression of the fires and their damage before moving to an analysis of their context with regard to financialization. *WFT*'s reporting on the three incidents pointed to clear evidence of the FIRE economy that are not available in academic research, either because they are too recent or, as Marxist scholars have pointed out, because obfuscation in this area serves capital and dominant social order. As Foster (2016) remarks

the dominant social science, which serves the dominant social order and its ruling strata, has thus far served to obscure these issues, putting its weight behind ameliorative measures together with mechanistic solutions such as carbon markets and geoengineering. It is as if the answer to the Anthropocene crisis were a narrowly economic and technological one consistent with the further expansion of the hegemony of capital over Earth and its inhabitants—this despite the fact that the present system of capital accumulation is at the root of the crisis (qtd in Angus, 2016, p. 15).

I directed my inquiry toward investigative reporting in *ProPublica* and *The Wall Street Journal* using keyword searches of the specific wildfires. From there I used keyword searches for each wildfire and “carbon offsets,” on the corporate websites of Microsoft and Green Diamond Resource Company and performed a similar function using “catastrophe bonds,” in trade journals *Insurance Journal* and *Artemis* for finance and insurance-linked securities respectively. For the Marshall Fire which is still an evolving story, I accessed local news stories and city archives to frame the role of real estate in the context of financialization.

In the final chapter, I draw propose a set of examples of actions that can begin breaking some of the mechanisms for a more equitable and sustainable approach to the wildfire paradox. I draw from the

fire ecology science as well as social programs outlined in the *Red Deal* and the Bolivarian Revolution. While an ecosocialist approach necessarily emphasizes Indigenous sovereignty and working class solidarity in order to overthrow the current economic system and reinstitute a mode of production under the direction of producers, I propose measures to begin the process within the current system. As Foster, Clark, and York (2010) argue solutions for bring social metabolic relations in line with the actual needs of humans and the sustainable limits of nature,

in the end a complete break with the logic of capital and the social metabolic order it creates, which does not mean we cannot take beneficial actions within the present system—although these will necessarily go against the internal logic of the system (p.86).

CHAPTER II

THE LIFE-GIVING FIRE: THEORETICAL VIGNETTES

Fire is a life-giving force. The presence of fire is so embedded in the cycle of life that it is impossible to untangle its unseen presence among Earth's natural processes. Fire has enabled our species to roam the earth, move to higher elevations, thrive in cold temperatures and extract valuable calories more efficiently. The use of fire by humans extends back in history to over 400,000 years (Anderson, 2018). The discovery of stones arranged in rings, burned bones, and clear evidence of cooking are common throughout Europe from that time period. There is archaeological evidence that fire was used to drive and hunt wildlife at this time. Knowledge of fire behavior enabled humans to influence the dynamics of landscapes, an activity of coproduction with other animals, plants, and other elements of nonhuman nature such as soil composition. This detailed understanding of fire became nearly universal and enabled humans to develop powers of cultivation and management as well as foraging to our storehouse of skills and enabled rich cultural development. In what is now the United States, western indigenous groups made extensive use of fire for cooking and warmth but also to change landscapes that favored plant health and production for food and tools, animal abundance, hunting access, ease of travel, and fire resilience (Anderson and Moratto, 1996; Anderson, 2005; Stewart, 2009 [1908]; Boyd, 1999; Anderson, 2018). For these cultures, fire remains an everyday part of life and a cultural necessity. Yet in the last 30 or so years, summer in the United States often bring catastrophe to communities in the form of wildfires and deadly smoke events that warrant massive, militarized suppression that clearly communicate the relationship between humans and fire is out of balance. Social scientists, and environmental sociologists, in particular have paid little scholarly attention to wildfires and their various social factors including contributing to health problems, injuries, and death, causing property and infrastructure damage, exacerbating social inequalities, and their complicated connection to climate change (Cordner 2021). This dissertation traces wildfire suppression as "the fatal distortion in the relation between humans

and nature (Saito 2017, p. 279).” I argue that formalization of fire suppression has benefitted from inputs of surplus labor during economic depressions, social protest, and population dispersal. Marx and Engels grounded their analysis in meticulous engagement with the natural sciences, anthropological studies, history, and economics. Marx and Engels’s greatest contribution, according to Rosa Luxemburg (1903), is the “materialist-dialectical conception of history which presents itself to us as nothing more than a method of investigation (Luxemburg 1903, p. 106).” I hope this examination of wildfire is one such example.

From the late 1990s to the present time forest fires, a natural part of the western landscape, have gained increasing attention through news coverage, smoke events, evacuations, and the destruction of whole towns. Climate change is helping to lengthen the fire season and drive more volatile fires (Hessburg et al., 2021) and exacerbate the effects of past land use practices such as fire policy that emphasized settler colonial fire exclusion (Lake, 2013; Long et al., 2018; Norgaard, 2019; Vinyeta, 2021) and capitalist production (Hudson, 2011). Additionally, complete fire suppression from the mid-1930s onward enabled the development of timber and public utility monopolies (Beesley, 1996). Cold War fire science was, for a time, integrated into the military Keynesian economy which used government spending on military and related projects to prevent to avoid the periodic crises of stagnation inherent to capitalism strengthening early monopolies and giving rise to new ones in technology. Normally, wars, territorial expansion, and revolutions in technology maintain economic activity feeding corporate profits. Military Keynesianism is part of the larger economy dominated by giant corporations that undergo periods of an accrual of surplus capacity when demand drops off, there’s excess manufacturing capacity, and consumers can’t buy their goods. When this happens, the government steps in to create a market through purchases, new loans for research and product development, etc. For fire suppression the Cold War provided an opportunity for building on the lessons from the world wars and using surplus military gear to research the effect of “mass fire.” Fire science, for a time was part of Big Science, contributing to research and development by private companies (Pyne, 1982; Wilson and Davis, 1988; Davis and Martin, 2000). Financialization beginning in the 1970s, affected fire suppression through loss of timber

revenues, budget cuts, and an increase of private reforestation and fire suppression contractors while expansion of housing fueled by housing speculation pushed human habitation into wildlands and semi-rural communities which picked up significantly in the 1990s (Radeloff et al., 2018). Recently the financialization of climate change mitigation measures the spotlight has fallen on fire management in a new bid by monopolies to maintain profitability through the finance, real estate, and insurance (known as the FIRE economy). As an integral component of monopoly-finance capital, the FIRE economy cannot avoid wildfire. As climate change affects the timing and severity of fires, companies are seeing threats and opportunities in the form of carbon credits and reinsurance schemes.

All of this taken together amounts to what some fire ecologists have dubbed the “wildfire paradox” whereby long-term fire suppression has “has altered vegetation and fuels, increased risk of severe fires and reduced resource values (Arno and Brown, 1991, p. 40)” contributing to significant wildfire danger. Between 2010 and 2020, 76% of wildfires in the western United States were human-caused and burned three times as many homes and structures as they had in the previous decade. Moreover, it has become increasingly common for those ignitions to begin close to areas with large amounts of flammable materials are located in relation to businesses and their outbuildings and homes (Higuera et al., 2023).

In the last decade or so, fire ecologists and the public have called for returning good fire to the land, building rural communities adapted to wildfire, and restoring humanity’s humble standing with regard to non-human nature.¹³ Most of these fire experts warn us that if we do not make the necessary changes in our approach to fire, urban areas in addition to those in communities closest to forests and grasslands will suffer the consequences of future conflagrations. This refreshing perspective borrows language from the environmental justice movement acknowledging the inequalities within and between communities and demanding effective action. However, running under cover of environmental justice

¹³ The concept of returning good fire to the land rightly points to how the numerous ecological problems created by the settler colonial practice of total fire suppression and the criminalization of cultural burning traditionally practiced by Indigenous and rural peoples have contributed to the present massive and devastating wildfires.

discourse are the brutal realities of global capital. Following the 2021 wildfire season which erased North American forest carbon offsets held by tribes and private landowners and released 6500 megatonnes of CO₂, or 148% of Europe's 2020 emissions, the finance, insurance, and real estate (FIRE) companies gathered at Glasgow's climate summit agreed to make Indigenous people stakeholders in carving up the Earth for profit in the name of conservation.¹⁴ But these conflicting concerns are rarely examined in a serious historicized structural analyses and certainly not by social scientists examining wildfire. This chapter provides a tour d'horizon of my opinions, basic theoretical orientation, assumptions, and the terms of the debate presented in this dissertation.

Racism or Rift?

Settler Colonial Fire Exclusion

Research by forest ecologists reveals that forest management practices since the late 19th century including logging, grazing, agriculture, and fire exclusion/suppression have changed the structure of forests and fire regimes in the western U.S. (Calkin, Thompson, and Finney, 2015).

Environmental sociologists Norgaard (2019) and Vinyeta (2021) and political scientist Marks-Block (2021), attribute the build-up of fuel from fire exclusion in the U.S. West to settler colonialism. Social scientists who make this argument generally employ theories of indigeneity to argue that fire exclusion scaffolds a form of racist dispossession called settler colonialism in the western U.S. (Norgaard, 2019; Vinyeta, 2021; Marks-Block, 2020). They point to fire exclusion which accompanied settler colonial

¹⁴ The November 2021 Glasgow COP26, sponsored by United Nations Framework Convention on Climate Change (UNFCCC), was vigorously protested by Indigenous people from around the world. However, the Glasgow summit agreed to unify carbon markets and financialize nature through the creation of a new class of securities called natural asset companies (NACs). Additionally, the summit agreed to deepen the relationship between Indigenous people and finance by stating, "These decisions mark a reorientation of policy towards nature to stabilize the global climate system, through engaging with the expertise of indigenous peoples, local communities and their diverse knowledge systems." <https://unfccc.int/news/cop26-strengthens-role-of-indigenous-experts-and-stewardship-of-nature>

state-building as the reason for fuel buildup in the western states and argue that the absence of cultural burning and fire suppression have greatly contributed to the wildfire paradox (Lake, 2013; Norgaard, 2019; Marks-Block, 2020; Marks-Block and Tripp, 2021; Vinyeta, 2021). Settlers employ racist discourse, legal frameworks, and violent means to force Native people off their lands with the goal of “modernist commodification of land (McKay, Vinyeta, and Norgaard, 2020, p. 3).”

Settler colonialism is the imperialist separation of Indigenous people from their land and the commodification of its natural processes and material with the primary objective territorial acquisition entailing unequal relations of labor and displacement of the population and ultimately the elimination of indigenous people (Wolfe, 2006; Veracini, 2011; Dunbar-Ortiz, 2014). Veracini (2011) explains that the defining feature of colonialism is domination of a territory from outside entailing unequal relations of labor and displacement of the population. SCS scholars emphasize land acquisition and elimination of Native people through genocide, dispossession, segregation, assimilation and other brutal methods to weaken Indigenous sovereignty with the ultimate goal of eliminating Native people, and especially their life modes altogether (Wolfe, 2006).

Scholars of settler colonialism (SCS) argue that the colonial relation is a specific and distinct form of expropriation. SCS came about as an intervention by historians seeking to rectify the “post” in postcolonial (Veracini, 2014). As part of the broader trend of the New Left’s rejection of Marxist materialism and the cultural turn in academia, postcolonial studies migrated beyond literature to other scholarly domains. This theoretical tradition’s rejection of Marxism hinges on a political rather than an economic argument that emphasizes race/ethnicity culture, spirituality, and sovereignty and claims not only to be a distinct and coherent analysis but also the basis for liberatory movements. Key postmodernist features are rejection of objective truth, especially as represented by the natural sciences, rejection of universal principles and liberties in favor of a plurality of subjective practices and experiences eschewing a coherent “integrated historical narrative within the larger world context (York and Clark, 2010, p. 97).”

It is imperative that we understand Eurocentrism with regard to its embeddedness in capitalist relations so that we may effectively its ideological assumptions. Amin's (2009) *Eurocentrism* counters the way in which those critics of Eurocentrism, including some Marxist critics, implicitly or explicitly assume European cultural superiority in describing the imperial project. In contrast, Amin argues that it is not Eurocentric to use or focus on ideas that developed in Europe. He provides extensive evidence showing the constitution of Europe itself is an amalgamation of Middle Eastern, North African, and Asian influences. He further complicates the picture by painstakingly documenting numerous examples of early precapitalist formations in the world before its emergence in Europe.

Indigenous Studies scholar Coulthard (2014) uses an SCS framework and more deeply engages with Marx but argues that he was a developmentalist who cheered on colonial conquest as a path toward revolution.¹⁵ Coulthard ignores a decade ecosocialist scholarship when he asserts that Marx's theoretical project "adhered to an instrumental rationality that placed no intrinsic value on the land or nature itself (p. 14)" leading Marx to unreservedly adopt a productivist and ecologically unsustainable vision of the future.¹⁶

Coulthard counters Marx's apparent Eurocentric preoccupation with capital by emphasizing the need to shift to the colonial relation "on its own terms and in its own right (p. 11)." Coulthard claims that settler colonialism imposes a spatial dimension of oppression – that of dispossession – which stands in contrast to Marx's focus on (labor) time, as understood through the labor theory of value. He characterizes settler colonialism as "structured dispossession (p. 7)" that includes ongoing primitive (or

¹⁵ Coulthard includes a lengthy walk-back in a footnote in which he acknowledges Marx's own voluminous *Ethnological Notebooks* and Kevin Anderson's, *Marx at the Margins*. With specific regard to settler colonialism, years before Coulthard's argument, Irish sociologists Eamonn Slater, Eoin Flaherty, and economist Terrence McDonough (RIP), published a number of articles taking a deep dive into the intersection of soil degradation, dispossession, and colonial extermination in Ireland via Marx's metabolic rift.

¹⁶ Both Foster's and Burkett's work predate Coulthard's by 15 years. Additionally, with regard to Marx's view of colonialism, he ignores Luxemburg's rich and detailed discussion of accumulation. He does not mention Amin's *Eurocentrism* and especially his *Unequal Development* or Utsa and Prabhat Patnaik's works on imperialism.

primary) accumulation that is “territorially acquisitive in perpetuity (p. 125)” that excludes the proletarianization of Native people.

Environmental Sociology and Settler Colonial Studies

Environmental sociologists who employ a SCS lens to the historical exclusion of Native cultural burning also acknowledge the validity of Marx’s critique of capitalism. Norgaard’s (2019) ethnography critically examines the racialized project of settler colonialism, including fire exclusion, with particular regard to the Karuk people. Norgaard states that the settler colonialism lens is “congruent with Marxist critiques of capitalism” but argues that Marx assumed “the colonization of North America was a necessary step ...” and therefore “... the notion of controlling the means of production is an insufficient response to capitalism (p. 28).”

Norgaard (2019) further argues that Marx accepted, rather than criticized, classical economic concepts such as the ownership of land

While essential, Marxist critiques of capitalism are also different from those emerging from Indigenous peoples. Sandy Grande (2004) observes, for example, “both Marxists and capitalists view land and natural resources as commodities to be exploited, in the first instance, by capitalists for personal gain, and in the second by Marxists for the good of all” (qtd in Norgaard 2019, p. 73).

Sharing Grande’s evidence-free opinion doesn’t really make a Marxist analysis sound essential at all.

Grande is doing more than just saying Marx believed in the commodification of land; she is arguing that *Marxists* do not support Indigenous claims to their own land.¹⁷ Moreover, in formulating this analysis, Grande accepts an ahistorical and *bourgeois* notion that land is a commodity.

¹⁷ It is frustrating and distressing to read casual repetition of secondhand excerpts of Marx’s work that confers on Marxist scholars the mark of academically and socially unacceptable views forcing us to relitigate debates that would be settled if actual engagement with Marx’s oeuvre and even cursory attention to debates among Marxist scholars was undertaken in good faith.

Norgaard extends Coulthard's claim that Native proletarianization is/was not the goal of settler colonialism with respect to the Karuk tribe in California, but confusingly quotes M. Kat Anderson's (2005) extensively researched ethnobotany of California which details horrific labor exploitation of Native people in numerous industries prior to U.S. state formation and continuing throughout the development of California.¹⁸ Anderson's description fits Marx's concept of primary accumulation outlined in the *Grundrisse* to a tee, "making it clear that the original basis for accumulation and capitalism's simultaneous dissolution of all earlier economic formations was the central issue (Foster, Clark, and York, 2010, p. 282)" in capitalist value relations. It is also clear evidence of exploitation. The *Grundrisse* and subsequent discussions by Marxist theorists covered in this chapter shows where I'm coming from with my own analysis.

Marxist View of Land Ownership

Work by Native Studies scholars emphasizes attachment to the land, which is both specific to localities but is also a more generalized connection to Earth, its inhabitants, and its processes. This land ethic and its accompanying scientific knowledge is transmitted intergenerationally through "legends, ceremonies, songs, dances, and arts" and guided by "complex cultural rules, sophisticated knowledge of reproductive biology, and awareness of community ecology (Anderson and Moratto, 1996, p. 194)." Native burning engaged particular cultural, material, and spiritual practices and aims.

¹⁸ In California, Spanish colonialism, imposed the "semi-feudal (Amin, 1976, p. 296)" *encomienda* system that demanded conversion of indigenous populations to Catholicism and forced labor in tribute to the Spanish Crown. Profits from these arrangements were divided between the *encomenderos* and the empire (Yeager, 1995; Fenelon, 2016a; Fenelon, 2016b; Fenelon and Trafzer, 2014; Steinmetz, 2014; Taylor, 2016; Greer, 2018). The system did not reach the area of my first chapter's or Norgaard's (2019) and Vinyeta's (2021) study, as Norgaard later acknowledges. The indirect impact of the invasion and the eventual dissolution of *encomiendas* forced people to become destitute and migrate. This population exemplified what Marx (1975, [1867]) calls a "surplus population," a group of people so wretched and easily taken up or cast aside according to the needs of capital that it was "beneath all calculation (p. 517)." Subsequent settlement brought material, cultural, and legal norms of settler colonialism imported by English colonists and practiced across most of the continental North America with the exception of the French colonial holding. The arrival of prospectors from the eastern U.S., Europe, China, Hawai'i and elsewhere unleashed disease, massacres, and further displacement in California.

The current wildfire paradox is part of the legacy of Naive dispossession and cannot be disentangled from capitalist expropriation. Historian Allan Greer (2018) who has documented diverse property regimes employs the concept of property formation in the so-called New World and invokes Marx's *Grundrisse* when he convincingly argues

Land cannot help but be part of a landscape that has natural, social and spiritual dimensions. My land cannot belong to me exclusively, simply because it cannot be fully detached from other lands. And what about this "me" who claims the land? Can I really be completely disconnected for ownership purposes from my spouse, my family, my community and nation? Since land is for all practical purposes eternal, and human life is finite, property in land implies some sort of inheritance arrangements and therefore it implicates lineages as well as individuals. At least that is the case where the owner is a human person, but in today's world, much land is owned by corporations or by offshoots of the state. The superficial view of property as a relationship between a single owning subject and an owned object ("I own this land") is deceptive in several respects. Though it sometimes appears to refer to a relationship between a person and a thing, property is actually very much a social phenomenon. In Karl Marx's pithy phrase, "An isolated individual could no more have property in land and soil than he could speak" (Greer, 2018, p. 12).

Marx's ecological view led him to reject John Locke's definition of property whereby Native peoples lived in a state of nature, only occupying land not improving it in any significant way that would qualify it as property. Locke's argument is sometimes called the labor theory of property which he outlined in *Second Treatise on Government* that states

We see in *Commons*, which remain so by Compact, that 'tis the taking of any part of what is common, and by removing it out of the state Nature leaves it in, *which begins the Property*; without which the Common is of no use. And the taking of this or that part, does not depend on the express consent of all the Commoners. Thus the Grass my Horse has bit; the Turfs my Servant has cut; and the Ore I have digg'd in any place where I have a right to them in common with others, become my *Property*, without the assignation or consent of any body. The *labour* that was mine, removing them out of the common state they were in, hath *fixed* my Property in them (qtd in Wood, 1995, p. 157).

As Wood (1995) explains, Locke is not simply arguing that labor is what confers the right of people to establish ownership of land through improvement but the generation of exchange values that labor on the land yields. Against Locke, Wood argues

It is rather that the virtues of labour and 'industry' have been displaced from the activity of labour itself to the employment of labour and to the productive utilization of property. Throughout Locke's discussion of property, it is not the activity of labour itself that carries the rights and

virtues of labour, but *improvement*, the productive use of property which gives it value ... (pp. 157-158).

Locke, an investor in the slave economy, clearly had racist and imperialist reasons for conceptually situating Native peoples in a state of nature and thereby denying that they exercised ownership over their lands (Dunbar-Ortiz, 2014). But his overarching rationale defined improvement in distinctly economic terms that accorded with capitalist expropriation – the appropriation without equivalent or reciprocity (Foster, Clark, and Holleman, 2019) of land. Wood (1995) observes that

In an economic system where commodity production is generalized, where all production is production for exchange, where all production is subordinated to the self-expansion of capital, where all production is the production of capital, and where surplus labour is appropriated not by direct coercion but through the mediation of commodity exchange, the activity of production becomes inseparable from the activity of market exchange (p. 158).

In “Comments on James Mill, *Éléments ’économique politique*,” Marx (1975[1844]) argued that people become aware of themselves individually and collectively through their relations with one another and the land upon which they conduct their labors; he recognized that these material relations entailed collective meanings and the fulfillment of human needs

These *natural conditions of existence*, to which he relates as to his own inorganic body, have a dual character: they are (1) subjective and (2) objective. The producer becomes aware of himself as member of a family, a tribe, a clan, etc.—which then, in the process of intermixture and conflict with others, assume historically different shapes; and, as such a member, he relates to a specific nature (we can still call it earth, land, soil) as his own inorganic being, as the condition of his production and reproduction. As the natural member of the community, he participates in the communal property and takes a particular share of it into his own possession; just so, as a native Roman citizen, he has (AT LEAST) a notional claim to the *ager publicus*¹⁹ and a real

¹⁹ Marx (1975 [1844]) alludes to the Germanic tribal concept of *ager publicus* in which “each individual owner has his share of the pasture, the hunting ground or the common woods (Bensaïd 2021: 50).” Bensaïd explains that Marx is making a historical distinction between individual property ownership within a collective territory under the community’s jurisdiction, and private property cut off from direct community control. In a beautiful passage from “Comments on James Mill, *Éléments ’économique politique*” Marx (1975 [1844]) recognizes the difference between self and community realization through unalienated labor:

Let us suppose that we had carried out production as human beings. Each of us would have in *two ways* affirmed himself and the other person. 1) In my *production* I would have objectified my *individuality, its specific character*, and therefore enjoyed not only an individual *manifestation of my life* during the activity, but also when looking at the object I would have the individual pleasure of knowing my personality to be *objective, visible to the senses* and hence a power *beyond all doubt*. 2) In your enjoyment or use of my product I would have the *direct* enjoyment both of being conscious of having satisfied a *human need* by my work, that is, of having objectified *man’s* essential nature, and of having thus created an object

claim to a specified number of *jugera*²⁰ of land, etc. His *property*, i.e. his relation to the natural presuppositions of his production as belonging to himself, as *his own*, is mediated by his natural membership of a community. (The abstraction of a community whose members have nothing in common but e.g. language, etc., and barely even that, is plainly the product of much later historical circumstances.) With regard to the individual, for instance, it is evident that he himself relates to his language as *his own* only as the natural member of a human community. Language as the product of an individual is an absurdity. But this is equally true of property (p. 414).

Most Marxist environmental sociologists would agree with Lower Brule Sioux Nick Estes's (2013) assessment that

primitive accumulation of land and the establishment of settler colonial property regimes, in effect, create the material conditions of possibility to simultaneously legitimize settler status through the protection of property rights within liberal democratic institutions of law and politics, and roots of capital as a formulaic enterprise of Native territorial dispossession. Marx's insights into colonial primitive accumulation ([1867] 1970, 915) are foundational to understanding the inherent violence of alienation from land and base colonial practices of Native dispossession (p. 192).

Settler Colonialism and Western Science

Vinyeta (2021) provides an example of the contested nature of fire use and its suppression by the USFS. She uses content analysis to show how the USFS's changing historical discourse used anti-Indigenous rhetoric to justify unscientific forest management, specifically fire suppression with particular regard to the Karuk Tribe. She documents how the USFS racialized light burning as "Piute Forestry" in its attempt to discredit, downplay, and erase Indigenous people and knowledge. Vinyeta cites Richard Boerker's (1912) opposition as a prime example of racialization of light burning. But besides Native Americans, she recites mentions a rogue's gallery of incendiaryists implicated in light burning: "vandals,

corresponding to the need of another man's essential nature. 3) I would have been for you the *mediator* between you and the species, and therefore would become recognised and felt by you yourself as a completion of your own essential nature and as a necessary part of yourself, and consequently would know myself to be confirmed both in your thought and your love. 4) In the individual expression of my life I would have directly created your expression of your life, and therefore in my individual activity I would have directly *confirmed* and *realised* my true nature, my human nature, my *communal nature*. Our products would be so many mirrors in which we saw reflected our essential nature. This relationship would moreover be reciprocal; what occurs on my side has also to occur on yours (pp. 227-228).

²⁰ A little over 1/2 an acre of land.

social outcasts ... and greedy corporate actors (p. 6)” suggesting that there is more than just racialization happening in the light burning debate. Rothman (2007) observes that fire suppression “had its vehement opponents ... Settlers and timber owners saw light burning as a sure way to reduce fuel load and limit uncontrollable conflagration (p. 29).” According to Miller (2020), federal forest managers and scientists were suspicious of and criticized light or prescribed burning because they feared the “extinction of the forest (Boerker, 1912, p.185)” – the loss of the natural reproductive capacity of the forest and consequent profit losses. Boerker does mention Indigenous burning on his way to arguing that he is concerned with mode of production specifically, and he tallies up the costs in lost revenue of burned timber.

By the 1940s and ‘50s the USFS had more funding and employees on account of booming lumber production and a renewed focus on protecting the resource (Beesley 1996). With the emphasis on production and the Forest Service’s decided authority over public lands, local rangers were part of a growing rural middle class that stood guard over national forests. These federal employees imposed the agency’s durable message of regulated public use and fire exclusion as part of a purportedly scientific aimed to maintain efficiency. That science was contested, particularly by people who worked with Native American foresters on the Colville, Fort Apache, and San Carlos reservations (Weaver, 1943; Kallander, 1969; Harrington and Sackett, 1988)

Vinyeta provides evidence of the broadly racist views of local rangers from Region 5 Six Rivers National Forest, which according to Conners (1998), is an area with a diverse and vibrant mix of Native American groups – Hoopa, Yurok, Tolowa, and Karuk – whose remoteness enabled them to maintain their traditional cultures, including cultural burning up through the 1940s. Citing a ranger report in Conners’ (1998) history of the forest, Vinyeta shares a particularly egregious description of Native people that links cultural burning to drunkenness and criminality:

Solving the problem of the half-drunk Indian and his retaliatory actions is a long process involving possible (a) enforcement of liquor laws in respect to Indians, and (b) long time educational programs in agriculture and forestry among the high school students. Law enforcement is, of course, essential but is a much different problem than that of the white man's conception, yet no one seems able to say what is proper punishment for an Indian. One sheriff says a rubber hose filled with buckshot is perhaps the best (Conners, 1998, p. 111).

As Conners (1998) observes, Hoopa and Karuk people had been engaged in cultural burning in the rangers' jurisdiction, which the agency was charged with putting out. Conners (1998) argues that along with their clearly racist comments the rangers, Cronemiller and Kern, expressed frustration with "larger social issues that hit Native American people especially hard (p.111)" such as the banning and regulation of everyday practices, differences in what constitutes land ownership, perceptions about alcohol use, and under and unemployment. Preceding the buckshot comment, the rangers' report mentioned that

The Indians are improvident but good workers. At present there is work for those who want to work yet they will take a day off when they don't feel like working and thus lose their jobs. All of them have automobiles and most are paying on them. When it appears they may lose their car through failure to make payments, 'job' fires may result ... The 1949 situation with a number of incendiary (Indian) fires is really a somewhat normal situation—partly retaliatory against the Indian Service and the government and perhaps partly economic. Wage rates for fire fighting are above those for common labor on the reservation and because of long hours the pay is greater per day than private industry ... (Conners, 1998, p. 112).

Given their full contexts, Conners' (1998) and Boerker's (1912) comments suggest that racialization *and* capitalist accumulation accompanied the heated but deeply economic arguments embedded in the light burning controversy that began as early as the 1880s and eventually settled in favor of suppression by the 1920s (Arno, 2012, 2017). It is true that foresters on all sides used deeply offensive and racist language to argue their cases, but what was not in dispute and still isn't was how to squeeze the most profit out of forests and who had the right to do it. In the same 1912 journal where Boerker's article appears, there is a glowing report detailing the profitable application of scientific forestry practiced by the Menominee Tribe in Neopit, Wisconsin whose lands and sawmill, the author hastens to remind his readers, belong solely to the tribe (Brown, 1912).²¹

²¹ Theodore Catton (2016) and Brian Hosmer (1991) recognize that the Menominee sought to sell timber for income as early as 1863. As cash income grew, the tribe's farming and traditional economic activities had virtually stopped by 1890. The Menominee actively sought interventions from the federal government to protect their timber operation and their white supporters in the USFS and Progressive Senator Robert M. Follette, argued that the Menominee needed a sawmill to stop fraudulent cutting by white contractors. And more importantly, as Hosmer argues, "...as a way of producing not simply lumber but wage earning, 'Americanized' Indians ... (p. 10)." According to Hosmer, by 1912, Neopit was an entirely Menominee town with streets, houses, and electric lighting. The sawmill is still a going concern. <https://www.mtewood.com/Sawmill/History>

Sociologically, the focus on race to the exclusion of other possible explanations is usually labeled race relations or some variant of those terms to establish the primacy of racism, or in this case, settler colonialism as a separate structure from capitalism that operates transhistorically. However, I agree with Marxist historian Barbara Fields (2012), who along with her sister sociologist Karen Fields coined the term racecraft to describe how the concept of race, “once ritually purified by the incantation *socially constructed* (p. 151)” is substituted for material relations:

Probably a majority of American historians think of slavery in the United States as primarily a system of race relations – as though the chief business of slavery were the production of white supremacy rather than the production of cotton, sugar, rice, and tobacco. ... No one dreams of analyzing the struggle of the English against the Irish as a problem in race relations, even though the rationale that the English developed for suppressing the ‘barbarous’ Irish later served nearly word for word as a rationale for suppressing Africans and indigenous American Indians (Fields and Fields, 2012, p. 117).

As Magubane (2023) rightly observes, overt and covert expressions of racial hatred accompany terrible consequences, including genocide, for people living in various historical periods and cannot be denied by themselves or anyone who seeks to understand their social circumstances; they are clearly not delusions or simply ideology alone. Magubane asserts that racial animus is an “ideology that mediates and expresses class conflict and exploitation (p. 132)” but no truly important analyst would treat such instances as baseless, because they are very real expressions of the social relations for which they stand. I do not argue that the racism is superfluous, only that capitalist settler colonialism assumes a racialized and Eurocentric character intimately bound up with dispossession, physical separation of the Indigenous population, and supplantation of the Indigenous mode of production. It must be noted that settlers also practiced prescribed burning with the goal of increasing forage, clearing weeds, and enriching the soil for ranching and agriculture as an act of erasure, intended or otherwise, of Indigenous cultural burning.

A final observation that I think is important to note is that some arguments based on the SCS model make primary accumulation, what Marx called expropriation, their point of departure. They confusingly claim that settler colonialism and thus primary accumulation are enduring as long as non-

Indigenous²² actors, embodied by the state, are involved in extortionist relations with Indigenous people, but they do not theorize historical transitions in capitalism. These accounts leave global capitalism's crises, financialization, and other developments untouched. The theory's foundation – land – is treated as a source and product of traditional ecological knowledge but there is little examination of how repatriation of Native land and arrangements with global corporations, not the state, undermines sovereignty. And while ecosystems are often shown to be devastated by settler colonial seizure, there is little attention to how this played out for *all* people and its role in furthering expropriation and exploitation. Because of this, there is an inability to recognize the international character of capitalism and so these arguments focus on localized efforts while SCS theory remains ensconced primarily in the academy. An ability to do so would draw critical attention to the role of global capital in promoting forest and fire management with regard to REDD+ and domestic carbon offsets. Lastly, because of the argument that elimination (Wolfe 2006) rather than proletarianization is the goal of the settler state, there is a stunning lack of attentiveness to the actual exploitation of Native people in the past and now.²³

²² Similar to Fields and Fields (2012), Kim Tallbear (2013) whose scholarship focuses on DNA science and how genetic claims to tribal citizenship like Elizabeth Warren's persistent lie undermine tribal sovereignty highlights the perils of using the concept of race as a category. Tallbear reveals that "gaming is central to the constitution of the twenty-first century capitalist Indian, and its wealth challenges well-worn ideas of authentic indigeneity (p. 103)." They point to the dilemma faced by wealthy casino-owning tribes who are "flooded with enrollment applications from would-be beneficiaries (p. 100)." They observe with trepidation that "DNA-testing-company executives reconfiguring the tribe or First Nation into a genetic entity feels particularly troublesome, like a culminating act in the unsettling-from-within of the very grounds for claims to indigenous sovereignty (p. 103)." Even though Tallbear is a postmodernist of the Donna Haraway stamp, their observation is not an either-or or not-that-but-this argument. The observation does not make the claim that nothing has changed since the settler invasion; it recognizes and clearly understands historical change and the capitalist fragmentation of identity among indigenous people. My focus is not on identity and consciousness but on material relations irrespective of identification or consciousness.

²³ In an interview with *International Socialist Review*, Roxanne Dunbar-Ortiz was asked to contrast Métis Marxist scholar Howard Adams with Coulthard who claims that proletarianization was/is not part of settler colonial processes. She asserts that Adams recognized the fight for decolonization in Canada as a worker's struggle and her own work shows that most Native people in the U.S. have faced dual impoverishment because of colonialism and capitalist exploitation as workers. <https://isreview.org/issue/103/sense-hope-and-possibility-solidarity/index.html>

For a better critique than I could do, please see Davies, Jack. 2023. "The World Turned Outside In: Settler Colonial Studies and Political Economy." *Historical Materialism* 31(2): 197-235.

A First Stage Ecosocialist Examination of Megafires

Mark Hudson's (2011) political economy, *Fire Management in the American West Forest Politics and the Rise of Megafires*, is the only sociological analysis of wildfire suppression that uses Marxist analysis. Hudson refers to the current wildfire paradox as a "... the history of fire is one of crisis management (p. 115)." According to Hudson, fire policy is beset by economic and ecological crises stemming from a legacy of mismanagement and poor regulation anchored in the industrial past. Due to the excesses of extraction from logging, mining, and land clearing for farming and ranching and careless burning, federal and state governments turned increasingly to aggressive fire suppression. However, suppression of all fire in the forest led to a build-up of large fuel loads with devastating effects on the forest as large destructive fires have now become the norm.

Proudly Marxist?

In a review of the book Pyne (2011) observes that Hudson "frames his analysis in proudly Marxist terms (p.1)," and that he does not adequately deal with the emergence of megafires. Pyne states that Hudson "fumbles the opportunity to take on the "dominant narrative" in a more robust way," and "treats the received account generously (p. 3)." Pyne finishes his reviews with a dismissal of Marxist analysis on ideological grounds not informed analysis of the terrain on which Hudson's is arguing. Pyne would need to engage political economy to prove Hudson's deficient theory, nevertheless, Pyne argues that Hudson contributes to the fire literature but does so in a way that appeals "more to Marxists searching out useful illustrations of their theories than to those wanting a better explanation (p. 3)." Pyne helpfully observes that "burned area, even when classified as megafire, is not by itself a useful index of that troubled inheritance (p. 2)." I agree with this assessment but I disagree with Pyne's hasty and general dismissal of Hudson's valiant attempt to apply ecosocialist analysis to the wildfire paradox. Hudson's book is an important first step from which I wish to build. I start with Hudson and weave in Marxist

ecology, as I understand it, with a critique of the various strands of analysis that I have run across dealing with wildfire suppression and management.

Hudson loosely draws on the Marxian concept of the metabolic rift to establish the claim shared by many contemporary politicians, scientists, and activists that we can trace the rise of megafires back to the Forest Service's capture by timber interests one hundred years ago. According to Hudson the agency's approach to the forest and its policy of declaring war internally and publicly is beset by economic and ecological crises stemming from a legacy of mismanagement and poor regulation anchored in its colonial and industrial past. Due to the excesses of extraction from logging, mining, and land clearing for farming and ranching and careless burning, federal and state governments turned increasingly to aggressive fire suppression but did so according to the dictates of the market. He claims that wanton destruction of the forests by the logging industry created in the agency a belief that the timber supply would eventually run out if cutting continued at the rate it was going in the early 1900s. Hudson argues that historic wildfire suppression pursued by the Forest Service developed in response to overcutting in the late 19th century but was always constrained by powerful lobbying and placement of the representatives of the timber interests. The belief in an impending timber famine became the animating force behind suppression.

However, Hudson argues that the USFS was essentially captured by capital and that its goal was to ensure an adequate supply of wood to the country by accommodating the demands of large timber companies and bending its science and its mission to their will

Much is made in the literature about the USFS's focus on instilling both a missionary zeal for conservation and a deeply held professionalism among its employees. This fits well with state-centered theory, in that the development of an ideologically committed professional corps within the state—one without personal or economic ties to the dominant class—is theorized to increase the autonomy of the state and help it avoid capture (Hudson, 2011, p. 55).

Hudson agrees with scholars who argue that settler colonial practices were primarily responsible for early fire exclusion, and acknowledges that the driving ethos of forestry in the late 19th and early 20th centuries was the racist equation of fire suppression as civilized and burning the landscape as primitive.

Hudson dismisses the particular arguments of what he terms “state-centered political theory” such as those advanced by Norgaard, Vinyeta, and Marks-Block that hold the settler state in the body of the USFS, responsible for fire suppression. Hudson argues that state-centric theory conceived of itself as a “‘self-conscious’ field of scholarship” in the 1980s in “response to perceived shortcomings in Marxist, elitist, and pluralist” theoretical perspectives that were “critical of Marxist and neo-Marxist conceptions of the state as an instrument of capitalist class power ... (p. 43).” Hudson dispels what he says is the dominant state-centric notion that the “project of eliminating fire from the woods and the ‘blowback’ of the increasing fire hazard do not stem from the USFS as an isolated, highly autonomous body (p. 4).”

Additionally, he refutes the idea raised by postmodernist sociology that the agency was driven by ideological arrogance that demanded fire suppression in the name of conservation. He asserts, contrary to this argument, it was capital not the state that accommodated itself to conservation using scientific management:

Domination was presumed to follow from scientific knowledge—a presumption usually traced back to Francis Bacon—and the Forest Service is held up as a leading example of the state’s penchant during the Progressive Era to push a technocratic model of administrative governance over both laissez-faire economics and democracy (Hudson, 2011, p. 54).

Hudson instead focuses on capital using Marx’s metabolic rift to illustrate the problems inherent in fire suppression pursued by the USFS, explaining that prior to industrialization, fire was a “pivotal element (p. 121)” in Native peoples’ widespread transformations of the landscapes to meet human needs. Suppression of all fire in the forest led to a build-up of large fuel loads with devastating effects on the forest as large destructive fires have now become the norm. He states that the rift is occurs at the juncture of production which effects “a rupture in the cycles of exchange within natural systems, including material and energetic exchanges between humans and nature (p. 120).” Moreover, he agrees that fire suppression originated in a colonial legacy inherited by U.S. forestry whereby the state oversaw the maintenance of natural resources and was responsible for their protection from wasteful use and destruction. This type of fire management, despite the now-changed stance that fire is an essential part of the landscape, promoted unhealthy ecological conditions and organizational responses to those conditions

that maintain them. Hudson calls this predicament a “crisis in crisis management characterized by metabolic rift that has taken the place of a ‘timber famine (p. 154).”

Through interviews with forest and fire managers, Hudson tests the question put forward by ecological modernization theorists whether “the state is capable, within the current social relations of production, of transcending its role as a manager of crises to become a proactive force in defense of the environment (p. 128).” What he finds is that managers believe they are pursuing conservation goals but are constrained by budgeting. He noted that, although non-timber budgeting for recreation and ecosystem restoration was significant, timber sales were still a large share of the budget while the share for wildfire has hovered around \$2 billion for years with emergency spending trending upward.²⁴ Additionally, Forest Service forest managers almost uniformly agreed that full fire suppression is contradictory to forest health but argued that local communities did not approve of prescribed burning and the political support was not there as the result of the USFS’s successful campaign to eliminate fire. In agreement with those who focus on the autonomy of the agency and its culpability in eliminating fire, Hudson argues that

Rather than view public expectations as some exogenous or extra-organizational force, they must be understood as a product of the Forest Service’s own proselytizing about the evils of fire and its optimistic assessments about its long-term ability to manage nature. In this sense, state-centric theories are correct in stressing that the state matters in and of itself. The Forest Service proved a highly reliable and effective transmitter of the anti-fire policy that arose in the early 1900s, and it now seems trapped by a public expectation of its own making (p.135).

Hudson begins with Marx’s concept of the metabolic rift and his general statement that the rift consists of the removal of indigenous people from the land is technically correct, but he approaches the topic by employing Marxist theories that directly clash with and contradict one another. His argument that the USFS was given the mission of maintaining the timber base through strict enforcement of fire regulations, aggressive firefighting and that funding for alternative approaches has never really

²⁴ I did a quick check of the *Ecological Society of America’s* Federal Budget Tracker and found that in past years the fire management budget could be as much as 50% of the total USFS budget but oddly, allocations for fire management have been dropping. Funding for fire science has slowed while fire management and firefighting pay was cut in half in the 2024 budget by the Republican House. *ESA* requested more money for the Joint Fire Sciences Program in 2022, as this program conducts important research regarding fire behavior and management. <https://www.esa.org/esablog/federal-budget-tracker/#usfs>

materialized is also historically accurate. And the contention that this policy has had grave consequences for forest health and helped to fuel current megafires is well-established. Hudson provides a wealth of evidence showing that the Forest Service has historically found it difficult to sustainably manage forests because its conservation aims have often run counter to private interests and the profitability of commercial timber companies. He concludes his examination by arguing that moving forward with sensible ecological and fire management is still constrained by capital and he pessimistically arrives at a call for more research into the fire practices of the “most ecologically forward industrialized capitalist nations” to determine whether “state-led ecological modernization” is a feasible pathway to balanced forest management with the working class taking a leading role.

Dialectical Departure

Hudson’s particular statements about fire suppression need to be unpacked, because they are not sufficiently dialectical.²⁵ Hudson attempts to employ a Marxist analysis, specifically associated with the metabolic rift, which acknowledges the interdependence of humans and nature but recognizes nature’s independent existence and ecological importance outside of human control. Somewhat contradictorily to his proposed method of framing wildfire suppression as an example of the metabolic rift, Hudson, early in his book, draws on O’Connor’s second contradiction of capitalism thesis. Observing that the Forest Service used fear of an impending timber famine as justification for pursuing regulatory measures against private capital including fire suppression, he states:

From its inception, the Forest Service’s mandate was to stave off the possibility of “timber famine.” Its goal was to manage the problem of forest devastation caused by unrestrained industrial logging and the potential supply-side crisis that practice presented. The USFS’s fears with regard to the future of timber supplies in an unmanaged market mirror the hazards James O’Connor suggested in his “second contradiction of capitalism” thesis (p.77).

²⁵ I do agree with much of Hudson’s argument, but there are holes and inconsistencies that I hope to correct in my own examination.

Hudson dismisses the Forest Service's timber famine thesis and also O'Connor's argument that environmental crises present as economic crises through higher prices. But Hudson keeps returning to O'Connor grounds his contention in the inaccurate claim that Marx didn't develop a theory of ecology and, as such, is insufficient to explain capitalism's environmental impacts without outside theory. Moreover, O'Connor argues that new social movements such as the environmental movement are far superior to class-based socialist movements in transforming the economic system to meet the needs of society and ensure ecological sustainability. O'Connor developed a theory of ecological crisis predicated on supply side underproduction using Karl Polanyi's argument that capitalist markets eventually undermine the basis of production through the degradation of social and material (e.g. natural) relations. He argues

Marx believed that capitalist farming (for example) ruined soil quality. He also thought that bad harvests take the form of economic crisis. However (although he did state that a rational agriculture is incompatible with capitalism), he never considered the possibility that ecologically destructive methods of agriculture might raise the costs of the elements of capital, which, in turn, might threaten economic crisis of a particular type, namely, underproduction of capital. Put another way, Marx failed to put two and two together and argue that "natural barriers" may be capitalistically produced barriers, that is, a "second" capitalized nature (p. 160).

O'Connor's (1998) underproductionist theory of crisis posits that the system's internal tendency to produce a mass of cheap goods through increasing productivity on one hand and rising exploitation and misery on the other through low wages, brings on a crisis of falling profits and the threat of underconsumption which he calls the first contradiction. O'Connor argues that this state of affairs is "internal to the system and has nothing to do with the conditions of production (p. 1976)" (e.g. the natural world). The second contradiction is the scarcity and rising expense of natural resources as capital increasingly incorporates more of non-human nature into the production process thus undermining its own material base and sparking a crisis of underproduction forcing it to produce its own natural conditions.

When Hudson uses O'Connor's argument to discuss fire suppression without contrasting the second contradiction's dichotomization of the economy and nonhuman nature with the more accurate and dialectical analysis offered by Marx's universal social metabolism thesis, he runs into trouble. In the *Grundrisse*, Marx (1973, [1856-1857]) was unequivocal in stating that under capitalism nature is a free gift that requires constant inputs of labor to maintain value,

The purely natural material in which no human labour is objectified, to the extent that it is merely a material that exists independently of labour, has no *value*, since only objectified labour is value; as little value as is possessed by the common elements as such (p. 366).²⁶

As Foster (2018) puts it,

This contradictory character of capitalist commodity production, manifested in the opposition between use value and exchange value, places the narrow form of the capitalist value calculus at loggerheads with real wealth, which has its sources in both natural-material use values and concrete human labor (p. 126).

Hudson further signals that his position significantly departs from a dialectical analysis when he employs the post-humanist position by stating that

The current regime of wildland fire, no less than that associated with indigenous burning practices, is an element of "second nature," a "produced" nature inseparable from the social relations from which it emerged (p. 15).

He provides a wealth of evidence that indigenous burning "produced" Oregon's Willamette Valley and other landscapes. This is not in keeping with the theoretical project of second-stage ecosocialists who established that ecological considerations are foundational to Marx's analysis.²⁷ The observation that

²⁶ Marx's reference to value here is a critique against capitalist valuation that treats nature as not wealth apart from itself. The full passage of this comment recognizes that without the addition of exploited labor – labor separated from nature to produce surplus value – raw materials lose exchange value. The crude essence of capitalist material relations and illogical rationale is failure to understand the intrinsic wealth of nature and *devaluation* of its integral and life-giving processes to all of non-human nature and not just humans.

²⁷ Foster and Burkett (2016) describe first-stage ecosocialists, such as O'Connor, as those who argue that Marx had no ecological angle and attempt to link Marxism with Malthusian and Green theory. Additionally, other first-stage ecosocialists associated with radical geographers Smith (2008), Castree (2000), and Harvey (1996) subscribe to the "production of nature" which seeks to overthrow Marx's alleged advocacy for the domination of nature and replace it with a left constructionist argument that treats the capitalist transformation of nature as another form of nature as indistinguishable from human society.

Second-stage ecosocialists led by Foster (1999; 2000) and Burkett (1999) and later Saito (2017), sought a return to the classical work of Marx and Engels revealing Marx's ecological analysis and his theory of the metabolic rift. Third-stage ecosocialists such as Longo, Clausen, Clark (2015), Angus (2016), and Holleman (2018) have applied second-stage arguments to particular environmental problems.

indigenous people used cultural burning to significantly alter the landscapes of the West is well established and indisputable. The changed fire regime was both a nation-building endeavor and a capitalist one. Hudson's use of second nature situates his argument within social monism, which is a radical departure from the Marxist conception of the metabolic rift and, in fact, is completely opposed to it.

The Post-Humanist Marx?

The basic argument put forward by these post-humanist theorists is that capitalism remakes the natural world and so nature itself is a human creation. Both the production of nature thesis advanced by Marxian geographers Neil Smith (2008) and Noel Castree (2000) as well as David Harvey (1996) and the world-ecology approach put forward by sociologist Jason Moore (2015) charge Marx and Engels as well as those who promote metabolic rift thesis as Cartesian dualists. The environment is then a hybrid of nature and society. In both Moore's and the production of nature theorists' work, capitalism is centered as the overwhelming force of human against nature. The production of nature thesis posits there is a second nature that submerges the natural world (first nature) completely within wholly-human social relations, namely capitalism. According to Castree (2000), first nature is a product of pre – or “non-industrial modes of production (p. 6)” and second nature “is produced within, and as part of, an increasingly global capitalist system (p. 25).” Post-humanist theorists selectively cite and interpret pivotal works by Marx and Engels to argue that classical Marxist accounts promote the domination of nature and are part of a utilitarian and Promethean tradition rooted in Marx and Engels' texts (Napoletano et al. 2019). For instance, they cite a comment Marx (1975) made in *The German Ideology* to criticizing the philosopher Feuerbach's²⁸ abstract conception of an eternal nature, separate from human social relations and history in which reads,

²⁸ Marx borrowed some of his initial impressions of human essence from Feuerbach but came to realize that Feuerbach's conception of human nature was too abstract and did not account for the material practices, or the objective social relations, that shape human behavior. Marx was interested human liberation and the liberal idea that

the nature that preceded human history, is not by any means the nature in which Feuerbach lives, it is nature which today no longer exists anywhere (except perhaps on a few Australian coral islands of recent origin) and which, therefore, does not exist for Feuerbach either (p. 40).

Post-humanists misunderstand Marx's irony and dismissal of analyzing the nature-human connection from an idealistic perspective of conceiving of a pristine wilderness untouched by humans or teleologically asserting that nature is a human accomplishment. Instead of grasping Marx's argument, present throughout his and Engels' work that nature must be viewed with an eye to the reciprocal human metabolism with nature with recognition that capitalism is an alienating mediation, post-humanist invert what they see as Marx's and metabolic rift theorists' alleged binarism and assert that since much of the world, in some way, has been touched human, particularly capitalist, activity nature doesn't really exist at all. They argue that capitalism has internalized nature and the result is a hybrid.

Saito (2022) argues that this line of reasoning is potentially Promethean; I would argue that it does advocate Prometheanism, because its concept of nature is as a passive thing to be acted on, a thing that can be transcended and even created by humans. If there was ever an example of "Marxism" representing itself as anti-environmentalist and Promethean this is it. As opposed to second-stage ecosocialists who analyze environmental problems using classical Marxist analysis, production of nature first-stagers argue that classical Marxist analyses are pessimistic regarding natural limits.

This argument may seem trivial, but it has real life consequences when nature is conceived of as a thing that humans map their social processes onto, thereby making it "real." Castree (2014) and others emphasize "epistemic communities" whose plurality of beliefs about nonhuman nature and environmental problems are weighted equally. Castree (2014) includes climate denialists as an example of an epistemic community worthy of consideration and attributes their relative public success to the

changing our thinking instead of changing our social practices was a path to freedom was not enough for him. His aim was to uncover how and why there is human alienation; he argued that it wasn't as abstract as Feuerbach believed, but resided in real material processes between actual people and could be viewed through the lens of history.

recent failure of climate change scientists to adequately represent uncertainty and to acknowledge publicly, however critically, any evidence that appears to challenge the IPCC consensus. The use of the word ‘denialist’ to characterise many climate change sceptics is perhaps symptomatic of an over-confidence in recent IPCC communications about climate change (p. 258).

While Hudson does not mention Bruno Latour’s postmodernism, the Marxist monism of Smith, Castree, and, to a more limited extent Harvey, has moved increasingly toward his interpretations of science, humans, and non-human nature. In his pivotal work *We Have Never Been Human*, Latour (1993) ponders AIDS, deforestation, climate change, and ozone depletion and asks if they are human or human-created, then states that they are hybrids, natural and created. The hybrids, these monsters of human creation, prove modern humans have not freed ourselves from nature – instead it has folded back on us. In this reading wildfires are not natural events but hybrids of human-nature networks.

As Naomi Klein (2014) argues Latour’s monism has become “a rallying cry in certain green circles, particularly among those most determined to find climate solutions that adhere to market logic (p. 241).” As a Senior Fellow at the ecomodernist Breakthrough Institute, Latour penned a widely circulated essay urging us to love our monsters, that is creations like Terminator corn or geoengineering. He argues from a “postenvironmentalist” stance, against the precautionary principle, the doctrine of refraining from introducing technologies or other interventions whose impacts are environmentally unknown or suspect. Breakthrough founders enthused,

if nature is more than Yosemite -- if it is everything and thus nothing -- then how could mere scientific descriptions of it ever guide human behavior? It was this insight -- that science is an intrinsically value-laden and political enterprise, not a simple representation of reality -- that catapulted Latour to fame ... (Nordhaus and Shellenberger 2012).

Breakthrough has recently published an article on its website with the title “To Protect Forests, They Must be Logged and Burned,” largely in opposition to John Muir Project environmentalist Chad Hanson (Baker and Hanson, 2022; Baker et al., 2023) who has argued that forest thinning and controlled burns kill more trees than they save.

Hanson and his colleagues refute the now dominant claim among forest and fire ecologists that mixed and low-severity fires were historically characteristic of lowland ponderosa pine-dominated Western forests and reject the efficacy of Indigenous burning as a misrepresentation of historical fire regimes (Baker et al., 2023). They claim mechanical thinning and prescribed burning reduces canopy shade that keeps forests moist and temperatures lower thereby making them less likely to burn (Baker et al., 2022). Hanson credits a misinformed public and the capture of the scientific community by the logging industry to beliefs that prescribed burns and thinning are viable fire management tools. Hanson has become famous for suing the Forest Service to delay fuels management projects including the Trestle Project aimed at protecting Grizzly Flats, California which was devastated by the Caldor Fire.²⁹

While numerous fire scientists (Haugo et al., 2019; Hagmann et al., 2021; Prichard et al., 2021) have refuted Hanson's claims, the Breakthrough Institute's advocacy for logging and burning also distorts the science in the other direction making no reference to the type of logging and burning that would be done and by whom. Climate change has served to exacerbate the wildfire paradox, enabling capital to step into the breach between environmentalists and scientists. As Foster (2022) explains Latour's explicitly ant-Marxist and anti-dialectical approach, embodied also by Breakthrough

advances what is often called a "flat ontology" or neutral monism, in which all entities and objects are equal and intertwined and to be approached as assemblages, bundles, hybrids, or networks. Nevertheless, the extreme relationism of [this view] which denies both nature and society as substantive objects, gives rise in the end to a kind of social monism, where the social is smuggled back in or "reassembled" (e.g., through technology and politics), taking the form of a capitulation to the status quo (Foster, 2022, pp. 578-79, footnote 40).

Increasingly, it is the Finance, Insurance and Real Estate (FIRE) economy that has moved into various methods of fire management through carbon offsets and other forestry projects. Rural communities with large tracts of land but low employment rates such as Native American tribes pursue these projects with the help of consultants and academics who then assist with grant writing and other activities aimed at

²⁹ <https://www.kqed.org/news/11922513/stalled-u-s-forest-service-project-could-have-protected-california-town-from-caldor-fire-destruction>

securing contracts. What Hudson fails to recognize is that even without the kind of 20th century production that necessitated the war against fire, adaptations to wildfire can still be captured by capital through the FIRE economy.

No Royal Road: Marxist Science

Marx's starting point is acknowledgment of humanity's embeddedness in and social metabolic relations with nature as mediated by local and temporal conditions. He stated clearly in *The German Ideology* (1975 [1846]),

The first premise of all human history is, of course, the existence of living human individuals. Thus, the first fact to be established is the physical organization of these individuals and their consequent relation to the rest of nature. Of course, we cannot here go either into the actual physical nature of man, or into the natural conditions in which man finds himself—geological, hydrographical, climatic, and so on. The writing of history must always set out from these natural bases and their modification in the course of history through the action of men (p. 31).

Wildfire suppression has developed because of and in tandem with capitalist accumulation. There is no other human-created force that has wrought so many wide-ranging changes to Earth as the current economic system – capitalism. Thus, the only theoretical perspective that is applicable to this task is one grounded in the ecological understandings provided by Marx and Engels. Yet, rarely is there a sustained and historical critique of capitalist mediation of specific environmental issues outside of explicitly ecosocialist analyses of environmental problems.

Levins (1979, 1996) argues that bourgeois science legitimizes the current situation by making claims to objectivity and apolitical inquiry which, he argues, is anti-democratic. Bourgeois science completely dispenses with Engels's *Dialectics of Nature* by refusing to acknowledge Marxist analysis as a completely different way of looking at the world, reducing it to a form of humanistic liberalism whereby academic disagreements are simply differences of opinion and approach. However, applying a materialist analysis entails recognition that natural science is a product of numerous strands of scientific knowledge developed over time through dynamic historical processes. Applying historical materialism is not an easy

task. It requires extensive and critical research. In the preface to the French edition (1976[1872]) of *Capital, Volume I*, Marx's reply to an admirer who wanted a serialized version of the book, he observes,

The method of analysis which I have employed, and which had not previously been applied to economic subjects, makes the reading of the first chapters rather arduous.... That is a disadvantage I am powerless to overcome, unless it be by forewarning and forearming those readers who zealously seek the truth. There is no royal road to science, and only those who do not dread the fatiguing climb of its steep paths have a chance of gaining its luminous summits. (Marx, 1976[1872], p. 21)

Fire suppression got its start in the nation-building process of settler colonialism through indigenous dispossession which furthered environmental disruption with the introduction of the mercantilist settler mode of production. An uneven emphasis on fire suppression informed the transition to timber extraction and the development of American forestry and conservation initiating a period of lurching environmental and economic crises in the lead-up to the formation of monopolies in the early 20th century. This newly constituted monopoly capitalism significantly contributed to full fire suppression through Big Science, linking "the powers of science and labor" in order to "control man's relation to nature" while making "millions out of it (Mills, 1956, p. 98)." During this American Celebration research advancements in social and political thought, breakthroughs in modern technological and chemical processes and improvements communication have improved the mobility of ideas and people. However, all of this accumulated knowledge while significantly improving some aspects of human existence has also functioned within an economic system that attempts *but does not succeed* to punch through the material bases of Earth.

In *Talking about Trees*, Levins (2008), argues that "the science we defend must be critical, dialectical, and rooted in a historical perspective (p. 93)."³⁰ Engels's (1975[1877]) *Anti-Dühring*,

³⁰ Levins' chapter "Dharma of Science and Science of Dharma" is a reply to Meera Nanda's 2002 "Dharma and the Bomb: Postmodern Critiques of Science and the Rise of Reactionary Modernism in India." Nanda, whose main academic focus is the philosophy of science, is the author of *Prophets Facing Backwards* (2004) and the *The God Market* (2010) and other books and articles. She has particularly attacked the rejection of modern science by postmodernism and Hindutva mysticism, including that of anti-globalization activist Vandana Shiva. While her criticisms are pointed, her argument is worth considering. She has been warning for years about the assault on science by nationalist Hindus. India recently dropped the periodic table, Charles Darwin, and electromagnetism

observes that in our examinations of nature, the history of humankind or even in our own intellectual endeavors and interactions, we are confronted with a limitless universe of swirling, transitory connections, actions, reactions, and contingencies so constantly in motion that we really only see the whole picture as an apparition – we cannot grasp the individual elements even though we know they are there. While a description of the general character of the picture can be obtained, it is an inadequate explanation because we do not examine the details that compose the whole. In order to examine the details, they must be detached and analyzed separately, however, to engage in this sort of analysis, as the natural sciences have successfully done, is also an insufficient method because it has fostered a habit of analyzing processes in isolation and detached from the web of interconnections that form the whole picture therefore not apprehending them in repose not in their normal state of motion, “as constants, not as essentially variables, in their death, not in their life.” This dissertation centers Marx’s open-ended scientific inquiry (Foster, 2018b) and draws on many disciplines including environmental sociology, fire history and ecology, radical political economy, and political science.

Indigenous Science

In my third chapter that uses the Caldor Fire as an example, I focus specifically on the Miwok people whose material exchange, land caretaking, scientific knowledge, spiritual practice, and community values recognize humans as one of many living beings and fire as a sacred obligation. Marxist materialism acknowledges spiritual and cultural values in relation to nonhuman nature but argues that the type of social production, or metabolism, with nature is what determines culture, spirituality, and community values.

Leanne Simpson (2017), a Mississauga Nishnaabeg member states that her community along with other indigenous nations, recognizes nature as the basis of knowledge, politics, economics and education.

from school textbooks under the National Council of Educational Research and Training. See <https://www.scientificamerican.com/article/india-cuts-periodic-table-and-evolution-from-school-textbooks/>

Indigenous scholars (Whyte, 2018) describe an approach to nature that features an ethical agreement among community members to give/leave more than one takes. There is no such thing as natural resources only relationships and obligations, as indigenous communities interact with natural features, minerals, plants, insects, animals, other Native nations, ancestors, and the universe.

There is now widespread recognition that the fire practices of Indigenous people associated with pyrophilic landscapes and species could prevent the catastrophic and destructive spread of wildfires as well as ensure healthier, more resilient landscapes (Cagle, 2019; Pike, 2022; Martinez et al., 2023). Fire ecologists recognize the important role that human metabolic activity played in limiting the overabundance of fuel and limiting the spread of catastrophic fires. In addition to ecological aims, researchers have argued that the return of fire to western landscapes provides cultural benefits to people, specifically Native peoples whose relations to their lands and nonhuman inhabitants have been damaged by settler colonialism and continued capitalist extraction (Hankins, 2009; Long et al., 2016, 2017; Whitehair et al., 2018; Roos et al., 2016; Roos, 2021; Norgaard, 2019; Carter et al., 2021; Lake, 2021; Marks-Block et al., 2019, 2021; Vinyeta, 2021). Researchers have documented Almost without exception, research and public mention of Indigenous cultural burning includes at least some understanding that it occurred/occurs for purposes other than capitalist extraction and accumulation. Research by Indigenous scholars points to the spiritual obligations of Native communities to their nonnative relatives as one of the reasons for cultural burning. The use of fire is part of the primary relation of Native peoples to non-human nature that had a marked impact on the environment in specific contexts and is highly contested in others (Coughlan, 2015). Indigenous scholarship differs from that of materialist analysis by highlighting the spiritual and cultural dimensions of the environment (Coulthard 2014; Simpson 2017; LaDuke 1999; Whyte 2018).

This dissertation acknowledges Indigenous fire knowledge as a distinct and valuable natural science developed through thousands of years of observation, experimentation, and spiritual obligation (Lake 2021). Beesley (2004) notes that Native Sierrans moved seasonally across all life zones and developed a conscientious understanding of their surroundings “through observation, experimentation,

and classification. Learning what was useful, edible, and adaptable was the work of both women and men (p. 23).” Fire played/plays an integral role in this environmentally sustainable existence. A materialist reading of the human relation to nonhuman nature recognizes the inseparability of the people from the natural environment as a unity of conception, intention, action and material consequences. Although Native American land management and economic practices in fire-dependent areas of the U.S. West are diverse, they are united by an ethic of humility, respect, and kinship with non-human nature that fosters a thriving co-existence. Potawatomi ecologist Robin Wall Kimmerer (2001; 2017) describes the embodied knowledge and cultural practice that enabled Indigenous people and their relations to survive and thrive as a covenant of reciprocity. This dissertation recognizes that pact.

Nature is His Body: Marx’s Ecology

M. Kat Anderson (2005) argues, and I agree, that the “idea that nature has a capacity for renewal as long as humans allow it to occur is not foreign to either Western culture or modern science (p. 9). This work deals only with material and not spiritual matters related to science, but it does recognize the relationship of Indigenous science to ethics of care, responsibility, and sustainability. “Marx’s ecology” was foundational to his critique of the capitalist mode of production. His voluminous notes, which are still being translated through the Marx-Engels-Gesamtausgabe (MEGA-2) project, reveal that much of Marx’s detailed written material deals with environmental and agricultural science; they not only center non-human nature but show the evolution of Marx’s analytical thinking as one informed by an awareness of environmental limits (Saito, 2017).

This dissertation briefly examines and recognizes the scientific merit of the Indigenous use of fire for meadow enhancement and game forage. Materialists focus on the interdependent and independent relations of nonhuman species and humans while *simultaneously* recognizing how their practices influence human material relations and vice versa (York and Mancus, 2013; York and Longo, 2017). In

The Part Played by Labour in the Transition from Ape to Man, Engels (1975, [1876]) recognized this relation when he commented

Animals, as has already been pointed out, change the environment by their activities in the same way, even if not to the same extent, as man does, and these changes, as we have seen, in turn react upon and change those who made them. In nature nothing takes place in isolation. Everything affects and is affected by every other thing, and it is mostly because this manifold motion and interaction is forgotten that our natural scientists are prevented from gaining a clear insight into the simplest things (p. 459).

Implicit in a materialist analysis is the assumption that the animal-human relationships could, and most likely would, engender cultural and spiritual beliefs and practices in the associated human communities to the benefit of the game species as well. While Marx did not emphasize spiritual and cultural values, he recognized the material practices that informed those values. In *The Economic and Philosophic Manuscripts*, he argues,

Just as plants, animals, stones, air, light, etc., constitute theoretically a part of human consciousness, partly as objects of natural science, partly as objects of art—his spiritual inorganic nature, spiritual nourishment which he must first prepare to make palatable and digestible—so also in the realm of practice they constitute a part of human life and human activity. Physically man lives only on these products of nature, whether they appear in the form of food, heating, clothes, a dwelling, etc. The universality of man is in practice manifested precisely in the universality which makes all nature his *inorganic* body—both 'inasmuch as nature is (1) his direct means of life, and (2) the material, the object, and the instrument of his life-activity. Nature is man's *inorganic body*-nature, that is, in so far as it is not itself the human body. Man lives on nature—means that nature is his *body*, with which he must remain in continuous intercourse if he is not to die. That man's physical and spiritual life is linked to nature means simply that nature is linked to itself, for man is a part of nature (Marx, 1975 [1844], pp. 275-276 emphasis in original).

The Nature-Imposed Condition of Human Existence

Critics of Marxist materialism often apply common economic logic to Marxist categories and so fail to recognize Marx's distinction between the bourgeois (capitalist) value form of exchange values, abstract labor (the opposite of concrete labor), and value (which is understood as the embodied amount of labor in an item's production). According to Foster (2000) Marx began to formulate the concept of metabolism by following the research of German physiologists describing metabolic processes within the body involving

respiration but also Justus Liebig's soil research which described the biochemical processes within animals and later in soil.

By 1865, Marx understood human metabolism with nature as one of mediation limited by environmental constraints, or as Saito (2017) puts it "nature cannot be arbitrarily subordinated and manipulated through technological development. There are insurmountable natural limits (p. 160)."

Humans are part of and apart from nature. Materialism recognizes that all creatures must provide for their material needs.

In Chapter 3 of *Capital Volume 1*, Marx (1990, [1867]) reveals for the first time his concept of social metabolism or *Stoffwechsel*, the conscious relation of humans to their environment. Marx does not imbue this concept with any moral attachment; it is simply a description of humanity's necessary relation to the Earth:

It is the universal condition for the metabolic interaction [Stoffwechsel] between man and nature, the everlasting nature-imposed condition of human existence, and it is therefore independent of every form of that existence, or rather it is common to all forms of society in which human beings live (p. 290).

Marx understood social metabolism as the "process between man and nature, a process by which man through his own actions mediate, regulates and controls the metabolism between himself and nature (Marx 1990, [1867], p. 283)" to be the universal dialectic of human labor or *Stoffwechsel*

The labour process, as we have just presented it in its simple and abstract elements, is purposeful activity aimed at the production of use-values. It is an appropriation of what exists in nature for the requirements of man. It is the universal condition for the metabolic interaction [Stoffwechsel] between man and nature, the everlasting nature-imposed condition of human existence, and it is therefore independent of every form of that existence, or rather it is common to all forms of society in which human beings live (p. 290).

Marx believed this "specific regulatory process" was mediated and regulated by human labor. At this point in the analysis, Marx is only speaking of the universal human condition arising as the result of simple existence anywhere on Earth, not as a specific mode of production. Marx develops his critique of capital in a detailed examination of material processes over history.

Awakening the Slumbering Powers: Concrete Labor

Marx describes the human relation to one's body, the organization of the thought process and the movement of the limbs in the modification of nature for one's own sustenance as concrete labor. Marx (1990 [1967]) argued that humanity's metabolic relation entails the exercise of a particular, uniquely human form of metabolism – labor.

Labour is, first of all, a process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature. He confronts the materials of nature as a force of nature. He sets in motion the natural forces which belong to his own body, his arms, legs, head and hands, in order to appropriate the materials of nature in a form adapted to his own needs. Through this movement he acts upon external nature and changes it, and in this way he simultaneously changes his own nature. He develops the potentialities slumbering within nature, and subjects the play of its forces to his own sovereign power. ... We presuppose labour in a form in which it is an exclusively human characteristic. A spider conducts operations which resemble those of the weaver, and a bee would put many a human architect to shame by the construction of its honeycomb cells. But what distinguishes the worst architect from the best of bees is that the architect builds the cell in his mind before he constructs it in wax. At the end of every labour process, a result emerges which had already been conceived by the worker at the beginning, hence already existed ideally. Man not only effects a change of form in the materials of nature; he also realizes [verwirklicht] his own purpose in those materials. And this is a purpose he is conscious of, it determines the mode of his activity with the rigidity of a law, and he must subordinate his will to it. This subordination is no mere momentary act. Apart from the exertion of the working organs, a purposeful will is required for the entire duration of the work (pp. 283-284).

Marx's use of the word "sovereign" is not an example of his supposed anthropocentrism, for he acknowledges in the same paragraph that nonhumans share with humans a capacity for changing their material circumstances. Human labor is different from not better than the operations of our nonhuman relatives. As Heinrich (2021) observes,

as soon as the labor process develops somewhat, it requires *previously elaborated* instruments of labor. Many animal species *use* instruments of labor (for example apes crack open nuts with stones or use sticks to reach distant fruit). But *creating* instruments of labor, in an ever more widespread way, is specific to human beings (p. 336)

What distinguishes human labor from the functions of nonhuman relatives is that it involves long-term planning, or *anticipation*, the pursuit of specific and various courses of action, understood as *intention*,

contemplation of processes, results, and alternative actions, called *reflexivity* and all of these taken together Marx called *purposeful activity* (Heinrich, 2021, p. 335).

An example of this is the long-term planning and stewardship by fire in the cultivation of basketweaving materials by numerous Native Sierra Nevadan groups, including the Miwok, Nisenan, Yokut, (Anderson and Moratto, 1996), Karuk, and Yurok (Marks-Block et al., 2021) and many other groups. Basketmaking requires attentive cultivation of the land, intimate knowledge of plants, the use of fire to condition the land where the basketmaking materials are gathered and a period of time for the materials to cure before the weaving can commence.

The entire enterprise of this Native industry, with fire as a critical component of the process, requires a massive input of human labor from the carefully timed burn of the land to the finished product. This is what is meant by Marx's description of concrete labor which stated that use values are things which provide for the satisfaction of human needs either directly such as sipping water from a stream. It can be an indirect value as a material means for production, such as appropriating beargrass (*Xerophyllum tenax*) or hazelnut (*Corylus sp.*) used to weave baskets (Burkett, 1999). But these use values do not "dangle in mid-air (Marx, 1990, [1867], p.126); they are "conditioned by the physical properties" which nature endowed and are modified by human labor to make them usable. The purposeful activity of basketry is years in the making (for instance, willow cultivation can take 3 to 5 years) and requires planning, patience, and skill. Correspondingly, in recognition of this, Marx argued that the unique purposeful activity of human labor awakened in nature its slumbering powers and unlocked the potential to provide for useful material conditions on the land as well as products of value to human communities. In contrast to Marx's view that nonhuman nature is a source of inherent wealth apart from human intervention, conventional economics treats nature as a free gift to capital because it does not require any labor to produce, since ecological processes can require many human generations to produce a particular natural item and can entail processes beyond human control like rain or solar energy (Burkett, 2009; Foster, 2016).

The Metabolic Rift

Marx's concept of the human disruption of nonhuman nature, which Engels (1975 [1844] called "our one and all, the first condition of our existence (p. 429)" is now known in environmental sociology as the "metabolic rift (Foster, 1999a, 2000)" from which Marx derived his concept of alienation. Most sociologists can name the forms of alienation: estrangement from the process of production, estrangement from the activity of labor and from other beings, and ultimately estrangement from themselves. The metabolic rift is the concrete separation "between human production and its natural conditions (Foster 1999a, p. 370)." This concept was retrieved from *Capital* and extended by John Bellamy Foster (1999a, p. 2000).

The "metabolic rift" (Foster, 2000, p. 155) refers to the irreparable break between humans and the environment entailed by commodification. The interruption of *Stoffwechsel* degrades the natural environment. It necessarily displaces humans from the basis of their existence – the land – and also their labor. In the production of use values people confront nature and each other in material exchange, but in the capitalist transition from use to exchange values, labor becomes labor power, an abstraction of human labor that can be exchanged for money. This transformation from the production of use values to exchange values is accompanied by corresponding and, in many cases, forces them to sell their labor power which produces exchange values, or goods and services for the marketplace. Marx's understanding of the rift in social metabolism was informed by the work of soil scientist Justus von Liebig who was studying soil exhaustion due to increasingly industrial practices. In Marx's time industrial agriculture dislodged small proprietors causing them to become itinerant and robbing the soil of its vital natural properties

Small-scale landownership presupposes that the overwhelming majority of the population is agricultural and that isolated labour predominates over social; wealth and the development of reproduction, therefore, both in its material and its intellectual aspects, is ruled out under these circumstances, and with this also the conditions for a rational agriculture. On the other hand, large landed property reduces the agricultural population to an ever decreasing minimum and confronts it with an ever growing industrial population crammed together in large towns; in this way it produces conditions that provoke an irreparable rift in the interdependent process of social

metabolism, a metabolism prescribed by the natural laws of life itself. The result of this is a squandering of the vitality of the soil, which is' carried by trade far beyond the bounds of a single country (Marx, 1991 [1894], p. 949).

Marx recognized the natural laws of social metabolism and saw in this distance: minerals carried away from the soil, people displaced from rural farms to live in cities, and “... the material estrangement of human beings in capitalist society from the natural conditions of their existence (Foster 1999, p. 383).”

Historical Materialism

This is the ultimate basis of my method is the historical materialist approach. Regardless of the economic system, the Marxian approach to human-nature relations recognizes that it is one of perpetual and changing interdependence. A good sociological examination of the wildfire must feature subtlety, complexity, and heterogeneity while making general claims about the nature of wildfire suppression. A dialectical analysis of fire necessarily recognizes that it is a force of nature independent and beyond human control, but it is also a natural part of human existence which has been intelligently and creatively modified by human labor to advance our species, as evidence has shown (Scherjon et al., 2015; Hoffman et al., 2021; Roebroeks, 2021; Roos et al., 2021, 2022).

Dialectic analysis seeks to avoid a holistic and romanticized understanding of the humans-in-nature thesis known as monism or a positivistic standpoint that treats humans as entirely separate and superior to nonhuman nature. This is not because Marx and/or Marxists have no moral judgements against colonialism or disdain spiritual practices – something of which we are often accused. The focus of the Marx-Engels intellectual project is analyzing and critiquing capitalism and revealing how it deforms the human metabolic relation to nonhuman nature from which the system wrings every usable atom. The capitalist economy is devastating to people and the environment and Marxist analysis shines a laser beam on that aspect with the assumption that all social relations and ecological processes are affected.

Habitus or Hecatombs of Workers?

In 1979, Richard Levins made the contradictory declaration that “All science is class science, yet science also finds out real truths about the world.” And asked how one goes about solving this contradiction. He answers, you can’t.

You certainly cannot perform any verbal construct which will remove that contradiction because contradictions in life are not resolved by intellectual formulas. The resolution of the contradiction between science as the growth of human knowledge and science as ideology of oppression comes only with political revolution. The break from radical philosophy to Marxist dialectical materialism is the recognition that contradictions aren't resolved by intellectual exercise. Rather, you recognize those contradictions, examine them, understand them, fight them, participate in them (Levins 1979, p. 3).

Cultural analyses reveal that gender regimes (Desmond, 2006, 2007, 2010; Eriksen, 2016, 2019), racial identity among (Goodman, 2014) prison inmates (Goodman, 2012, 2010) are mobilized in different ways to bolster firefighters’ commitment to and identification with suppression, the organizational logic of firefighting agencies and normative gender performance. These studies observe, that in order to be effective, firefighters rely on certain typologies and mindsets to justify the mission and the fact that they are risking their physical and emotional health in seasonal work that pays a little above minimum wage or less in dangerous and sometimes deadly conditions. What is generally problematic about these ethnographies is researchers’ close identification with the participants, uncritical acceptance of participant perspectives, and/or a bureaucratic ethos that refuses to evaluate the structural and historical context in which they and their subjects are situated.

An example of this is Matthew Desmond’s (2006, 2007, 2010) part ethnography, part memoir, on wildland firefighters. Desmond applies Pierre Bourdieu’s cultural analysis to a USFS fire crew he worked with for four seasons while he was studying at Arizona State. The focal point of his inquiry is Bourdieu’s habitus, “the presence of social and organizational structures in individuals’ bodies in the form of durable and generative dispositions that guide their thoughts and behaviors (Desmond, 2007, p. 12)” which is a form of deep culturally-developed knowledge. Desmond (2007) argues that the goal of

the USFS is to fashion a specific wildland firefighting habitus from the “rural, masculine, and working-class (p.12)” country boy primary habitus that he and his fellow firefighters embody.

In common with many liberal sociological examinations and characteristic of Desmond’s work in general, *On the Fireline*, recognizes class, not as a dynamic historic relation to capital but as an identity possessing certain aesthetics, diction, knowledge, skills, and access to money. The book employs terminology particular to the job, features detailed descriptions of fighting fire, and concludes stating what is “dramatically perplexing is that most organizations have very little trouble motivating their workers to expose themselves to virulent hazards (p. 275)”

Desmond sets out to answer why it is that wildland firefighters choose the risky job. Why, he asks, would anyone leave a job they had in the winter and take up one that is low-wage, entails relocation to a remote encampment in the forest and dissolves the division between home and work life? He asks why firefighters ostensibly accept the USFS’s argument that they can stay safe and avoid dying on the job by following the Ten Standard Fire Orders and Eighteen Situations That Shout “Watch Out!” The Ten and Eighteen are rules that firefighters memorize and adhere as part of the command structure and safety procedures during an incident.

According to him what motivates male firefighters to accept the labor discipline of the fireline is a Bourdieusian habitus he calls “country boy” masculinity. This habitus barely needs molding by firefighter training, because it is informed by a familiarity with the woods that comes from rural working-class leisure activities like fishing and hunting. Apparently, these firefighters distinguish themselves from other men through country competence which makes them efficient workers capable of prosecuting the standard fire orders with unplanned coordination and ease.

Making Firefighters Deployable: Trucks and Dirty Dishes

Desmond argues that despite the obvious negatives of living far away from families and conveniences, the sacrifices are compensated by a sense of freedom and independence

Although they would enjoy a larger salary, they view the cubicle, computer, and necktie that accompany white-collar professions as too large a sacrifice. The desk represents the world of paperwork, sycophants, and middle-class managerial masculinity. The forest represents freedom, wilderness, and working-class masculinity. The rejection of indoor work, the denial of the desk, reinforces a major distinction in the minds of the men of Elk River. This distinction between “outdoor” and “indoor” people, between “the country” and “the city,” functions as their primary symbolic binary (Desmond, 2007, p. 29).

In contrast to city boys who are educated, drive small cars and are effeminate, Desmond’s country boys, which includes himself, drive mud-spattered, beat-up trucks and wear “faded Wranglers or Levis displaying a ring of chewing tobacco in the left back pocket (p. 35)” and possess living habits that include sinks full of dirty dishes and “empty beer cans and spittoons made of plastic water bottles (p. 68).” Desmond describes the hazing acts of intimidation and violence his subjects use to establish their own hierarchy based on their knowledge of country skills. This prowess endows them with a comfort around machines that enables them to take “to the rigors of firefighting *secundum naturam*,³¹ with nearly instinctive proficiency (p. 266)” by which they judge other men and conform or not to the work demands of firefighting.

Burawoy (2017) observes that “far from breaking with common sense” Desmond engages in hyperempiricism, abdicating any commitment to theoretical construction by faithfully reproducing the statements and observations of his participants and mimicking the experiences of the people he studies. A prudent observation on this topic comes from Freudenberg et al. (1998), in their study of declining of timber jobs in which they refute the claim by Matthew Carroll and colleagues (1995;1999) that the loss is attributable to the protection of the Spotted Owl. Freudenberg et al. warn against “the dangers of historical naiveté”³² stating

Social scientists have often learned, with good reason, to have high levels of respect for the insights and expertise of the citizens who live in areas we study, but as Thernstrom long ago pointed out, there is a significant difference between treating those views with respect and treating them as definitive – a distinction that proves to be particularly important when there is a need to understand historical antecedents of long-term trends. Affected local people are often

³¹ The term could read “in accordance with nature” or “second nature.”

³² A phrase coined by conservative sociologist Stephan Thernstrom who, with his sociologist partner Abigail Thernstrom, served as experts in favor of racial discrimination (Fields and Fields 2012). This is not an endorsement of their views.

highly knowledgeable not just about their own experiences, but also about the nature of the world they inhabit; at the same time, however, they may be no more likely to be infallible than are the social scientists who study them, whether in what they remember or what they forget. Where the existence of historical record makes it possible to double-check – whether on what is remembered or what is forgotten) the principle of prudence makes it imperative to do just that (Freudenberg, 1998, 19-20).

The fact is that burnover deaths were already steadily decreasing, when Desmond undertook his study, but he selectively used the data, because dying in a crummy crash, keeling over hauling rolls of 1 1/2” hose, or being crushed by a snag are just boring, ordinary job hazards.³³ Moreover, regular job hazards require us to look at the work itself and ask what we can do *before* fires start to protect nonnative nature, communities, and firefighters. Additionally, Desmond’s argument is reductive, because he focuses on the individual habitus as a marker of competence, he gives too much weight to what his participants say about their individual identities and views but doesn’t pursue the truly sociological reasons they give by checking them against the historical record, particularly that of labor. He acknowledges class issues for becoming a firefighter stating,

The reason individuals become firefighters cannot be found solely at Elk River itself, for it is also found in the economic bleakness of American Indian reservations, the land loss taking place in rural America, the inability of small-town communities to carry out economic development strategies in the face of global demands, and the rising costs of higher education. Firefighters’ admiration for their craft must be conceptualized as molded (in part) by a process of adapting to such socioeconomic structures (Desmond, 2007, p. 87).

Yet, even when his respondents’ statements and mannerisms invite him to ask more about their views, to “strange the familiar” through closer questioning, he does not. For instance, one fire lookout, a science teacher, named Clarence, mentions that a millionaire has acquired a large amount of land with the

³³ Some of the sociological reviews of Desmond’s work focus on what is called “edgework” which is self-actualization through dangerous or risky activities and criticize his disregard for the entire field even though he does mention it briefly. Desmond (2011) briefly refers to edgework in “Making Firefighters Deployable,” but argues that since Stephen Lyng (2004), who deploys Simmel’s argument that people find self-actualization through dangerous pursuits, was focused on leisure activities, Goffmanian analysis is a better fit. Goffman argues that undertaking dangerous work is part of the maintenance and acquisition rather than self-actualization of masculine character. Desmond spills a lot of ink on theory and not enough examining the actual dangers of firefighting. A large percentage of wildland firefighters sustain tripping/falling injuries but when they do die, it is from vehicle accidents and other mundane things. Desmond used documents with clear statistics showing an improvement in fatality rates by the time he was working. Regardless of his engagement with the field of risk behavior, his analysis really does not get to the heart of why people would put their lives on the line, as he argues they do, for so little money.

intent to develop it, adjacent to the forest Desmond's team patrols. The discussion among the firefighters and the lookout becomes animated as they review the imminent environmental destruction that the planned vacation cabins will wreak on the forest. Clarence is bothered by how this development will bring the "Buick crowd," the city people who differ from the country folks who "aren't afraid to eat beans out of a can (p. 32)." Despite all this and Clarence's stated wish to be "buried in an unmarked grave somewhere on public land, just like Edward Abbey," Desmond interprets Clarence's environmental concern and class analysis in this way:

Clarence is troubled not so much by the environmental damage caused by the new development or even the construction of made-to-order oversized cabins per se. He is worried not about the importing of nonnative trout to fill Hutchinson's fake lakes but about the importing of noncountry people to fill his luxury resort. What brings a flush to Clarence's cheeks and makes him grind his teeth is the thought that city people might overrun the forest (pp. 32-33).

Desmond defends his choice not to pursue the thread of Clarence's comments, or construct them theoretically, arguing that while it was his job to exoticize the domestic, his own working class, country-masculine habitus positioned him to intuitively understand Clarence's meaning without having to ask. There is no follow up on the resentment among the interlocutors and how they thought their jobs might change or what exactly they feared from the invasion such as possibly risking and losing their lives defending empty properties like the Granite Mountain Hotshots from Desmond's own state of Arizona did.³⁴

Desmond argues elsewhere in the book that "the Forest Service also differs from many high-risk organizations in that it is more or less insulated from production pressures (p. 346)." This is simply not true and Desmond cannot deny that a "production pressure" is limiting human and nonhuman deaths,

³⁴ The homes in the area of the Yarnell Fire had been evacuated before the shots were burned over. Andrew Ashcraft, 29; Robert Caldwell, 23; Travis Carter, 31; Dustin DeFord, 24; Christopher MacKenzie, 30; Eric Marsh, 43; Grant McKee, 21; Sean Misner, 26; Scott Norris, 28; Wade Parker, 22; John Percin, Jr., 24; Anthony Rose, 23; Jesse Steed, 36; Joe Thurston, 32; Travis Turbyfill, 27; William Warneke, 25; Clayton Whitted, 28; Kevin Woyjeck, 21; Garret Zuppinger, 27 and surviving member Brendan McDonough.

destruction to property, ecosystems, and timber values. Because of media hype and historical policies such as the 10 AM rule and current pressure to limit the acreage burned, we are now faced with a wildfire paradox that has led former firefighter and fire ecologist Crystal Kolden (2020) to argue that we must count destruction in qualitative rather than quantitative terms. She cites numerous historical examples of small fires that had high death tolls and argues that we need to prioritize ecological health to save firefighter lives. An example covered later in this dissertation is the Marshall Fire which was Colorado's most destructive fire at roughly 6,000 acres – far smaller than the “megafires” (Linley and Jolly, 2022) dominating the headlines.

Desmond does not mend the cracks in his own analysis when an offended crewmate who has likely listened patiently to a tedious explanation of Goffman's theory of dramaturgy asks Desmond if he really thinks his crew is ““full of blindness, half-truths, and illusions,” when it comes to denying risk and possible death. The participant attempts to reorient Desmond by arguing “I mean, they don't make that much money. The only way to make money is by the long hours and the overtime (p.299).” The respondent could well have quoted Marx (1976, [1867])

It is not enough that the conditions of labour are concentrated in a mass, in the shape of capital, at the one pole of society, while at the other are grouped masses of men, who have nothing to sell but their labour-power. Neither is it enough that they are compelled to sell it voluntarily. The advance of capitalist production develops a working class, which by *education, tradition, habit, looks upon the conditions of that mode of production as self-evident laws of Nature* (emphasis mine, p. 899).

Additionally, he argues that his participants identify with a particular style of life (country masculinity) and do not think of themselves in terms of class “in the orthodox Marxian sense (p. 36).” Desmond's response to the question of “half-truths” was just to choose another word, the Bourdieusian concept that signals conscious investment in the project of habitus – *illusio* – “an acceptance of and investment in the organizational common sense of the Forest Service, through which they approach danger as un-danger, risk as un-risk (Desmond, 2007, p.194).”

Desmond focuses on a discrete aspect of wildland fire, missing the larger picture of the cultural changes in the agency through neoliberal restructuring and the permanent state of un and

underemployment that took hold beginning in the 1970s (Foster et al., 2004). Desmond and his crewmates, as he notes in the last pages of his book, were mostly full-time college students. He only briefly mentions the work of USFS sociologist Jon Driessen, a Durkheimian, whose papers helpfully include explicit sociological reflections on work culture (1997), crew cohesion (2005), and entrapment situations (2002) and are more focused on group dynamics among agency employees, including how they perceive and negotiate risk. At the time Desmond was writing, Driessen was documenting the rapid shift to part-time “city kids (University of Montana 1996)” on fire crews, including college students like Desmond.³⁵ Driessen (1996) states that the loss of experienced fire leaders during the USFS’s long shift to part-time seasonal workers in the ‘80s and ‘90s which included women, people of color, and younger people with no fire experience like Desmond and myself.

While Desmond (2007) mentions the miserable yet better remunerated office jobs his subjects denigrate, he does not critically examine how even those jobs were already in decline or how the general extended decline in all employment affected his subjects except to say that they collected unemployment or did odd jobs (Jonna and Foster 2016). By the time Desmond was on the hill these developments simply expanded the working class, deadened the work life of office and service sector employees and did not result in a larger, more prosperous middle class (Braverman, 1974). As Schnaiberg (1980) argues,

Offices have become mechanized, and some tedium and even drudgery of the assembly lines has become extended to white-collar work, especially in the greatly expanded service industries such as finance and marketing. Expanded service occupations both within and outside of tertiary industry have all the dreariness and economic insecurity of the old working class (p.164).

Schnaiberg’s comments were written in 1980 but by the time Desmond was fighting fire, the insecurity was accentuated (Foster et al., 2004). The history of wildland firefighting has always included the surplus population and the only *illusio* that his participants had was recognizing their relative freedom from the dead-end jobs and the mind-numbing office work described by Braverman (1974).

³⁵ Half of Desmond’s crew were full-time college students.

Desmond does complicate the narrative of the cheerful robot (Mills, 1959) – an uncritical American society whose needs are met by every modern convenience – somewhat, but his argument is undermined by the elevation of the insecure, rural working class over the insecure, urban working class in a liberal inversion of the guns and Bibles caricature typical of political elites.³⁶ The refusal to dig underneath the rhetoric and grasp the possible material reasons for his subjects’ comments risks shallow categorization. Contrary to his dramatic opening that exaggerates the danger of firefighting, Desmond concludes that the Forest Service has done a good job protecting workers and calls for more research to further rationalize the wildfire environment, leaving the ecological and systemic reasons for catastrophic fires untouched.

The Doublethink of the Human Exemptionalist Paradigm

The “environmental” passages in Desmond’s 2007 book exhibit an uncritical and crude acceptance of his subjects’ destructive behaviors toward nonhuman nature. He details how his crewmates make a game of stoning a rattlesnake to death for being on a running trail. Another time they relocate a nest of baby barn owls in violation of federal protections and consigning them to certain death as a compromise to a Hopi crewmember’s desire to kill them, because they were “evil omens (Desmond, 2007, p. 127).”³⁷ He makes scattered references to the views of environmentalists vs. the USFS with

³⁶ In 2008, Barack Obama revealed his beliefs about the working class in deindustrialized towns saying, “They get bitter, they cling to guns or religion or antipathy to people who aren't like them or anti-immigrant sentiment or anti-trade sentiment as a way to explain their frustrations.” Hillary Clinton condemned these comments only to turn around in 2016 and call some of the same people, who supported Donald Trump an “irredeemable basket of deplorables.” In both cases, the uneducated working class lacking the proper liberal outlook and social graces demanded of them deserve their poverty and powerlessness. Desmond’s unreflective glorification of simple folks who “eat beans out of a can” is patronizing and his unwillingness to shed his country boy cred and ask probing questions renders his subjects cartoonish.

<https://www.theguardian.com/world/2008/apr/14/barackobama.uselections2008>

³⁷ In a footnote, Desmond reports that his Navajo and Hopi crewmates explained that snakes and owls were considered bad luck in their respective cultures, but he does not balance this with any reflections on how the wanton killing of animals, even at the behest of indigenous people, is problematic. Failure to problematize arguments made in or outside one’s cultural group is poor sociological practice, and in this case, the suspension of critical inquiry surrenders to the “ecological Indian” trope (Krech, 2005) as well as a lost opportunity to reflect on the cultural tensions and contradictions of the country boy habitus.

regard to prescribed burns and the Endangered Species Act (2006), but aside from this, the interplay of humans and nonhuman nature is one of human domination in the battle against fire.

Desmond's ethnography is an example of the unreflective bent in the larger discipline known as the human exemptionalist paradigm (Catton and Dunlap, 1978). Catton and Dunlap argued that sociologists had long viewed nature as controllable and/or inconsequential with regard to human society. In contrast to Desmond's (2008) later framing of the gap between rich and poor as partially responsible for the heroism that pushes "all those grunts who bear society's crosses (p. 58)" onto the fireline, former wildland firefighter and wildlife conservationist Emily, Shepherd (2021, 2022) points out that firefighting is not particularly dangerous and there is nothing at all heroic about ignoring climate change. Contradicting Desmond's understanding of what constitutes competence and safety, to aspiring wildland firefighters, Shepherd offers

Though you will adhere to your regimen with zealotry, you will sustain lingering injuries, both physical and emotional. In order to fit in with your crew, you must acquire a taste for rape jokes, because your crew will tell them. Some of the rape jokes will be confusing, but others will be crystal clear. They will be about using alcohol as a date-rape drug and penetrating people while they are unconscious. The men around you will use the word flippantly and with a smile. Rape. If one of these men brings a copy of George Orwell's *1984* to the fireline, you must not read it. To do so will force you to grapple with Orwell's concept of "doublethink," which means to think, to truly believe, two mutually exclusive premises at the same time. If you read your crewmate's copy of *1984*, you will realize you have already been employing doublethink to survive. You will notice disturbing similarities between yourself and the main character ... You will begin to admit your fears to yourself: assault, incineration, failure. You must not allow your fears to keep you awake at night as you lie directly under the stars. You must rest. And though you will sleep, as you learn more about the history of fire management, another fear will emerge in your dreams. The new fear will be existential, nebulous; you will only grasp its shape in the fleeting seconds before sleep. This will be the fear of a future without forests.

Shepherd's nightmare has a real basis. Climate change has accelerated and worsened wildfire events and researchers (Dahl et al., 2023) with the Union of Concerned Scientists have directly connected rising emissions from 88 companies to the burning of nearly 20 million acres of western forest, an area a little smaller than the state of South Carolina. Over the last 45 years significant wildfire increases in activity and severity have been linked to higher average air temperatures, increases in vapor pressure deficit (VPD

or the difference between how much air can hold and what it is actually holding), decreases in relative humidity, and decreasing fuel moisture content (FMC) or fuel drying (Varga et al., 2022; Higuera, 2023). Research by fire ecologists has revealed that between 1985 and 2017 there was an eight-fold increase in wildfire severity that, in some cases, has been so intense it can lead to stand-replacement, meaning the trees cannot reseed themselves naturally (Parks and Abatzoglou, 2020; Haggmann et al., 2021). Research has also shown that increasing average nighttime VPD poses a danger to firefighters, who typically take advantage of the cooler, moist period after sunset when fires are less active to strengthen containment lines and to rest. Environmental conditions that encourage active nighttime burning remove opportunities for rest periods and can force firefighters to overextend themselves in attempts at containment or having to physically retreat (Vargas et al., 2022).

The Value of Ethnography

Ethnographies can be valuable accounts of historical events. A notable one in environmental sociology is Longo's (2009) dissertation on Sicilian *tonnaroti* which captures not only the political economic and metabolic relations writ large with regard to Atlantic Bluefin Tuna (ABT) but also the visceral realities of the *tonnara*, the traditional ABT fishermen. What makes Longo's dissertation so notable is its commitment to a theoretical model that places community biography in social, environmental and historical context. Longo juxtaposes his subjects' accounts against the larger structure of global capitalist ABT fishing, testing the various historical changes to ABT fishing against the fish population with the decline and his respondents' ability to continue their traditional fishery. This integrated approach using the Marxist concept of the metabolic rift captures class dynamics, changes in production, and environmental damage. In Desmond's postmodernist account of the wildland firefighter habitus, climate change, and economic developments such as the expansion of housing whose effects raise the possibility of injuries, entrapment, and burnovers, do not even make an appearance (Withen, 2015). Nonhuman

nature is a screen upon which human social facts unfold denying “an independent existence to nature apart from thought (Foster, Clark, and York 2010, p. 34).”

Desmond concludes his book with a Durkheimian call for more order and a tacit acceptance of policing and militarization

In a world where maintaining order can be very dangerous, where order means policing the lawless, waging war against the threatening (or the vulnerable), or rescuing the helpless, professional risk takers are the *keepers of social order*. ... As sociologists, we must understand how this is possible. ... And we must do so if only because questions of risk illuminate questions of inequality, poverty, and power. As the world grows increasingly dangerous, we must never forget that it will be the poor and the working class who bear the heaviest loads. ... We must avoid the decontextualized fallacy practiced by earlier theorists of risk who ignored the class composition of high-risk organizations (emphasis mine, pp. 274-275).

As Desmond does in his later books, he indirectly references the social contract between the state and labor, a supposed agreement between equals whereby if a modicum of comfort can be worked out between the two parties, labor will consent to its exploitation. Moreover, he emphasizes that the solution to more wildfires, wars, inequality, poverty and increasing insecurity, is to study and make reforms, not do away with the system that caused the problems in the first place.

Project Flambeau: Militarization

In 1956, Mills wrote *The Power Elite*, one of sociology’s first and most brilliant indictments of the topmost U.S. decisionmakers. Using plain, direct language Mills revealed that the “interlocking directorate (p. 8)” was composed of corporate executives, politicians, and military leaders, who “occupy the strategic places in the structure of American society... command the dominant institutions of a dominant nation,” and “are in a position to make decisions with terrible consequences for the underlying populations of the world (pp. 286-287).”

There are no known sociological studies of the militarization of wildfire, possibly because it is assumed that fire suppression requires the type of organization and equipment used by the military, since it is *fighting* fire. Over the last century militarized fire suppression has developed in tandem with

extractive production and environmental conservation efforts. A large component of the wildfire paradox is the mechanization and chemicalization of fire suppression that developed during the so-called Golden Age of U.S. capitalism. Spanning from about 1945 to the 1970s monopolies in the chemical, aerospace, energy, and communications industries emerged from the boom years of the two world wars with a problem – how to maintain aggregate demand. During those years, demand for goods remained high, factory capacity and profits ballooned, and times were good for workers and labor unions. But peace, such as it was, meant that companies had large economic surpluses and diminished opportunities for expansion and investment. The metabolic rift has numerous environmental and social knock-on effects such as deforestation and further division of labor, but core to the capitalist economy's survival is constant internal growth and external expansion. These imperatives generate crises within the system that are external to nature but also play a large role in widening the metabolic rift and generating further rifts. In the wake of the world wars, U.S. policymakers within the Forest Service, who included some of Mills' directorate joined together with scientists from early aerospace, chemical and industries, the military, and other government agencies to study what they called "mass fire," which was shorthand for fires occurring from nuclear and incendiary attacks.

Environmental sociology and Marxist political economy offer bases from which to theorize the connection between the military and capital accumulation vis-à-vis wildfire. Since the end of World War II, militarization, even in peacetime, has served a vital economic function pushing forward technological progress, providing employment and increasing market demand. Leaving war aside, militarization is still the most ecologically destructive human activity because defense production is exempt from environmental standards (Gould, 2007). It is implicated in resource extraction (Downey, Bonds, and Clark, 2010), the production of environmentally destructive agents (Frey, 2013), the expropriation of freshwater (Alvarez, 2016) and to fight offshore drug production (Smith, Hooks, and Lengefeld, 2014) among other things.

One of the founding works in environmental sociology, Schnaiberg's (1980) *The Environment*, focused on how capitalism's rapid and irrational growth drives environmental decline in the form of

withdrawals and additions. The treadmill of production (TOP) draws on the Marxist theory of monopoly-capital to explain how the contradictory expansionist and stagnation crisis tendencies inherent in capital accumulation affect humans and nature. Schnaiberg describes a treadmill of workers and capital on a squirrel cage of production, profits, and wages with some (owners of capital and shareholders) more invested than others (workers who need jobs). The acceleration of the treadmill results in harmful additions or wastes such as water pollution and withdrawals such as deforestation and reduction of habitats. However, even with efficiency measures such as labor rationalization and technological advances, energy intensification and expansion of an increasingly insecure working class serve to stimulate not slow the pace of production. This system fundamentally driven by capital accumulation and the need to continue using up physical products in order to ensure continued profits (Foster 2005). Wildfire is an excellent outlet for destruction of produced goods and investment in new technologies and it lends its research and its workforce to increased U.S. militarization.

As part of the Great Acceleration, Cold War technologies enhanced suppression to include aircraft, chemicals and more efficient and enabled expansion of human settlement in historic fire corridors (Radeloff et al., 2018) the planting and conservation of even-aged commercially-valuable trees has resulted in overgrown forests in fire-dependent ecosystems which have lost ecological resilience subject to insect attacks and drought that now provide fuel for wildfires. These developments, in combination with climate change, have contributed to more devastating wildfires affecting forest ecosystems (Coop et al., 2020), contaminating water supplies (Proctor et al., 2020), and increasing human and non-human animal mortality from smoke and disease (Marlier, 2022; O'Dell et al., 2021; Zhou et al., 2021; Yang et al., 2021; Sanderfoot et al., 2021).

Wildfire suppression particularly lends itself to increased accumulation via the domestic use and development of war technologies because it is an opportunity for peacetime development of equipment and research that has support from the general population, as it is ostensibly about protecting communities and nature. During the Cold War years, the militarization of fire science provided a training ground for new techniques, absorbed surplus military equipment, and enabled a network of USFS administrators,

military heads, and corporate scientists to extend markets for these new goods. Coinciding with the promise of militarized suppression, real estate speculation and expansion into the WUI placed communities at increased risk. Much of the literature coming out of the social sciences allied with the planning field has taken on the flavor of Talcott Parsons in its emphasis on reform and clear messaging.

Principled Pluralism and Wildfire

Social scientists allied with policymakers and the field of planning who study wildfire and non-governmental organizations (NGOs) that advocate for survivors, firefighters, and communities affected by wildfire adopt a post-Parsonian approach stressing the need for change in the fire, recognizing inequalities and calling for a new social contract that levels the playing field but tacitly accepts the status quo. While Mills (1959) criticized Parsons as a grand theorist, the current situation has seen the merging of the concepts of voluntary action with liberal analysis he called, “liberal practicality,” which Foster (1990) explains employs

(a) the notion that the discourse of liberal democracy, if simply broadened and extended, provides the basis for a form of socialism; (b) the utilization of social contract metaphors outside of any realistic consideration of power relations; (c) the proliferation of timid blueprints for the rebuilding of America; (d) the insistence on attacking corporations rather than capitalism; (e) the reliance on nationalist thinking that downplays US capitalism's historic role as an imperial power; (f) the presentation of social struggle entirely in terms of a plurality of social movements; and (g) the calls to 'liberate theory' by decentering the concept of social class.

At their root, this framework eventually devolves into an explanation that reifies cultural and individual responses and does not significantly address historic inequality in any meaningful way. Many of these studies rely on an implicit acceptance of reflexive modernization and ecological modernization theory as the organizing frameworks of their analyses, particularly the concepts of structuration and ontological security put forward by Anthony Giddens. Wildfire research in this vein adopts the neutral language of policy and planning, acknowledging environmental risks diversity within and between communities and disorientation in the event of fires, but stressing the importance of communication and

cooperation among “stakeholders” situated in the highly contested wildland urban interface (WUI). Commonly, these studies assess the feasibility of voluntary action and community acceptance of fire preparedness and adaptation policies in order to ensure community resilience.

Many WUI areas affected by devastating fires have experienced a shift from natural resource extraction (timber, minerals, etc.) to amenity-based (natural beauty and outdoor recreation) settlement patterns (Collins, 2008; Carroll et al., 2005) in the last 20 years. But most studies on this dynamic of meso-level processes limit their focus to discrete interactions between/among communities. A cluster of wildfire research in this vein deals with topics such as social cohesion (Carroll et al., 2011), social characteristics, (Paveglio et al. 2012), community economics and landowner interests (Nielsen-Pincus et al. 2011; Johnson et al. 2023). Some studies even assess the ability of cash-strapped communities to capitalize on wildfire events through firefighting employment and associated services such as restaurants, hotels, and other service jobs (Nielsen-Pincus, et al. 2013). In general, the research assumes that proper organization of communication, technology, and incentives are key to fire resilience. Much of this research analyzes communities’ and individuals’ willingness to engage in risk reduction and attempts to discern social characteristics inherent in those individuals and communities.

While not always explicitly citing ecological modernization or risk theory, these analyses emphasize the cosmopolitization of environmental risk, acknowledging neoliberalism and the inequality of wildfire impacts but eventually collapse risk into an argument that all are eventually affected equally, and the market can provide the solutions. However, they studiously avoid recognizing capital accumulation as the primary driver of environmental problems, social inequality, or a non-solution to the problems. Employing this line of analysis, social scientists studying environmental problems assume “environmental rationality represents its own separate, disembodied cultural logic” which can be “grafted onto or melded with the present system (Foster, 2012, p. 219).” Thus, sustainable environmental management and even economic reforms can be made with an eye to greater efficiency, but no break with the dominant structures of capitalist production and consumption or its accumulation imperative (Foster, Clark, and York, 2010, p. 212).

Poverty is Hierarchic, Smoke is Democratic

A startling example of this occurred in 2020 amid the COVID-19 outbreak and massive wildfires in the western states (Safford et al., 2022) that drove fine particulate matter (PM 2.5) counts far above normal ranges, contributing to thousands of excess deaths from the virus (Zhou et al., 2021). On the radio show *Democracy Now!* my colleague Tim (Ingalsbee, 2020) stated that recent wildfires were climate change related. He noted the large gap between rich and poor people affected by the wildfires but stated that “just like the pandemic, wildfire makes no distinctions between rich and poor. ... we’ve suddenly realized we’re all in the fire zone, even those of us in the middle of the city.”

He praised incarcerated firefighters as brave and deserving of justice through expanded job opportunities but sidestepped any appraisal of the criminal justice system’s core function as a tool of repression against radical movements (Pellow, 2018), and as a site of private investment, capital accumulation, and labor discipline (Lewis, 2018; Jay, 2019). Moreover, while also acknowledging the neoliberal drawdown of public money available for wildfire protection, he stated we must break the “monopolization of fire management by government agencies” and that there was a “huge role that communities and citizens should play as partners with government agencies in preparing their homes for fire.”

While perhaps unintentional, the allusion to such programs as Firewise that place an emphasis on individual and community preparation of buildings to withstand wildfires, the emotional tenor and proposed solutions expressed by Ingalsbee are illustrative of the enduring power of ecological modernization and risk theory at work in assessments of wildfire risk. Research has shown that such programs do not work because mitigation and suppression resources favor high-value homes (Gude et al., 2013; Bayham et al., 2022; Anderson et al., 2023), they exacerbate and deepen inequality (Auer, 2021; Auer and Hexamer, 2022), and are a source of capital accumulation (Fu, 2012; Balaban and Fu, 2014).

I heard this while sitting safely in my home, in Eugene’s Whiteaker neighborhood where my dining room window affords a clear view of my houseless neighbors (Vargo et al., 2023) in Scobert Park,

who are often harassed and forced by police to vacate the park in search of other places to sleep. At the time my unhoused neighbors had nothing but thin nylon tent walls, if that, between themselves and the polluted air, since the city had not set up safe places for them to ride out the smoke. I thought about the rural poor sweltering in mobile home parks and on Native American reservations (Greenberg, 2021; Pierce, Gabbe, and Rosser, 2022). I thought about those toiling behind the “bougainvillea curtain,”³⁸ many of who are undocumented and/or Indigenous people, in the heat and smoke because their invisible status afforded them little protection or say in their working conditions and made them ineligible for health or disaster-related compensation (Méndez et al., 2020). I thought about the “heroes” in crowded fire camp mess tents and crummies coughing from exposure to the smoke and possibly spreading the COVID-19 virus to one another (Metz et al., 2022).³⁹

Ulrich Beck’s (1992) oft-quoted pronouncement, “*poverty is hierarchic, smog is democratic* (p. 36)” came to mind. Beck argues that universalization of risk brought on by capitalist productive relations hardens social antagonisms based on identities such as race, sexuality, gender, and nationality but supersedes class relations as individuals become overwhelmingly conscious of risks. Social scientists have established that there are disproportionate impacts and avenues of relief from natural disasters (Collins, 2009; Elliott and Howell, 2017; Howell and Elliott, 2019). In a radical departure from the Marxist understanding of classed material relations and capitalism as the prime suspects in the production of environmental risk, Beck (1992) argues that “we increasingly confront the phenomenon of a capitalism *without* classes, but with individualized social inequality and all the related social and political problems (p. 88)” so that attachment “to a ‘social class’ (in Max Weber’s sense) has nevertheless become weaker. It now has much less influence on their actions (p. 92).” Beck understands these other categories as risk classes. In particular reference to Beck, Heinrich (2012) states,

³⁸ According to Méndez (2020), undocumented migrants call the luxurious estates and farms where they work, the bougainvillea curtain, for the fast-growing and beautiful vine that often grows at the gates to preserve the privacy of wealthy farm and winery owners.

³⁹ On the 5-month long 2020 Cameron Peak Fire, the largest in Colorado history, epidemiologists identified 79 COVID-19 cases and 273 close contact quarantines among the 6,123 responders, including 1,260 firefighters.

When modern sociology— against Marx—claims to discover the end of class society within capitalism, then it usually cites as evidence the lack of class consciousness, on the basis of possibilities for upward mobility or the “individualization” of society. It therefore makes use of a criterion that Marx does not at all apply to the structural concept of class predominant in *Capital*. However, traditional Worldview Marxism often drew the conclusion of a common consciousness arising from a structurally common social position and tended toward assuming a common social agency. Thus, instead of conceiving “class rule” as a *structural relationship* between social classes, it was conceived as an *intentional relationship*, where one class imposes its will upon another class. The sheer existence of this class relationship—owners of money and means of production on the one hand, propertyless but legally free workers on the other—is in no way “natural,” but the result of a historical development (pp. 91-93).

The reliance on voluntaristic rather than organized and just responses to wildfire simply means that inequalities are inevitably deepened as some property owners, including timber companies and utilities, are able to insure themselves against risk or even bet on that risk as we are now seeing with carbon markets. As Naomi Klein (2007) has pointed out, large catastrophes damage or clear the landscape of less-valuable buildings and other infrastructure opening avenues for “orchestrated raids on the public sphere (p. 6)” and original market opportunities. Klein (2014) observes that anti-environmentalist think tanks like the Breakthrough Institute and large corporations are constantly advising a middle path that includes technocratic solutions backed by large financial interests. This is certainly the case with regard to climate change and wildfires in which the insurance and reinsurance companies, the real estate industry, and the banking sector, (known as the FIRE economy) are able to marshal the resources for re/building, speculation, and trading. When combined with environmental factors such as global climate change and local wildfires, the financialization of nature has become a growing site of capital accumulation.

Capitalizing on Catastrophe: Financialization

Wildfire is a dramatic example of the separation of humans from direct relation to nonhuman nature using fire. And as the approach to fire shifts from suppression to management, as Shepherd mentions, the severity of wildfires threatens to eliminate forests. Destructive wildfires have galvanized the public and

the scientific community in calling for different policies, but have unfortunately also become a justification for financialization of natural processes in the name of conservation and climate change mitigation (Foster, 2022). Marxist environmental sociologists argue that ecological analysis formed the natural-material basis of Marx's critique of political economy. Marx attended the scientific research and debates of his time to arrive at his concept of the "universal metabolism of nature (Foster and Clark, 2016)" which holds that humans are embedded in nature and in continuous interchange with it as we incorporate it into our bodies and modify it the physical and spiritual act of appropriating sustenance for ourselves. In Marx's conception, the interaction of humanity with nature through labor and the production process constitutes "social metabolism." In order for capitalist accumulation to occur, the spread of private property must produce "conditions that provoke an irreparable rift in the interdependent process of social metabolism, a metabolism pre scribed by the natural laws of life itself (Marx, 1991 [1894]: 949)." Along with Marx, ecosocialist sociologists argue that it is not the *unity* of humans and nature that needs explaining but the *separation* of humans from existence and this active existence. Capitalism must maintain this state of separation to maintain profitable and gain access to a labor force to generate surplus value. In other words, individuals or communities cannot be self-sufficient within a developed capitalist system. This is the case, because mature capitalism displaces or solves ecological problems by shifting them to different geographically as well as qualitatively by changing production methods. This rift-shift dynamic simply produces more rifts. Climate change is a worldwide example of an accumulation of numerous rifts (Clark and York, 2008).

Stratigraphers researching climate change have proposed naming the current geochronologic epoch (hundreds of thousands to tens of millions of years) the Anthropocene to reflect the geomorphological and atmospheric deposition of carbon dioxide, radionuclides, microplastics, and forever chemicals by human activity. Natural scientists have pointed to the rebuilding of cities and economies in the aftermath of the second World War, and the detonation of the first nuclear bombs as a Great Acceleration during which Earth's natural systems began to come under tremendous stress and began declining (Soriano, 2018; Steffen et. al., 2015a; Ellis, 2015; Steffen et al., 2015b; Steffen et. al.,

2007). Volcanologist Carles Soriano (2020) and sociologists John Bellamy Foster and Brett Clark (2022) have separately argued that capitalist reproduction occurring in the Anthropocene is so pervasive and international that “the metabolic rift has globalised and now affects most aspects of the social metabolism between humans and nature (Soriano, 2018, p. 210).” They argue that this dynamic is an important descriptor for the current geochronologic age (~ lasting a few thousand to millions of years) which they propose as the “Capitalian (Soriano)” or “Capitalinian (Foster and Clark).”

Natural scientists and fire ecologists are rightly cautious about predicting the effects of climate change. Generally, we are told that we can expect variability outside historic norms. The financial is not so reticent. Wildfires have joined war as way for the financial sector to invest, protect, and accumulate more profits. Naomi Klein (2007) has called this souped-up accumulation disaster capitalism whereby the very corporations that have precipitated climate change through their activities profit by it.

Profiting Without Producing

Environmental sociological analyses rarely mention financialization, instead favoring shorthand general terms like neoliberalism or globalization that implicate the financial sector along with other components of the economy but often lack a systematic analysis of capitalism as the cause of environmental degradation. Such analyses offer only partial explanations because the genesis of financialization as capitalism’s response to economic stagnation is rarely highlighted. By contrast, Marxist sociologists recognize the class struggle at the heart of historic changes in capitalism produces contradictory social and environmental outcomes (Foster, 1993; Magdoff and Foster, 2011; Holleman, 2018). Marxist social theorists have shown that Marx’s goal in formulating his critique of capital was to reach beyond crude mechanistic and reductionist views of humans in the natural world or the natural world as a human creation. Instead his dialectical approach accepts the general transhistorical unity of humans and nature but argues that modern capitalist society is a “... *historical* deformation of the relationship between humans and nature ... (Saito, 2017, p. 258).”

Despite the fact that modern production and the frenzied pace of financialization bear little resemblance to Marx's nineteenth century, the Marxist definition of financialization remains the most effective analytical framework by virtue of the fact that it satisfies three important criteria. First, a focus on the accumulation process highlights the necessity of financialization to increase profits in response to the economic stagnation of production. Second, recognizing finance as a response to economic crises and stagnation situates capitalist accumulation within a historically specific timeframe of the last four decades while still illuminating the linkages to past developments in modern productive capitalism. Third, this strain of analysis recognizes the transformation of monopoly capital to global monopoly-finance capitalism. As Magdoff and Sweezy (2009) argue

“... there is certainly no excuse for continuing to ignore this role of finance after the fantastic explosion of the financial sector which characterized the 1960s and 1970s. If a capitalist economy worked in the manner assumed by the textbook models, there would be no reason for the development of a distinct financial sector. All incomes would be paid out by productive enterprises in the form of wages, salaries, dividends, interest, and rent; and all incomes would be spent on consumer goods or on means of production serving to expand the productive base of the economy. Savings would be directly invested in or loaned at interest to productive enterprises, and credit would be limited to modest role of facilitating commercial transactions and economizing on the need for cash. With the coming of corporation all this gradually changed. The original purpose of the corporate form was to allow a number of investors to go into an enterprise together without each of them running the risk of losing his or her entire fortune. The matter is often presented as though this is really only an extended partnership with each participant actually owning a piece of the productive assets in question. But this is not so. The corporation itself owns the real assets, and the participants own only shares in the corporation – pieces of paper embodying specified legal rights (to vote for directors, receive dividends when declared, acquire a pro rata share of assets in case the corporation is liquidated, etc). The difference between owning real assets and owning a bundle of legal rights may at first sight seem unimportant, but this is emphatically not the case. It is in fact the root of the division of the economy into productive and financial sectors. (p. 101).

Marx (1993 [1894]) argued that the real impetus behind capitalism was not the production of goods, the well-being of society, or environmental sustainability rather it was the accumulation of profits – making money for money's sake

The *true barrier* to capitalist production is *capital itself*. It is that capital and its self-valorization appear as the starting and finishing point, as the motive and purpose of production; production is production only for *capital*, and not the reverse, i.e. the means of production are not simply means for a steadily expanding pattern of life for the *society* of the producers. The barriers within which the maintenance and valorization of the capital-value has

necessarily to move - and this in turn depends on the dispossession and impoverishment of the great mass of the producers - therefore come constantly into contradiction with the methods of production that capital must apply to its purpose and which set its course towards an unlimited expansion of production, to production as an end in itself, to an unrestricted development of the social productive powers of labour (p. 358).”

Marxist economist Paul Sweezy (1970, 1981) added important interventions to Marx’s description of capitalism’s laws of motion. Sweezy reminds us that *Capital Volume 3* describes capital accumulation as a system of self-expansion that continually attempts to transcend the production process and skip straight to profit – its sole purpose. Through the cheapening of goods, the squeezing of labor, massive scale of production, and the knocking off of competitors, by the latter half of the 20th century, the typical firm governing the capital accumulation process was the giant, monopolistic/oligopolistic, multinational corporation.

A good working definition comes from political sociologist Greta Krippner (2005) who states that financialization is an accumulation-centered process “in which profit making occurs increasingly through financial channels rather than through trade and commodity production (p. 174).” According to Lapavitsas (2011, 2013) who described financialization as profit without production, this late 20th century phase of capitalism replaced an earlier era dominated by giant monopolies quickened by capital accumulation and concentration. Lapavitsas (2013) credits scholars associated with the journal *Monthly Review* (Baran and Sweezy, Braverman, Foster, Magdoff, and McChesney) for charting a “innovative path by claiming that financialization reflects an epochal shift in the balance between the spheres of production and circulation, in favour of the latter (Lapavitsas, 2013, p. 795).”

According to Baran and Sweezy (1966), monopoly-capital avoided direct competition in favor of profit maximization through price-setting, large volume production, creating multiple product lines, and internationalization of operations. Additionally, corporate giants increased labor rationalization through scientific-technological innovation, task simplification and monopolization of production knowledge (Braverman, 1974). The tremendous centralization and concentration of accumulated capital, products, and profits leads to crisis periods of slow effective demand that have only three possible resolutions:

consumption, waste, and investment. Military spending, advertising, and financial expansion help break the stagnation impasse (Baran and Sweezy, 1966; Braverman, 1974; Foster, 2018).

Environmental Profiteering

The long-run problem of surplus capital disposal sharpens the contradiction between capital and environmental sustainability by “increasing corporate reliance on debt (especially short term) for financing production expansion (Schnaiberg, 1980, p. 224)” and inducing high consumer debt in order to ensure the reliability of the workforce. The state plays a key function in the accumulation process by eliminating restrictions on capital mobility, military spending, deregulation, austerity and anti-labor measures (Burkett, 2017; Foster and McChesney, 2012). Since the 1970s there has been an increasing move on the part of large non-financial monopolies towards increasing financial activities such as lending and speculative finance as outlets for surplus signaling a new face of monopoly capitalism known as monopoly-finance capitalism. Marx (1993 [1894]) argued that the purpose of the capitalist mode of production is not to make things but to make profits such that “the production process appears simply as an unavoidable middle term, a necessary evil for the purpose of money-making (p. 137).” Moreover, as wildfires kill more people and destroy more property, the financial sector has become more deeply involved in calling for carbon reductions and arguing for better risk management, improved mapping, and disaster-proof building. The process has not replaced war as a supplement to suppression economics and technologies but represents the speculative aspect whereby the climate change and wildfire risk are folded into the overarching and brutal mission of the FIRE economy to monetize the planet in the name of climate change mitigation and adaptation.

Companies specializing in the commodification of the environment acknowledge the limitations of human-produced goods, services, and assets. They even acknowledge the damage capitalism has done to the environment. But they argue that the great rift capital has opened up between humans and our collective environment can be repaired by financializing it. These strategies are so unjust, so

irresponsible, and so environmentally-damaging that no measures are better the ones proposed by the giant corporations and the startups, NGOs and local elites they fund.

The climate change crisis fix of carbon offsets reveals the deep and growing contradictions of capitalism. Carbon offsets continue the privatization of land either directly or under management for capital. In the western U.S., climate change is strongly linked to increased warming and drying patterns of fuel related to increased fire frequency and size, longer fire seasons, the erosion of the high elevation barrier, more frequent fall-season wildfires, and increased emissions (Abatzoglou and Williams, 2016; Alizadeh et al., 2021; Westerling et al., 2006; Williams et al., 2019; Wilmot et al., 2022). Carbon offsets, use financial instruments to incentivize forest owners to manage their land in ways that enhance CO₂ absorption and storage while limiting the danger of wildfires.

Environmental sociologists rarely engage with examinations of insurance from the standpoint of the market. Insurance is an important component of modern societies aimed at cushioning consumers and businesses from losses, however increasing financialization has ratcheted up the exploitation of people and nature. The aim of the insurance industry is to make money through bundling multiple risks and gambling for the long term that events will not wipe out the pool of money. People are exploited through increasing insurance premiums, higher utility rates, and denial of insurance altogether. In the face of the growing climate-related disasters of the Anthropocene and given their own irresponsible corporate behavior companies PG&E look to insurance and other novel products to protect them against the risk of liability. These corporations are transferring risks covered by their policies to investors through the issuance of catastrophe bonds or simply cat bonds. Cat bonds are insurance-linked securities (ILS) that protect insurers against losses that even reinsurers, corporations that insure insurance companies, might not be able to cover. The ILS market “extracts value from non-existing future events, uncertainties, natural catastrophes and the biosphere (Lehtonen, 2017, p. 47).”

Where the ILS market extracts value from events, the real estate industry leverages the damage from environmental and natural disasters to remake the landscape in order to serve capital’s needs not human needs for home. The loss of homes augments the role of rent-seeking with regard to placing more

expensive or even market-value houses and other infrastructure on bare spaces cleared by wildfire. The speculative nature of the real estate industry and the lack of constraints to private acquisition of land in the WUI generates its own set of rifts by continuing and extending infrastructure into pyrophilic environments (Gude et al., 2014; Bayham et al., 2022; Anderson et al., 2023). In conjunction with financialization, neoliberalism – the retrenchment of government services and regulation and shift toward private provision of services in the recovery efforts in the wake of wildfires, leaving behind the already-invisible populations. Tragically, the people most affected by these developments are people in insecure housing such as homeless people, renters, elders, and other people who are considered as non-contributors to the economy they exacerbate and deepen inequality (Auer, 2021; Auer and Hexamer, 2022). This dissertation analyzes these ecological and social processes associated with wildfire in the western U.S. and argues that wildfire management originated as a mechanism of capitalist accumulation and has helped to increase the likelihood of wildfires placing firefighters and communities at risk.

CHAPTER III

FROM RELATION TO MASTER

Fires are a part of Earth's biophysical that can, but don't always, pose threats to human and nonhuman communities, but fires originating in the grasslands and forests have gradually come to be seen as disasters through the lens of the capitalist mode of production. The large fires we are seeing today and the program of fire suppression deployed to attempt their containment, owe their existence to human alienation from nature as the result of capital accumulation. A little over 20 years ago before the term megafire (Linley, et al., 2021) entered the fire management lexicon, ecologists revealed the wildfire paradox. They noted that disruption of indigenous fire as a land management, long-term suppression and conservation efforts aimed at protecting natural resources and biodiversity had "altered vegetation and fuels, increased risk of severe fires and reduced resource values (Arno and Brown, 1991, p. 40)." While the wildfire paradox is used to describe an ecological problem, capitalist accumulation lies at its heart. This chapter uses the 2021 the Caldor fire in California as a point of departure to examine the legacy of fire exclusion. The reason for this choice is that fire exclusion in the U.S. West developed faster and more comprehensively in California than anywhere else as a consequence of the Gold Rush and the timber industry.

Scholars who apply a settler colonial studies framework hold that fire exclusion is aimed at elimination of Native presence and practices on the land (Wolfe, 2006). According to Norgaard (2019), the settler colonial

formulations of power taking place through these processes cannot be wholly conceptualized within the framework of race. And although capitalism has emerged in the context of colonialism, the dynamics experienced by Indigenous communities cannot be subsumed by either capitalism or even racial capitalism (p. 73).

Additionally, Vinyeta (2021) contends that racist logics and discourse are extended through fire science to support fire suppression through the U.S. Forest Service. According to these scholars, these dynamics and processes cannot be fully explained from a Marxist perspective. Many scholars of indigenous and settler colonial studies as well as some Native fire ecologists attribute fire exclusion to settler colonialism. Marks-Block and Tripp (2021) state that settler colonialism

is a political structure that, through occupation and genocide, has attempted to erase, dispossess, and disenfranchise Indigenous peoples in California of their land, culture, and political autonomy. This framework, alongside an examination of Tribal sovereignty, has been applied by American Indian scholars to analyze environmental and Indigenous governance throughout North America. Settler colonialism is inseparable from the capitalist project to maximize individual and corporate profits through the commodification and exploitation of land and human labor. Furthermore, settler colonialism is justified through white supremacist ideology, as European colonialism racializes Indigenous peoples as inferior subjects. The denigration and subjugation of Indigenous peoples and their cultural practices parallels efforts to dominate and control other species, and fire, by colonial scientists and foresters, to increase profits and state hegemony. Therefore, settler colonialism undergirds fire suppression policies worldwide, and American cultural symbols, like Smokey Bear, reinforce a general fear and phobia toward fire amongst public agency staff and the general public (p. 2).

In contrast to these theorists, I argue that settler colonial development and the advent of Indigenous fire exclusion followed by paramilitary fire suppression is in line with the concept of war capitalism (Beckert, 2014). While scholars using a SCS framework emphasize the political, and especially the racial, aspect of dispossession, Sven Beckert's war capitalism focuses primarily on the way that violence safeguards industrial capitalist development and accumulation accompanied by racism as a powerful supporting ideology. Thus, I argue that fire exclusion was a key component of capitalist nation-building and territorial expansion and extraction.

The intentional use of fire as a land management tool preceded the founding of the United States by thousands of years. Originally, fire set by Native Californians enhanced intrinsic environmental values and promoted nutrient cycling for plant uptake and eliminated conifer seedlings and brush which increased water absorption in the soil and reduced high-severity fire risk. That is not to say that fires never got out of control or spread and as Additionally, cultural burning encouraged the growth of plant resources as associated with indigenous food and technology, eliminated pests, provided paths and clear

sightlines and delineated land access (Anderson and Moratto 1996). Yet fires timed by settlers to encourage the growth of forage for cows and sheep while eliminating the indigenous plants that Native communities depended upon were not seen as disasters at all but simply a tool in the production of exchange values for the mercantile economy. Fires that fed on hillsides full of slash created by logging and mining came to be seen as disasters when they threatened towns and raw materials for the production of marketable commodities.

The shift from Indigenous lifeways that incorporated fire to settler colonial mercantilism which used fire for agriculture and ranching, and finally monopoly capitalism which focused on complete fire exclusion physically changed the landscape and contributed to large fires in the 1900s. While economic relations today are different than they were a century and a half ago and the destructive legacy of fire suppression has finally come under widespread scrutiny, many of the changes made during capitalism's Golden Age which began with large scale mechanized extraction and consolidation of energy and water delivery are still inscribed on the landscape.

Marx recognized the natural economies premised on natural-material use values (real material wealth) rather than exchange values (the abstract value form). Native people used and, still to a more limited extent, use fire to enhance plant growth, eliminate pests, provide forage for animals, and numerous other non-commodified and materially and spiritually important purposes. From the standpoint of scholars who study indigenous people, this cultural burning is an expression of obligation, reciprocity, and social vitality. From the perspective of second-stage ecosocialists cultural burns are a form of concrete labor, or the natural appropriation of nonhuman nature by humans. Marx explained that nature is the source of all wealth and human appropriation from nature was a natural form of labor in nonaccumulative or non-capitalist societies. Marx observed that expropriation, or the taking of land, and the dissolution of non-accumulative and non-privatized production of the prior owners is a precondition to capitalist accumulation. In ecosocialist terms this removal of people from their land – the dissolution of their rational and sustainable interaction between themselves and non-human nature is an inherent

condition of capitalist production called the metabolic rift. This rift is the starting point for the historic fuel accumulation of the wildfire paradox.

The Caldor Fire

The Caldor Fire started 7pm on Saturday August 14th initially as a slow 40 acre burn about 5 miles from isolated Gold Rush-era town of Grizzly Flats, California. In the ensuing fight against the fire, the Shingle Springs Band of the Miwok Indians Fire Department became a “resource” in their own territory. A century and a half prior, the accumulated Native fire knowledge of the Miwok and other Indigenous groups, shaped the fire-adapted pine forests and oak savannas of the northern Sierra Nevada. In the area of California known as the Mother Lode, a non-capitalist indigenous mode of production that included routine burning lessened the likelihood of catastrophic wildfires like the Caldor Fire by eliminating excessive fuel.

In the Sierra Nevada, U.S. capitalism grew significantly through territorial expansion into and theft of Native lands. The early settler economy or what Beckert has called “war capitalism” thrived on subsistence and small-time grazing, agriculture and extraction of minerals and wood provided the first impetus for Indigenous fire exclusion. The Gold Rush, supported by the timber industry, enabled massive expansion of ranching and agriculture further displacing, and the end of the Civil War. The construction of the transcontinental railroad enriched timber companies and pushed urban development contributing to increasing fire spread and damage prompting calls for fire suppression.

The 2021 fire season began during an unprecedented heatwave and historic drought that included the 460,000-acre Dixie Fire, California’s largest in history, which was started by Pacific Gas & Electric lines and was the first to cross the high-altitude Sierra Mountains. As the Dixie raged and thousands of firefighters battled numerous conflagrations across the West, *The Guardian* argued in favor of Indigenous

cultural burning. The Northern Sierra Miwok⁴⁰ and Nisenan people primarily frequented the area and established winter villages at the lower-elevation western slope of the Sierra Nevada mountains. These Native Californian groups traditionally used fire to manage the areas around the Sierra Nevada as travel and commercial corridors to access acorns, basket material, pine nuts, fish, deer and other cultural resources.

The Guardian observed that despite long-established scientific evidence of the efficacy of Indigenous fire knowledge and practices that had shaped the landscapes of the West and historically lessened catastrophic wildfires, there was not enough government support for cultural burns (Singh, 2021). Two days after the *Guardian*'s article the Caldor Fire second-ever fire to cross the Sierra began as numerous fire emergencies put the United States Forest Service on a triage footing.

Within 24 hours of its ignition Caldor exhibited unusual fire behavior and its volatility combined with the steep terrain in which was burning prevented hand-crews from engaging with the head of the fire to stop its progress (Cal Fire, 2021). The fire grew to 6,500 acres by Monday evening, moving northeasterly toward Grizzly Flat and threatening 800 structures. As people attempted to flee and protect their homes, 2 civilians were airlifted from the area to area hospitals with serious injuries. The following day California Governor Gavin Newsom declared a state of emergency as the fire increased again to 23,000 acres helped along by strong winds and steep topography, burning through Grizzly Flat. Aided by large amounts of dry vegetation and steep drainages, Caldor had expanded so rapidly, to roughly 54,000 acres, that fire officials briefing the public and press could not map the fire in real time.

The alarming rate of spread prompted evacuation orders in several small towns as the Caldor moved northeast feeding on drought-stressed trees with active crowning and spot fires igniting half a mile from the flame front as it approached within 6 miles of the million-dollar homes of the popular ski and tourist town of South Lake Tahoe. Thousands of residents jammed the roads leaving the area, as firefighting resources poured in, including more than 30 helicopters, over 350 engines, fixed wing

⁴⁰ The name Miwok is a corruption of miwu which, like many Indigenous group names is the word for person (d'Errico 2012; Barrett and Kroeber 1908).

aircraft, and over 5,000 personnel (McAndrew, 2021). A little over a month after it started, the 222,000-acre Caldor Fire had reached 100% containment surrounded by over 400 miles of fireline (Avitt, 2021). Climate change-related drought and high temperatures combined to enable Caldor's dramatic runs and high-intensity burning. But another contributing factor was the fire deficit on the landscape where it was burning. *Wildfire Today* reported that Caldor was feeding on timberlands that had not experienced fire for at least 20 years (Gabbert, 2021b). According to North et al. (2022), between 1911 and 2011, the average tree density per acre in western U.S. forests increased by 6 or 7 times while average tree diameters and heights decreasing by 50%. In some cases, tree densities went from around 20 trees per acre to over 300 per acre in a 100-year span as the result of a policy of fire exclusion. The researchers explain that frequent-fire forests have become more uniform than they were a century ago and are now subject to additional stressors such as beetle-kill, drought, and more intense wildfires (North et al., 2022).

Form-giving Fire: The Direct Producers of California

Indigenous people in the western states of the U.S. are culturally and linguistically diverse but many of the region's original people share in common a traditional place-based knowledge. And many have used fire to mediate their relations with the plants and animals on the landscapes on which they live. Different groups of indigenous people have used fire on their landscapes for various reasons. Fire has been applied around their settlements to eliminate pests and keep areas clean, to clear travel routes, for hunting ground forage and visibility, to eliminate vegetation competition at resource collection sites, to demarcate traditional tenure and in other contexts (Anderson and Moratto, 1996; Anderson, 2005; Stewart, 2002; Lake, 2021). Ethnographic research shows that fire Native Californian settlements, land-use methods, and other activities, including the use of fire, were capable of producing widespread ecological change and persistent effects on vegetation patterns and growth in the Sierra Nevada prior to settler invasion (Blackburn and Anderson, 1993; Skinner and Chang, 1996; Beesley, 2004; Anderson, 2007; Long et al., 2016). Pollen samples and sedimentary charcoal stratigraphy representing 800 years of history in the Yosemite Valley from 1300 to 1800 show extensive burning despite greater soil moisture in area

meadows corresponding with the presence of Miwok people (Anderson and Stillick, 2013). Native Californians' cultural burns significantly increased the number of fires above what would be expected from lightning strikes, particularly in the foothills, frequently at the end of the summer and into the fall. Fires set by humans in the Sierra Nevada varied in intensity and distribution depending on management objectives (Skinner and Chang, 1996; Keeley, 2002). While these past fires were clearly key to meeting material needs, they were also cultural burns, part of a commitment to community and a spiritual obligation to nonhuman kin.

Kimmerer (2017) describes Native American environmental philosophy as centered on gratitude, cultural ceremonies, attention that acknowledges beauty and pain, respectful relationship, generous kinship, recognition and care for the land; it is a covenant of reciprocity informed by “the understanding that we are not alone, that Earth is populated by non-human persons (p. 377).” For native Sierrans, a foundational element of this obligation is fire. Native Californians in the Sierra Nevada used their fire knowledge, gained over millennia, as part of an immediate, conscious, and reciprocal set of relations between humans and non-human nature in which Indigenous people see themselves not as separate from but as part of nature, possessing mutual obligations (Lake, 2021; Yazzie, 2007; Anderson, 2007; Eriksen and Hankins, 2014). This knowledge is not only mapped onto the landscape but permeates Indigenous economic, spiritual, artistic, and other cultural practices today. Prior to the Gold Rush the surrounding hills, valleys, and mountains of the present-day northern Sierra Nevada range belonged to the Maidu, KonKow, Mechoopda, Nisenan, Northern, Central, and Southern Sierra Miwok, Washoe, and Yokut peoples (Anderson and Moratto, 1996; Native Land Digital, 2023). About 310,000 First Peoples resided California before the Gold Rush, making it one of the most densely populated areas of North America.

Native Sierrans historically used fire to enhance the growth of plants, provide forage for animals, fertilize the soil, clear trails, and numerous other important ecological and social processes. The products from this labor, known as concrete labor, produced use-values or items that are vitally important but do not generate a profit. In his *Grundrisse* (1973, [1856-1857]), Marx recognizes the geophysical and biological independence of nature and refutes the idea that human labor is the sole source of material

wealth (Foster, 2000). He argued that humans and nonhuman nature were interdependent and that natural processes shape humans, who must adapt to these independent forces and mediate them to satisfy their needs, leading Marx to observe that

labour is the living, form-giving fire; it is the transitoriness of things, their temporality, as their formation by living time. In the simple production process – leaving aside the realization process – the transitoriness of the forms of things is used to posit their usefulness (Marx 1973, [1856-1857], p. 361).

Fire use and knowledge among the original peoples has coevolved with fire-adapted landscapes and species. This understanding of the world accepts dynamic change and reciprocal relationships derived from metabolic relations with landscapes and species that provide food and materials on which Indigenous communities depend. The traditional Miwok diet consists of nearly 100 different plant-derived foods and depend on cultural fires to encourage their growth and weed out undesirable plants and insects that compete for water and nutrients. Native fire knowledge is part of a complex matrix of biophysical, metaphysical, and spiritual understanding of the natural world by specific Indigenous communities, it constitutes a form of research based on empirical observation, experimentation, cumulative integration, and transmission of knowledge (Morishima and Mason, 2017). This metabolic exchange, accrued knowledge, and conscious regulation of and adaptation with nature, accords with the Marxian conception of associated producers, whose “... everlasting nature-imposed condition of human existence ... (Marx qtd in Saito, 2017, p. 102)” forms the basis of their mode of production. Additionally, Luxemburg (1913 [1951]), argued that processes of social reproduction, or the production of use values, is not mere repetition but depends on the relation of humans to non-human nature and also the relation between human and human. She further acknowledges that the two interlocking spheres of the production of use values and of exchange include a dimension of spirituality that is understood as “traditional social commitments (Luxemburg, 1913 [1951], p. 5).”

According to ethnoecologist M. Kat Anderson (2005, 2007), the success of first peoples’ economies depended on fire, which they used extensively to shape landscapes, particularly the oak

savanna. Lake and Long (2014) list provide only a very partial list of highly valued fire-associated plants used for cordage, basketry, food, medicine, and spiritual practices

willows (*Salix L. sp.*), Indian hemp (*Apocynum L.*), milkweed (*Asclepias L.*), skunkbush sumac (*Rhus trilobata* Nutt.), sedges (*Carex L.*), deergrass (*Muhlenbergia rigens* [Benth.] Hitchc.), California redbud (*Cercis orbiculata* Greene), Pacific dogwood (*Cornus nuttallii* Audubon ex Torr. & A. Gray), and beargrass (*Xerophyllum tenax* [Pursh]Nutt.); California black oak (*Quercus kelloggii* Newberry), beaked hazelnut (*Corylus cornuta* Marshall); elderberry (*Sambucus L.*), woodland strawberry (*Fragaria vesca L.*), and blueberry (*Vaccinium L.*), snake lily (*Dichelostemma* Kunth), mariposa lily (*Calochortus* Pursh), and camas (*Camassia* Lindl.); wild tobacco (*Nicotiana L.*) (p. 176).

Omer Stewart (2002), drawing on early historical reports, gives an account of just how dramatically the land was shaped by Miwok fire describing a park-like appearance, free of conifers, with clear views and carpeted with flowering plants and luxuriant native grasses. Fire enhances the health of the soil and increases the productivity of important plants.

In order to sustain such a large number of people, it is estimated that Indigenous people used fire extensively and at different times of the year to achieve different effects. Lake and Long (2014) observe that “A lack of fire or undesirable applications of fire (including, but not limited to, uncharacteristically severe wildfire) can pose a threat to the sustainable production” of important plants in both quantity and quality (p.176). Indigenous fire knowledge and plant and animal growth and movement shaped the landscape of the Sierra in mutually constitutive ways. Lake (2021) states that “cultural burning is typically associated with fires of varying intensities that alter the frequency, seasonality and specificity of fire regimes designed to elicit the ecological, societal, and cultural outcomes that are specific to that time and place (2021).” There are numerous uses of cultural burning for environmental and social sustainability including the enhancing the vitality of food producing trees, encouraging the growth of basketry plants, promoting water retention and reducing the danger of large, destructive fires. Additionally, several seeds native to California chaparral germinate in the presence of nitrogen dioxide and butenolide, chemicals present in smoke (Levy, 2005).

Nature's Larder: Oaks

Ethnographic evidence suggests that the majority of Native Californians living in the area where Caldor occurred, used fire to manage oak and pine for their staple food. The temperate coniferous forests of the northern Sierra Nevada mountains harbor one of the most diverse biomes in the world, including montane hardwoods such as black oaks (*Quercus kelloggii*) associated with conifers, pines and incense cedar up to 6,000 feet and drier foothill blue oaks (*Quercus douglasii*) at elevations below 3,500 feet (Anderson, 2005; Chaw'se, 2023; Crabtree, 2017; El Dorado, 2023). Oak forests are a foundation of forest ecosystems that provide food, shelter, and materials for native bees, butterflies, deer, squirrel, and black oak forests are home to declining keystone species like the fisher (*Pekania pennanti*). The oak forests of the West and their human relatives are so enmeshed that it is impossible to understand the landscape without recognizing the symbiotic dynamic of cultural burning and forest sustainability.

Miwok cultural burning exemplifies the coevolution of people and plants (Ergas and York, 2021). Over thousands of years, through their choice of acorns as a staple food source, Native Americans used fire to shape the evolution of oak species and the structure of landscapes in the West. In California, Washington, and Oregon acorns have been the “bread of life” for Native peoples for more than 9,000 years. Across the West, Native Americans intentionally selected oak species and used various woodland management strategies for productive, diverse, and healthy stands. Fire was the most powerful management tool available, as Miwok people set frequent, light surface fires in the herb layer of oak savannas with the intention of maximizing acorn production. Burning controlled populations of oak-eating insects, such as weevils, and checked the growth of pathogenic bacteria and fungi. Fire also promoted the growth of sprouts for material use, optimized the structure and composition of oak stands and made it easier to gather acorns (Anderson, 2007; Beeseley, 1996, 2004; Levy, 2005).

Oaks, in particular are both dependent on and resistant to low-intensity and low-severity fire, so consistent burning contributes to their growth through elimination of competition from pine species and diseases while also releasing important minerals the increase soil fertility. Native plant management

entails the removal of flammable pine species, the use of cultural burning to clear undergrowth to clear unwanted plants and kill insects, and the selection of oaks contributes to significant landscape fire resilience.

The Original Tool House: Baskets

Indigenous cultural fire not only prevents large fires by clearing dead and dry herbaceous materials; it also encourages the growth of young shoots and grasses needed in basketry. Baskets are essential vessels for collecting, processing and storing food, as animal traps, cups and bowls, cradleboards for carrying children as well as other uses. As the single most material-intensive industry it is described by Anderson and Moratto (1996), as “the very heart of Native American material culture in the Sierra Nevada (p. 195).” The weaving industry had strict standards based on the plant components and the basket’s intended use. This required efficient, large-scale management of resources in order to supply hundreds of thousands of shoots of various plants including milkweed and Indian hemp stalks (Anderson, 2005; Stevens and Zelazo, 2015). Basketry necessitated knowledgeable and skilled craftspeople, primarily women, to select the proper materials.

Because of the long curing period of basketry materials – from 1 to 4 years – weavers had to make long-term plans for future baskets. The sheer amount and uniformity of the various plant materials and the long curing times meant that “collecting basket materials was not happenstance, but was, rather, a sizable collective enterprise (Anderson and Moratto, 1996, p. 195)” that could not rely on natural lightning-caused fires which could strike in the wrong ecosystem. In order to maintain a steady supply of the proper materials, yearly burning was undertaken to stimulate the production of young, flexible plants with less side-shoot development (Anderson and Moratto, 1996; Skinner and Chang, 1996). For instance, bear grass must be burned to the ground to be flexible enough for weaving and takes a couple of years after burning to achieve this quality. However, the burning is precise requiring detailed fire knowledge as too much fire can destroy the grass, since it is located at the nexus of soil and the duff layer (Ortiz, 1992).

Indigenous fire was so widely used as a habitat management technique that it was considered a threat to the interests of settler communities engaged in profitable logging, ranching and agriculture, and mining enterprises. The economic interests of settlers led to fire exclusion laws as soon as California became a state and even provided for the enslavement of Native people for transgressions widely understood in racist terms. Many of the racist terms carried Lockean notions that pejoratively referenced Native lifeways as inferior to the settler mode of production, such as digging corms and roots, encapsulated in the offensive Digger Indian trope (Lönnberg, 1981; Anderson, 2005). Settler laws against burning were unevenly enforced in favor of the particular yeomanry initially practiced by incoming settlers from the East who set fires to clear away brush and trees and allowed livestock to roam freely.

War Capitalism: Death Squads and Expropriation

Harnecker (2015) reminds us that capitalist relations of production “were born in the bosom of pre-capitalist societies” in which the state intervenes to effect two basic conditions “first the complete separation of the producer from his means of production (p.175)” and the second, capital accumulation. However, this bloody process is uneven, chaotic, and contradictory (Mészáros, 2014). In the case of the Sierra Nevada, the U.S. government relied on cash-poor settlers to carve out mineral and timberlands for the purpose of nation-building and to act as death squads to displace and terrorize native people from their lands and farms. The Army with or without the sanction of the federal government often used settler claims of indigenous aggression to slaughter Native people. For instance, in 1846 Colonel John C. Frémont abandoned his assignment surveying in the Rocky Mountains and marched his troops 900 miles into what is now California where there were scattered settlements of U.S. citizens. On the report of Native aggression against the settlers, Frémont and 75 other men cornered and murdered 1,000 Wintu people of all ages and genders in what is now present-day Redding. This war crime set a pattern of coordinated massacres that included encirclement, surprise attack, and execution of noncombatants, opening the way for an increase in prospectors, shepherds, and ranchers (Madley, 2016). Beckert (2014)

observes that many historians have called this violent age of expropriation, sadistic murder, and theft, mercantile or early capitalism, however he named it war capitalism to reflect the raw violence of this previously unrecognized form of capitalist development. Back of this bloody expropriation was a conception of what constitutes productive land use.

The area around in El Dorado county near Caldor's ignition was part of the Gold Rush when between 1847 and 1860, the population of settlers in California tripled to 308,000 (Library of Congress, 2023). At the time of the colonial invasion, there were about 100,000 Native peoples in the Sierra Nevada (Anderson and Moratto, 1996) with Miwok people living in family villages of up to 100 persons along rivers. These villages and their surrounding landscapes were forms of property that were managed as regulated inner and outer commons (Greer, 2018).⁴¹ Inner commons are proprietary holdings managed by families and communities while outer commons have freer access. Between 1848 and 1855, California saw an influx of thousands of European, Chinese, and Native Hawai'ian immigrants to the territory bringing with them diseases like smallpox for which indigenous Californians had no immunity (Stephens and Sugihara, 2012; Madley, 2016). The population exploded from an estimated 2,000 non-indigenous people of European and Mexican descent to more than 53,000 settlers in 1849 enabling to California to skip territorial status and become a state in 1850. Settlers established as many as 1,400 rural towns below the hillsides and ravines covered with numerous gold mines making San Francisco a major financial center (Dilsaver, 1985).

The exclusion of Indigenous cultural burning began with the war capitalism period of American capitalism and is one of the primary reasons that wildfires have become so destructive. The Caldor Fire got its name from the former logging company town of Caldor, a contraction of California Door Company, established during the Gold Rush along the Middle Fork of the Cosumnes River. The river is reportedly a corruption of the Miwok *kosum* for salmon and the suffix *-umnes* meaning village or people

⁴¹ Greer (2018) explains that inner commons are proprietary holdings managed by families and communities while outer commons entail freer access. Inner commons might be basket and seed fields while outer commons, thought of by settlers as "waste lands" are claimed by larger communities or nations with negotiated access for fishing, hunting, gathering and other activities.

(Kroeber, 1916). At the time of invasion, Native Sierrans, had a centuries-long (~500 years) land use pattern that had used place names, managing, and gathering areas based on negotiated relationships between family groups. As part of a long-established tradition of management and collection of materials for basketry and cordage in sites inherited along family lines, fire was used as a way “of visually marking one’s relationship with the area” and as “a signal for gaining land-use rights (Anderson and Moratto, 1996, p. 194).” In many areas of the West, towns, mountains, bodies of water and other landmarks bear the names that settlers bestowed on the land as an act of Native erasure. Colonizers used naming as a form of national racialization of Native people and landscapes in various locations as a cultural project that inscribed settler property rights, citizenship, and moral conduct (d’Errico, 2018; McKay, Vinyeta and Norgaard, 2020).

However, according to Greer (2018) while marking boundaries with fencing and renaming landmarks were important forms of elimination and settler property formation, the primary clash between settlers and Native peoples centers on their particular types and uses of land. Fire exclusion was part of the overall project of the expropriation, or taking without like compensation, and extinction of the Indigenous mode of production which is fundamentally at odds with capital accumulation. Greer states that common property was a fundamental aspect of landholding in both the Old and “New World,” negotiated by custom making the commons not just a place but a specific set of land use practices.

The rift in the metabolic relation of humans to nonhuman nature that wildfire presents depends on access to land, but another important factor is the purchase of labor power. Marx argued that, in order for the capitalist mode of production to take root, all prior forms of social production must be extinguished. However, this process, like capitalism itself is chaotic, contradictory, and often leaves remnants behind, and even in the face of violence and enslavement, Native peoples have surreptitiously continued to burn their lands. Capitalist mediation entails expropriation of people from the basis (land) of their non-accumulative mode of production and conversion to free laborers (Foster, 1999a; Mészáros, 2014; Saito, 2017). The distinctly non-capitalist mode of production practiced by Indigenous people the world over and in fire-dependent Sierra Nevada communities is anathema to surplus accumulation. Fire, situated as

it is in the lifeways of many Native peoples in the western states is characterized by reciprocal exchanges between humans and non-human nature. Negotiated land access and/or ownership, collective production, trade in use-values, spiritual kinship, and community distribution of surplus is therefore incompatible with commodity production. Moreover, the extinction of prior forms of Indigenous production occurs against a backdrop of violent dispossession, theft, environmental damage, terrorism, sexual violence, murder, enslavement, and criminalization (Dawson, 2016).

The end of the Civil War set off a frenzy of extraction as settlers fanned out across the continent logging, mining, and expanding agricultural fields and ranchlands that left the landscape scarred, degraded, and prone to wildfires. Both Native and rural settler communities used small scale fire, but the objective of wildland fire suppression was to protect the lumber resource and revitalize the forest for future extraction. But the intensification of production and its geographic expansion eventually favored settler fires over cultural burns and as Native people were forced to occupy increasingly marginal lands their life modes came under increasing pressure and outright exclusion. Exclusion of Indigenous cultural burning rapidly progressed in tandem with nation-building and resource extraction as settlers initiated an enclosure of the western U.S. by squatting on Native lands in a general pattern of scattered privatized land holdings. At the conclusion of the Civil War U.S. empire and capitalism merged and grew significantly through territorial expansion and resource extraction which provided the first impetus for Indigenous fire exclusion. According to Mauldin (2017) in the post-Civil War years, “revolutions in land use practices initiated a series of ecological shifts such as increased erosion, soil nutrient loss, and animal diseases” that created economic dislocation of poor black and white farmers, sharecroppers and tenants. In the Sierra Nevada, settler colonial dispossession and environmental degradation created a structural change in the fire regime as settlers pursued a mercantile pattern of land privatization and resource extraction during the Gold Rush.

Bloody Legislation: Exploitation

The U.S. government favored privatization of land based on Lockean notions of property ownership such as proven occupation and commercial improvement which became the norm with the westward movement of “poor, white, and useful (Wilm, 2017)” settlers dislodged by poverty and impoverished soil in the former slave states. The federal government was hesitant to freely release land to prospectors, for fear of not being able to collect taxes on mining proceeds, so it placed restrictions that required continuous use of a mine and allowed for squatters to take over abandoned mines. Recognizing their status in the eyes of the federal government as vagrants and idlers, settlers often argued that in the same way pioneers “cleared land for more ‘productive’ purposes such as agriculture, they would clear the land of the Indigenous populations (Wilm, 2017, 2015)” and establish towns. For many settlers, access to land and mining claims was also an important component of avoiding labor exploitation by the wealthy company owners located on the East Coast and in San Francisco.

According to Teitelman (2020) labor exploitation increased dramatically in the 1850s but the government extended work exemptions to miners who “went to fight the Indians.” Predictably this increased violence against indigenous people “which reached extraordinary heights (p.887).” Thus, “western mineral lands miners became a driving force of U.S. colonialism” and “federal authorities appreciated miners for seizing valuable resources and populating ‘savage wastes’ (p. 887).” While the federal government did, at times, attempt to regulate the spread of homesteading, settlers often formed death squads to kill Native people and take their property and land without any consequences. In some instances, suspects were quickly arrested and prosecuted for their crimes, but often these cases fell apart when lawyers used racist and xenophobic arguments to defend the accused. In one case, Madley (2016) recounts, the defense impeached the reliability of remaining Miwok eyewitnesses to a murder of four of their compatriots when it was pointed out that they did not understand English well enough to grasp the nature of taking an oath in court. As Gilio-Whitaker (2019) states

Elimination as a process hinges on the expropriation of Indigenous lands and their transfer into settler possession via regimes of private property ownership, beginning with war, killing, and forced removal (pp. 51-52).

Despite signing 18 treaties with California Indigenous people, the U.S. Senate refused to ratify any of the agreements (Miller, 2017) leaving Native Californians essentially landless. Anderson (2005) notes that by 1850, the combination of disease, displacement, and murder of Native people had fragmented communities and led to widespread hunger and desperation causing them to be

trespassers on the lands where their ancestors had lived for centuries. The best Indian lands – open, fertile, and flat or gently rolling and dotted with villages – were taken by Anglo settlers for farms, ranches, and mining settlements (Anderson 2005, p. 85).

However, despite the periodic expressions of sympathy displayed by government agents, the constant plunder, theft and murder of Native Sierrans by settler death squads was supported by the U.S. military which recognized the value of this expropriation. As Barker (2015), recounts, a land development company that had been illegally obtaining Native territory all over the eastern U.S. hired lawyers on both sides of a case involving land⁴² to provide “the legal fiction Congress and SCOTUS needed about tribal land title (p. 251)” to amend the Constitution smuggling or more accurately openly forcing a Lockean interpretation of land title and applying the Doctrine of Discovery to Native land claims. The Court found that

Discovery is the foundation of title, in European nations, and this overlooks all proprietary rights in the natives. The sovereignty and eminent domain thus acquired, necessarily precludes the idea of any other sovereignty existing within the same limits. The subjects of the discovering nation must necessarily be bound by the declared sense of their own government, as to the extent of this sovereignty, and the domain acquired with it. Even if it should be admitted that the Indians were originally an independent people, they have ceased to be so. A nation that has passed under the dominion of another, is no longer a sovereign state. The same treaties and negotiations, before referred to, show their dependent condition (qtd in Barker 2015, p. 250).

The Court was very specific in laying out its intent of expropriation arguing,

as laid down by the tribunals of civilized states, denied the right of the Indians to be considered as independent communities, having a permanent property in the soil, capable of alienation to private individuals. They remain in a state of nature, and have never been admitted into the general society of nations (qtd in Barker 2015, pp. 249-250).

⁴² Johnson v. McIntosh, 1823.

This decision enabled the federal government to assume for itself the role of arbiter and “protector” of Native people who, it decided, only occupied but did not own their territories. Furthermore, the government could extinguish the tenure of Indigenous people who it deemed did not make adequate use of their land. Barker observes that this and similar decisions accompanied a centralization of corporate power to trade in land and natural resources.

As settlers moved westward, they drained wetlands, destroyed salmon runs, chopped down trees, and released their livestock onto the landscape. The released animals muddied waterways, denuded and compacted the grasslands and ate valuable acorns. Lopsided use and criminalization of fire, along with laws that legalized the enslavement of Native people, fostered a cruel entrepreneurialism among newly-arrived settlers, enshrined in the 1850 *Compiled Laws of the State of California* in its chapter “An Act for the Government and Protection of Indians,” which forbade Native people from using cultural burning as they had since time immemorial

If any person or persons shall set the prairie on fire, or refuse to use proper exertions to extinguish the fire when the prairies are burning, such person or persons shall be subject to fine or punishment, as the court may adjudge proper (Garfielde and Snyder, 1853, p. 824)

The settler economy including the introduction of nonnative plants, and the differential use of fire led to an alteration of indigenous peoples’ lifeways as they were forced to take up farming, mining, and lumbering in order to feed themselves. This, in turn, aided in enriching settlers who exploited indigenous labor and frequently cheated Native people who bought food and other provisions from them (Anderson, 2005; Madley, 2016). In 1856, a US military agent (Livingston 1856) noted that settlers regularly stole from, terrorized, murdered, and burned down the homes and farms of displaced Native people.

Livingston stated that Sierran Natives had small farms and were often forced to defend themselves, their lands, property, and even their livestock from gangs of settlers. In some cases, driven by hunger or in search of their stolen livestock, Indigenous individuals and groups did take food and crops to avoid starvation. But often they were gratuitously accused of theft by settlers eager to take possession of Native

land. These actions, along with the environmental damage wrought by homesteading and mining left many Indigenous people homeless or unable to provide for themselves forcing them to seek employment from white settlers who exploited their labor. Anderson (2005), describes the proletarianization of Native people that began with the Spanish Crown and continued through U.S. domination:

California Indians provided much of the labor needed to build the new economies of the colonizers during each historical period, and many prominent non-Indian men in California's history built their fortunes on the backs of cheap Indian laborers. But the California Indians gave the newcomers far more than their labor. The success of the mission economies and of the many fur trading, market hunting, gold mining, logging, ranching, and agricultural enterprises of early California rested on a land that was productive and healthy ecologically because of the careful stewardship of many generations of California Indians (Anderson, 2005, p. 64).

Livingston (1856) reported that settlers

have worked many Indians, reaping a considerable pecuniary benefit thereby, and, in return, treated them *worse* than slaves; this has caused a great many jealousies among the whites, and is continually working evil (p.137).

Moreover, California legalized forced labor enacting what Marx (1990 [1867]) called “bloody legislation” whereby for the crime of vagrancy, begging, or “leading an immoral or profligate course of life (Garfield and Snyder, 19853, p. 825),” Native men were to be hired out within 24 hours of judgement to the highest bidder for a term of no more than 4 months with the proceeds of their labor, after deducting costs to the employer for their upkeep, be “paid into the country treasury, to the credit of the indian [sic] fund (p. 825).” As their livestock roamed the landscape destroying native grasses, farmers and ranchers hired or enslaved homeless Miwok people to act as human fences chasing errant animals off their property (Fischer, 2015). Forbidding cultural fires and enslaving “vagrant” Native labor served the dual purpose of eliminating the Indigenous mode of production and replacing it with a hybrid mercantile-capitalist system. Native fires were seasonally timed fires, produced use values, and promoted nutrient cycling while proletarianization and settler-set fires contributed to a growing merchant class that achieved the aim of nation-building and propelled trade in exchange values and profitability. In the valorization of settler exchange values over Native use values, the expropriation of Indigenous land without reciprocity, was an integral component of capitalist accumulation. Marx recognized that non-human nature's true wealth,

developed through thousands of years of Indigenous labor, is worthless to capital which treats it as free gift to exploit and despoil in pursuit of profit.

Botany of Empire

The capitalist mode of production was the engine of nation building and fire's role was often discursively deployed to justify U.S. civilization and a Lockean understanding of land tenure. Looking back on this period, Teddy Roosevelt (1900 [1896]), a good friend of Gifford Pinchot, and the president who put him in charge of the nascent Forest Service opined

Such a man, though both honest and intelligent, when he hears that the whites have settled on Indian lands, cannot realize that the act has no resemblance whatever to the forcible occupation of land already cultivated. ... let sentimentalists say what they will, the man who puts the soil to use must of right dispossess the man who does not, or the world will come to a standstill; All men of sane and wholesome thought must dismiss with impatient contempt the plea that these continents should be reserved for the use of scattered savage tribes. ... The truth is, the Indians never had any real title to the soil (pp. 4958-4959).

In his work *The Eighteenth Brumaire*, Marx (1979, [1852]) describes how the transition from mercantilist interests to that of industrial capitalism deepened the metabolic rift and gave rise to a

bourgeois order, which at the beginning of the century set the state to stand guard over the newly emerged small holdings and manured them with laurels, has become a vampire that sucks the blood from their hearts and brains and casts them into the alchemist's cauldron of capital (pp.190-191).

Just as the dissolution of Native claims and use of the land was incomplete, chaotic, and bloody, so too, was the transition from the mercantile class of settlers to the rise of the mining and timber barons. By 1873, the California constitution forbade official genocide against Native Californians, but environmental destruction of the forests quickly denied Native people of their traditional lands and foods. Twenty-five years after the initial rush for gold the number of small settlements in the area around Caldor with mining as a primary activity dwindled from 191 in 1855 to 82 in 1880 (Dilsaver, 1985). Mining had driven the settler rush but the federal government provided a legal framework for permanent settlement and

privatization in Oregon, California, Washington, and Nevada in order to develop a network of self-supporting communities of small landowners. The logging industry which grew as a supplier of mining timbers and other infrastructure, helped to stabilize the population of El Dorado County and by 1880, 837 residents lived in Grizzly Flats (El Dorado County Museum, 2023). The town served as the closest supply town to the small town of Caldor, the location of California Door Company's logging camp and the start of its railroad.

Pisani (1991), reports that by 1872, 122 individuals and companies claimed dominion over a total of more than 20,000 acres in California, 2,298 people owned more than 1,000 acres, and 22,000 acres were owned by 620 of the largest ranches and farms. The owners, settler-squatters purchased land from former Mexican holders and then successfully fought the federal government for land title. Along with the Homestead Act, the legislation transferred large tracts of stolen land (Manning and Reed, 2019) to private, ostensibly smallholder hands. The Timber and Stone Act offered "public" mineral and timber lands unsuitable for cultivation to private parties for \$2.50 (about \$83 in 2023) per acre if the purchaser promised not to buy more than 160 acres. The Free Timber Act provided for cutting wood for personal use on the purchased land. However, timber and railroad companies in the eastern states and large local firms circumvented the provisions by encouraging their employees to purchase claims and sell the deeds back to the companies, thereby amassing hundreds of thousands of acres of standing timber for virtually nothing. The growing monopolies immediately cut the timberlands realizing massive windfalls. Despite widespread recognition of the fraud, the economic crimes went largely unpunished because the growing monopolies were contributing to booming economic growth in the new urban centers (Connors, 1998; Godfrey, 2005).

Traditionally, local Miwok people observed the habits of game animals and employed phenological wisdom in the use of fire in meadow ecotones. Fire was used to prevent the encroachment of fast-growing species of trees such as lodgepole and sugar pines in meadows. Conifers are thirsty trees that take up a lot of water. Native people have fired meadows to eliminate conifers, enhance culturally significant plants and to draw game to the rich grass, ensuring healthy herds and long-term tribal

sustainability. On the other hand, settlers used unrestrained fire to create pasturage for sheep and cattle who are not adapted to the same grasses and broadleaf plants as deer, elk, and other species. In many cases fires were set as an effective mechanism of dispossession by settlers looking to expand commodity production as part of their hybrid agricultural economy that increasingly included items produced for sale outside the territory (Carle, 2002). According to Wagtendonk (1995) settlers indiscriminately fired the landscape “to clear areas for farming, ranching, and mining. The impact of such burning was not a concern because vegetation was thought of as a nuisance rather than a resource (p.11).”

The combination of indiscriminate burning and the releasing of cattle and sheep onto the landscape entailed an additional form of ecological imperialism through the loss of native plant life and the introduction of flammable non-native species. Beginning with the Spanish but intensifying into the 1850s settler farmers and ranchers expanded a new mode of production premised on empire botany (Ergas and York, 2021) with the introduction of livestock. Cattle introduced and spread weeds and their manner of close grazing eliminated native grasses that could conserve water by forming dense root systems. For, instance needlegrasses (*Nassella sp.*) that had not evolved in relation to their presence was virtually eliminated. Indigenous plants that had previously remained less vigorous in the presence of cultural burning and native grazers, were able to flourish as the result of settler ranching practices (Fischer, 2015). As the result of weed elimination in the interest of grazing, milkweed and Indian hemp, key components of basketry are “relatively uncommon today and not in the abundance necessary to support this level of technology (Stevens and Zelazo, 2015, p. 166).”

Additionally, settlers introduced weeds that currently contribute to modern wildfires.⁴³ Ripgut brome (*diandrus*) was brought to the West by settlers looking to improve rangelands and cheatgrass (*Bromus tectrum*) arrived as a contaminant in hay for cattle. Both are flammable grasses that currently pose a fire danger in the western states. For instance, a 1939 report from the 9,155-acre Fremont-

⁴³ UC Weed Science. 2019. “California’s Bad Romance with Bromus Fuels Wildfire.” <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=30883>

Bonanza Fire in Oregon, which like most of the western region of the U.S., underwent similar settler impacts as the northern Sierra, states

The large area and rapid spread of this fire was due entirely to the dense and continuous stand of "cheat grass" (*Bromus tectarum*) with very little timber overstory. Consequently, the usual "forest" fire standards are not fully applicable (Headley, 1939, p. 33).

In contrast to the Sierra Miwok whose fires generated use-values that bolstered ecological resilience and provided food for storage in granaries to protect against hunger or for trade with other tribes for useful items, settlers used fire to clear areas for livestock in support of their economy. Supplying beef and mutton to neighboring towns where large labor forces were concentrated and abroad during the Civil War became a profitable home industry as meat prices rose (Mayer, 1976; Anderson and Moratto, 1996; Anderson, 2007; Library of Congress, 2023). However, between 1870 and 1890, livestock ranching became concentrated among a few wealthy operators who pastured as many as 7 million sheep rent-free in California, mostly on public (stolen Native) land in the Sierra Nevada, as rising prices for wool and meat garnered high profits squeezing out small-time producers (Cermak, 2005). Shepherds fired the forests and meadows of the high mountains to clear areas for pasturage leading the naturalist and Sierra Club founder John Muir (2017) to complain,

Running fires are set everywhere with a view to clearing the ground of prostrate trunks to facilitate the movements of the flocks and to improve pastures ... Indians burn off the underbrush in certain localities to facilitate deer-hunting ... but the fires of the sheepmen or muttoneers, form more than ninety percent of all destructive fires that range the Sierra forests (p 243).

From its early beginnings, the Sierra Club promoted a view of wilderness devoid of people in which rich, white outdoor enthusiasts could play. Muir was not suggesting that he preferred the return of "Indian" burning despite the fact that it had shaped and maintained the vitality of the land he wished to protect from the settlers doing capital's dirty work. (Taylor, 2016; Gilio-Whitaker, 2020).

Mercantile pastoralists, agriculturalists, and placer miners caused horrific pollution of waterways, soil erosion, and forest fires that leveled towns. But the arrival of timber and railroad concerns deepened this metabolic rift with the introduction of more extensive extraction and increased settlement in areas

previously inaccessible to most settlers. The transition from the extraction of timber as a support for mining had led to forest decline in and around towns and mines with fires accompanying settlement and mining activity. But the epoch-making railroad industry (Baran and Sweezy, 1966) sparked crises of deforestation, depressions, and devastating fires.

Of Beast and Baron

Given the foregoing discussion, it is clear that the uses of the land and the webbed ecological systems of the West played and continue to play an enormous role in attempts to use or contain fire. Saito (2017) argues that, as capital expands out, extracting ever-more resources for commerce, “life in the countryside as well as life in the city is fundamentally transformed and destroyed by the logic of capital (p. 173).” The banishment of Indigenous fire, the scale of extraction through mining and timber cutting, and the situation of towns along railroad corridors compromised ecological diversity on the landscape, leaving behind water pollution and large amounts of plant debris primed to burn.

The establishment of the National Parks and Forests and the Forest Service were at once a nation-building exercise and an attempt by the Progressives under Roosevelt, to curb the massive destruction of forests in the West that were being lost to theft, unremunerated cutting, and fire in order to ensure future profits and phony homesteads using the Timber and Stone Act. The prime offenders were Weyerhaeuser, the Southern Pacific Railroad, the Northern Pacific Railroad, King Lumber and other early monopolies that cut millions of acres, leaving stumps and slash in their wake which did contribute to massive conflagrations.

As the railroads arrived, they permitted more extensive access to forests, transportation of people for tourism and goods for trade, a tremendous amount of waste in the form of cutover landscapes that supplied train infrastructure and lumber operations, and they brought fire in the form of sparks and careless right-of-way clearing. Employees of timber and railroad companies were responsible for fighting the inevitable fires lumbering operations created. The consolidation of large timber and mining

companies occurred as they expanded their landholdings and their respective markets and incorporated epoch-making technology such as the steam engine and locomotives (Baran and Sweezy, 1966). During the rise of monopoly capital, cities were not only affected by the logic of capital but directly and indirectly impacted by the material waste that capitalism generates causing conflagrations and requiring a more formalized response. Clary (1988) lays out the case neatly:

By the turn of the century the lumberman's frontier had worked its way through the Great Lakes states and the South and had entered areas that had previously been by-passed, such as the Appalachian Mountains, or those that had previously been untapped, such as the Pacific Northwest. Especially in the Great Lakes region, the nature of the industry in the latter part of the nineteenth century made logging destructive, all-consuming, and heedless of the future. The industry was mostly migratory, and it left behind denuded areas, plagued by fires, soil erosion, and unemployment (p.14).

In the 19th and early 20th century, the lands of the U.S. West became, in Weinberg's (2003) words, "little more than an 'economic province' of the industrial East (p. 155)." Access to railroads and high lumber prices drove a massive timber cut all across the Sierra Nevada. In the midst of the Civil War 1862, President Lincoln, sought to undercut the South's economic reach by signing a suite of bills designed to consolidate Union power on the western frontier and encourage settlement by free laborers under the aegis of the United States. The Department of Agriculture Act encouraged the expansion of colonial agriculture and livestock husbandry; the Homestead Act enabled women, immigrants, and freed slaves to claim homesteads, and the Pacific Railway Act provided loans and granted millions of acres of land for the northern transcontinental railway route, bypassing the South (Dunbar-Ortiz, 2014).

As the result of widespread land speculation, by 1870 industrial monopolies had gained a foothold on both coasts (Steer, 1938; Baran and Sweezy, 1966). Writing for the USDA, Steer (1938) acknowledged that, unlike other products of the soil, stumpage prices had remained stable while lumber prices had risen, enriching speculators and causing them to continue buying timberland while passing transportation and other costs on to consumers. Between 1866 and 1873, the U.S. laid 35,000 miles of track with the transcontinental railroad, which arrived in 1869, marshaled an enormous exploited workforce. The Central Pacific Company, faced with a shortage of recalcitrant white laborers unwilling to

work on the railroad, hired 12,000 Chinese and Chinese American men displaced by racist violence and high tariffs in the mines through labor contractors. They were paid \$28 rising to \$41 per month, two-thirds of the wage of Anglo labor, working 16 or more hours a day, 6 days a week cutting trees, laying track, blasting, and digging tunnels. While isolated in the mountains, far from medical attention or outside material support, twelve hundred Chinese men died from explosions, cave-ins, avalanches, and disease, prompting a strike which was quickly broken when the company refused to feed them (Taylor 2016; Loomis 2015). The railroads accelerated forest destruction, as lumber companies could sell their products far from their mills at a phenomenal rate as well as generating large profits and destructive fires that required control.

According to the Environmental Protection Agency (2018), from the early 1900s to 1930, the timber industry wasted 20 to 30% (EPA 2018) of what it harvested. Additionally, unemployment rose significantly from about 2.5% in the early 1900s to as high as 6% by 1910 (Lebergott, 1957) as mechanization increased efficiency and simplified labor practices eliminated the need for skilled workers. In an increasing wave of industrialization, clearcutting spread East to West, exhausting forests while at the same time the average laborer in the lumber industry was working over 100 hours per week (Kolko, 1977; US Bureau of Labor Statistics, 1932). In many cases these same laborers were expected to drop their tools when a fire broke out in order to protect the operations and raw materials. Initially, the only way to harvest and transport the timber was with saws and axes and ox or mule-drawn wagons. But soon this system was revolutionized by steam-powered donkey engines that hauled logs via cables attached to sets of winch drums and hoisted them onto locomotives for transport, eliminating the need for animal power which required skilled handling, food, and shelter. The machines simplified the work and accelerated the cut on steep slopes but also increased the danger of being crushed by a log or having a limb severed by a frayed or whipping cable.

According to Loomis (2016) these machines “contributed to the proletarianization of the timber workforce by undermining worker control over production (p. 22).” Loomis (2016) recalls that, under these conditions, loggers suffered

disease, filth, insect bites, bodies ground down through hard work, drafty housing, and soaked clothing. Laborers, unmarried and transient, rode the railroads from job to job. Carrying their waterlogged and flea-infested bedrolls on their backs, loggers suffered through respiratory illnesses, filth, and miserable discomfort. Operators constructed drafty housing with hay for a mattress, refused to install modern sanitary facilities, and provided adulterated food that made workers sick. New technologies lacking safety precautions killed and maimed workers daily (pp. 19-20).

Killing the Goose: Timber Capital's Environmental Destruction

As Ergas and York (2021) observe, the advent of the steam engine accelerated mechanization increasing productivity and expanding the ability of industry to bring larger areas of forests into production using fewer workers. Having supported the mining industry, lumber concerns expanded further during construction of the railroads as their infrastructure required large amounts of wood. The Central Pacific basically leveled a forest eighty miles long and several miles wide (Godfrey, 2013, p. 59) requiring 2,500 ties per mile of track and millions more board feet for other infrastructure such as snowsheds. By the early 1900s, a third of the northern Sierra forest had been logged off leaving as much as 210,000 acres with heavy undergrowth (Cermak 2005). The editor of the *Amador Ledger* (1906) documented the tremendous toll of the cut at Caldor in an editorial

... close to Caldor saw mill. The company is cutting the great forest like a mower in a grainfield. They intend to cut 15 million feet of lumber this season ...
Few people realize what these great milling propositions mean in waste— in destruction. While it is true that the lumber is cut and sold for use. It is also true that they are killing the goose that laid the golden egg.

As well as the exploitation and maiming of workers, logging operations left destruction on the landscape with piles of slash, small diameter trees, and stumps that dried out and served as fuel for uncontrolled fires. Lumber technologies caused fires both in the immediate vicinity and forests around the mills when boilers exploded, hurting workers and starting fires. Drifts of sawdust in the buildings was another source of fuel that commonly burned when machinery overheated or sparked. Between 1848 and

1904, the heavy toll of industrial development in the Sierras had destroyed forest market values and contributed to a tremendous loss of biodiversity forcing the transfer of forest reserves to the US Department of Agriculture (Godfrey, 2013).

The gradual program of institutionalized fire suppression got its start in an atmosphere of what Dorceta Taylor (2016) calls business environmentalism, an amalgamation of “utilitarianism, preservationism, conservationism, and capitalist interests (p. 27)” that arose during the late nineteenth century and early twentieth century. During this time capital and the state, through the Forest Service, were sometimes aligned, sometimes at odds, but generally agreed that efficiency and voluntary environmental protection were necessary components of long-term profitability. According to Blackford (1975), lumber firms recognized that their activities were wasteful and causing fires but fought forestry legislation because they worried other aspects of their business model might also come under scrutiny and state control. Timber firms preferred to self-regulate their environmental activities and relied on their own employees or state fire wardens – volunteers who were usually too late to fires to put them out because of lack of transportation. Those who were injured or died while fighting the fires often left behind loved ones without any legal recourse to claim compensation (Nash, 1965). Gifford Pinchot’s (1905) *Use Book* reveals that the government did not seek to “hamper the work of settlers and lumbermen, nor to limit the rights of property holders (p. 66),” and allowed these parties to fire the land while threatening to punish with fines and jail time the willful setting of destructive fires.

In response to corporate overreach and uncontrolled fires emerging from poorly managed burning, President Theodore Roosevelt, established the Forest Service and placed millions of acres of degraded land in federal ownership with the aim of forest and water conservation. The establishment of the USFS in 1905 occurred amid pressure on one hand from middle class naturalists such as those in the Sierra Club who wanted to stop deforestation and on the other from firms such as Great Western Power

Company,⁴⁴ Pacific Gas and Electric⁴⁵ and the powerful agricultural sector to increase the water supply and enable development corridors from the mountains to the cities. The development of the timber, water, and energy sectors was both a perpetrator of fires on western landscapes and a reason for fire suppression. According to Brown and Show (1944), four energy monopolies came to dominate the water and electric power sector in California including Great Western Power Company and Pacific Gas and Electric (PG&E) with investments climbing from \$37 million in 1902 to \$408 million in 1920. Energy and water companies bought land, dammed waterways such as the Feather River area, home to numerous Native Sierrans including the Maidu, Paiute, Washoe, and KonKow people,⁴⁶ and excavated reservoirs, disrupting the hydrological cycle. Power executives located energy infrastructure where trees weren't as dense and where railroad development would enable access for line repair and fire protection (Blunt, 2022). Pinchot was a utilitarian who was supported by the American Forestry Association and "regarded forests as economic resources (Kolko, 1977, p. 111)," no different from agricultural crops. As a subscriber to President Theodore Roosevelt's new nationalism and an early member of the Progressive Party, the first chief of the Forest Service pursued a program of wise use which favored government oversight of conservation efforts but accommodated capital's expansion with state and federal regulation.

In an 1899 *National Geographic* article, Pinchot had explored the role of controlled burns in forest development and observed that a few people, including John Muir "have grouped fire with temperature and moisture as one of the great factors ... (Pinchot, 1999[1899], p. 29)" that contributed to the character of forests. Pinchot ended his ruminations with a call for a wider examination of forest dynamics and the sustainability of prescribed fire.

⁴⁴ Great Western Power Company was formed by New York stockbrokers who were members of the Western Pacific Railroad which ran between Oakland and Salt Lake City; it was financed by interests in Comstock mines, American Tobacco Company and Standard Oil (Blunt 2022).

⁴⁵ PG&E was the product of a merger between miner and hydroelectric pump designer Eugene de Sabla and iron and electrical equipment merchant John Martin (Blunt 2022).

⁴⁶ Miraculously, the Cosumnes River was one of the few California rivers not to suffer damming by the energy companies. But an earthen dam erected in Grizzly Flats area and PG&E's powerlines enabled the extension of timber activity and eventually led to the Grizzly Park subdivision decimated by the Caldor Fire.

Arno and Allison-Bunnell (2002) note that while Pinchot

traveled widely in the western United States. He observed that fire played an important role in producing some of the magnificent natural forests. In 1899 he published an essay, *The Relation of Forests and Forests*, in *National Geographic* magazine. He urged that the role of fire in creating forests be studied to help in designing forest management (pp. 15-16)

Throughout his article, Pinchot (1999 [1899]) discusses the various benefits of fire and adaptations that have evolved to survive and thrive in the presence of fire. One specific example he mentions is the “fire glades” described by USDA botanist Frederick V. Coville’s (1898) “Forest Growth and Sheep Grazing in the Cascade Mountains of Oregon.”⁴⁷ Coville states that “fire-glades (p. 20)” were created over a 3- to 5-year process of burning that encouraged sedges and vetches to grow under lodgepole pine. Coville surmised that these fire glades were created by Indigenous burning and observed that such burns were common in the Willamette Valley

Historically considered, we must look to the Indians as the first manipulators of forest fires in this region. It is a clearly established fact, based on observation, that the Indians of the Willamette Valley in western Oregon were accustomed before the advent of white men in that region, to as late a period as the early forties, to set fire to the grass for the purpose of burning it off. Their object in doing this is supposed to have been chiefly (1) to cause a fresh growth of grass in the autumn, upon which enormous quantities of wild fowl descended to feed, particularly geese, and (2) for the purpose of killing and roasting for food the great quantities of grasshoppers that in certain years fed upon the grass. Similar uses of fire by the aborigines in other parts of the western United States have been recorded by which they were enabled to keep certain large areas denuded of timber. Upon the cessation of these fires, by reason of the intervention of white settlers, the timber has begun again to encroach upon such areas, and in the Willamette Valley, for example, we now see frequent groves of Douglas spruce (*Pseudotsuga mucronata*) and white fir (*Abies grandis*) about fifty years of age, of remarkably uniform and symmetrical growth, which have developed through their natural seeding without human assistance. ... The Indians probably cannot be accused of starting fires to a large extent accidentally, or of setting fires indiscriminately, but it is undoubtedly true that at certain seasons it was their custom to set fires in the mountains intentionally and systematically, in connection with their fall hunting excursions, when deer were driven together and killed in large numbers (pp. 29-30).

Pinchot was clearly intrigued by Coville’s observations, as most of his article is devoted to the study of fire in forests and he avers that, if not for fire, the coastal Douglas fir (*Pseudotsuga menziesii*) forests of

⁴⁷ According to Brunson et al. (2022), Coville’s study was a “milestone in applied ecology, combining botanical observations, ethnographic interviews, and rigorous logical analysis (p. 374)” making it the “direct progenitor of rangeland science (p. 374).” Coville was later to employ Arthur W. Sampson, a graduate of Frederic Clements’ lab and considered the first range ecologist.

the Pacific Northwest coast would have been replaced by hemlock (*Tsuga heterophylla*). But he also characterizes forest fires as an economic loss to the nation and a threat to profitability

That fires do vast harm we know already, although just what the destruction of its forests will cost the nation is still unknown. Records compiled by the Division of Forestry indicate that the average direct recorded loss from this source is not less than \$20,000,000 a year. To this figure must be added that vast direct loss unrecorded, together with a great but indefinite damage from the effect of forest destruction on water supply, and other losses of immense importance, the deterioration of the soil, the destruction of the young growth, and the loss of the increment which a healthy young forest would have been laying on year by year. ... even now it is safe to assume that for the nation as a whole the loss is represented yearly by a sum much in excess of \$50,000,000 (Pinchot 1899: 29-30).

Because of a concern that wildfires would damage or even lead to complete loss of timberland, Pinchot “staunchly advocated fire suppression and, the political drive to establish complete suppression of fire (Arno and Allison-Bunnell 2002, p.16)” by the federal government as a guard against future clear-cutting and destruction which “ultimately overshadowed the scientific need to study fire’s natural role in the forest (Arno and Allison-Bunnell, 2002, p. 16). However, in the early 1900s, any kind of fire control was haphazard and performed by ad hoc groups of volunteers in communities or poorly paid rangers most of whom lacked knowledge in forestry or fire behavior (Cermak, 2005).

Forest fire destruction in the West accompanied the environmental and economic crises of newly emerging monopolization. Timbering machinery, notably trains, were sources of ignition as the steam engines used waste wood and coal throwing sparks into slash and requiring workers to ride along as spotters and firefighters. The chaotic industrial landscape dominated was by large private industries owning millions of acres and resisting attempts at regulation or taxation for the public good left thousands of acres denuded, polluted, and with piles of slash. Railroad and logging companies alternately left their rights of way overgrown with weeds and small trees that ignited as trains passed or carelessly burned them allowing fires to escape (Hudson, 2011). One of the most prominent examples of this was the catastrophic 1910 conflagrations, known as the Big Blowup, that firmly established fire as a threat to people and property. Big Blowup dramatically ushered in era of complete fire control. According to the

USFS, careless loggers and campers were responsible for the blaze, but “the largest single contributor was the newly constructed Chicago, Milwaukee and Puget Sound Railway, which followed the St Joe River east from St. Maries to Avery, Idaho (Koch, 1978; USFS, 2023).” Nearly 2,000 wildfires started on August 20th and ranged over eastern Washington, Idaho, and eastern Montana feeding on drought-dried vegetation driven by high wind winds. They burned over 3 million acres, destroyed much of the town of Wallace, Idaho and killed 86 people, most of them working class men who had been pressed into day labor as firefighters. When the fire occurred, the USFS was just 5 years into its existence and operating on a fraction of its original budget due to strife within the federal government between Pinchot and Interior Secretary Richard A. Ballinger. The agency, even when it was flush with public money, would have been unprepared for the scale and intensity of the fires. Numerous fires burning across the region necessitated a massive mobilization of 10,000 firefighters including the Army.

Empire Forestry and American Capitalism

The USFS used settler colonial and racist discourse to advance a program of scientific forestry which resulted in a scientifically and ecologically damaging relationship to fire rooted in suppression.

According to Lewis (1999), Pinchot

praised the German forestry theory of the state's duty to preserve forests for their economic value, but warned against blind imitation of their "advanced and minute forest methods" in America primarily because of the many differences in national character and land conditions. France received praise for its high annual revenues from public forestry and for cultivating local support by not having a "hands off" preservation approach. However, the republican traditions and flexible management so evident in Switzerland, he said, presented the best model for America (p.148).

While in Germany, Pinchot studied with the world's leading authority on forestry, Sir Dietrich Brandis, a German who was knighted by the British Empire for introducing empire forestry to Burma and

India.⁴⁸ As Catton (2016) explains, the scientific and managerial basis of this method was alien to traditional Native land management and was premised on three factors endemic to Germany: a scarce land base with scarce forests, a dense population with an abundant and stable workforce, and a standardized approach to forest management. However, land and timber in the West were not scarce, the vast majority of the workforce was poor and itinerant with social tensions running high, and the railroads had opened up ever-greater swathes of forests and grasslands to unregulated cutting and grazing, settlement, and tourism. All of this resulted in large amounts of industrial waste and plenty of intentional and unintentional sources of fire. At the time of the light burning debates, U.S. foresters believed the country was headed toward a timber famine because of the massive cut (Pyne, 1982; Clary, 1988; Hudson, 2011). The concept of the timber famine is similar to the soil depletion that led Marx to formulate an analysis of capitalism's social and environmental disruption known as the metabolic rift (Foster, 1999a; 2000). And just like modern agriculture, scientific forestry, which included fire suppression, significantly aided in widening the rift between humans and the environment. The USFS promoted wildfire suppression as a component of scientific forestry while simultaneously discrediting Indigenous traditional ecological knowledge and minimizing Native fire expertise in an attempt to fully exclude all fire from the landscape. Discursive characterizations of Native fire use as backward were coupled with the argument that free burning fire was a danger to timber resources that necessitated full fire suppression. The takeaway lesson for Pinchot in his early studies before the founding of the Forest Service was to make the forest pay for its own reproduction and management – and it wasn't going to do that if fires from stockmen, the railroads, and private timberlands encroached on the newly demarcated public forests.

⁴⁸ Bagchi (2005) observes, “Arguably the most destructive impact of British conquest on India's environment occurred in the first century of British rule. When conducting military campaigns and flushing out communities resisting dominion, the British often followed a scorch-earth policy, cutting down forests and destroying all natural obstacles against the rapid march of the army (p. 256).” Many of the fortresses were ringed by trees and the British destroyed the forests to eliminate future hiding places. Dam construction ruined soils and forests and British engineers and geologists warned the governments of Bombay and Madras of the cholera, pollution, and famine obtaining from these circumstances. Bombay heeded the warning and set up a forest conservation department on the advice of Brandis to protect forest reserves.

As mentioned above, Pinchot had called for more study of forest-fire dynamics but was wary of using fire, because of the large amounts of waste present on the landscape which were estimated by recent calculations to have been 2 to 7 tons per hectare (~2.5 acres) (Dodge, 1972) were the source of fires and a threat to reproduction. According to Miller and Lewis (1999), in the early 20th century, the history of U.S. forestry was characterized by strenuous debates, not a straightforward scientific paradigm regarding forest management and fire. Both Carl A. Schenck, founder of the Biltmore Forest School, and Gifford Pinchot, founder of Yale School of Forestry, clashed bitterly over their differing approaches to forest management. They agreed on the inapplicability of the German model of forestry to the U.S.⁴⁹ context because of the seemingly inexhaustible timber supply, and also because they both believed that foresters needed to study local conditions and respond to them. However, Schenck promoted a style of scientific forestry that catered to the sons of large landowners and lumber executives who wanted to extract as much timber as possible from their forests and firmly opposed the political stand taken by Pinchot and Teddy Roosevelt who Pinchot was furious that Schenck's version of scientific forestry emphasized employment with private timber companies and "gave greater weight to a knowledge of logging and lumber" over ecological principles, leading him to call Schenck an antichrist (Lewis, 1999, p. 152). But clearly, as Catton puts it, "The main principles of public forestry in 1900 were hardly applicable to the Indian reservations, nor did they resonate with traditional Indian forest values (p. 32)."

Scientific Forestry and Clementsian Science

In the early years of fire exclusion, forestry science⁵⁰ was in its infancy and supported the real economy through the adoption of a utilitarian approach called scientific forestry. Scientific forestry

⁴⁹ Roosevelt and Pinchot and many other conservationists were racists and linked civilization with economic efficiency, disciplined labor, and middle-class values and aspirations (Allen 2013; Taylor 2016). Additionally, Lewis (1999) alone and with coauthor Char Miller (1999) uses primary research such as letters, autobiographies, etc. to show that Pinchot did not subscribe to the German model and fought vehemently against an application of wholesale cutting.

⁵⁰ Fire science didn't exist until the late 1930s.

aimed to maintain profitable lumber productivity and protect the resource base for future use. There were arguments in favor of prescribed burns or “light burning” in print as early as the 1880s, long before the advent of public forests when stockmen and timberland owners used fire to increase the value and productivity of their lands (Arno 2017). The fight eventually became one between larger timber owners, who favored light burning, and Forest Service officials who favored fire exclusion as part of the national plan to conserve public forests under the control of the federal government. According to Arno (2017), what

Gifford Pinchot and William Greeley refused to accept was that frontier laissez-faire burning practices could be allowed to coexist with systematic fire protection, which increasingly became the forester’s mission. Foresters saw light burning, derisively called “Piute burning” by Forest Service leaders, as a political threat, and they refused entreaties from advocates of burning to develop procedures for applying fire as a forestry practice (p. 15).

During the time of the Roosevelt/Pinchot push for federal regulation of the forests, the work of the founder of ecology, Frederic E. Clements’s (1910) holistic philosophy of succession was influential in forestry and soil conservation circles both as a sociological concept as well as an ecological one. Progressive Era fire control and state-sponsored conservation science emphasized the holistic Clementsian model of forestry. At the time of the light burning debates within the USFS there was no argument that Indigenous people used fire to manage the landscape, but they used it extensively which “in the view of early conservationists, violated the precepts of sound scientific forestry (Brown, 2008, p. 33).” Many foresters accepted the holistic sociological notion that humanity followed nature in a progression toward a civilizational peak. How societies used fire and what they used it for was seen as a marker of the developmental stage of civilization. When applied to human beings this developmentalism held that the fire-setting among Indigenous people and mercantilist settlers was a lower form of social maturity (Pyne 1997). And while Clements did not express any overtly racist views, he was greatly influenced by sociologists Herbert Spencer and Lester Frank Ward.⁵¹ Clements drew directly on Ward’s sociological

⁵¹ Ward was a liberal reformer, idealist, and part of the “revolt against formalism” in science that included John Dewey, Thorstein Veblen, and others. Ward believed in universal education as an avenue to “overthrowing every

concepts to develop his succession model that attributed ontological qualities to vegetative formations, or what would now be called plant communities. He further viewed successional climax, or the maturation of plant communities, as the most desirable quality for ecosystems (Schiff, 1966; Lee, 1987).

Clements' 1916 *Plant Succession: An Analysis of the Development of Vegetation* was a bold argument for a general theory of the evolution of plant communities and established him as the leading theorist and spokesperson of American ecology. Clements conceived of forests as superorganisms in which each "organism occupying any particular niche affects and is affected by the entire web of living and nonliving environmental (Merchant 1980: 100)." Trees were seen as a single organism of confederated embedded in larger one whose and understood to grow together in succession and eventual climax. Clements's 1910 *The Life History of Lodgepole Burn Forests*, surveyed burns of lodgepole pines and actually advocated for burning:

The use of fire as a silvicultural agent of the forester will make it possible to secure whichever result is desired. The artificial treatment of lodgepole forests rests upon the three silvicultural methods, namely, burning, cutting, and planting (p. 55).

Clements argued that fire was useful in high altitudes as a silvicultural agent for eliminating competition, seedbed preparation, improving sunlight exposure, and removing squirrels and other seed-eaters from the landscape. But he also argued that "the best results will be obtained in pure or nearly pure lodgepole stands by clearcutting of the entire forest, followed by thorough burning (p. 56)" to prepare the ground prepared for the climax species. This unidirectional model identified the climax species as a sign of forest equilibrium in which all members of the forest community formed a functional, stable superorganism. As

species of hierarchy" and removing "all artificial inequality" and leaving "the natural inequalities to find their true level (qtd in Lewontin 1996: 21)." The operant word is *artificial*, because at that time, most science subscribed to a belief in the hierarchical distribution within the social structure of people based on so-called natural abilities. According to this belief Native Americans, Africans, Jews, Irish, Italian, Polish, people with disabilities, homosexuals, poor and homeless people and people with other social and physical characteristics fell on a continuum. The revolt against formalism upheld the hierarchy but sought to remove barriers to natural development.

Cronon (2003) observes

This functionalist emphasis on equilibrium and climax had important consequences, for it tended to remove ecological communities from history. If all ecological change was either self-equilibrating (moving toward climax) or nonexistent (remaining in the static condition of climax), then history was more or less absent except in the very long time frame of climatic change or Darwinian evolution. The result was a paradox (p.10).

In contrast to the Kuhnian concept of paradigms, Marxist scientists (Lewontin and Levins, 2007) argue that holistic models have always existed alongside reductive ones in science and in a certain sense the arguments about light burning exemplified this. Levins and Lewontin (1985) criticize the Clementsian understanding of ecology because it holds that

the superorganism paradigm is indeed idealistic. Its community is the expression of some general organizing principle, some balance or harmony of nature. The behavior of the parts is wholly subordinated to this abstract principle, which causes the community to develop toward the maximization of efficiency, productivity, stability, or some other civic virtue (p. 135)

Foresters on both sides of the fire divide seized on Clements's ideas because they were primarily concerned with increasing efficiency and ensuring the long-term economic viability of production. Clements was a progressive who was aware of the ways in which capitalist extraction was clearly leading to soil erosion, pollution, deforestation, and wildfires and though he had little to say about the role of Native peoples as agents of change on the landscape, he believed humans should engage with nature in a sustainable way (Kingsland, 2005). Some timber and sawmill owners accepted Clements's view of fire as a way to improve forest reproduction and ensure long-term exchange value as part of a program of practical forestry (Hoxie, 1910).

A Band of Warring Brothers: Fire as Servant

Scientific forestry and fire suppression provided justification for the existence of the USFS, as the agency aided capital by providing free or low-cost fire protection and technical assistance while having

no say over how it dealt with its cutover forests. The light burning controversy was more a square-off between monopoly capital and the state over control of the specific mode or style of capitalist production (Kolko, 1977; Clary, 1988). As Hudson (2011) has convincingly argued, the agency's funding comes from timber concessions, Congressional appropriations, and fire suppression activities making it beholden to capital.

Government foresters refused to entertain light burning, which they denigrated variously as Indian burning, Piute forestry or Paiute forestry, partly because of ignorance of forest ecology whereby all forests were seen as similar and uniform protection from disturbance was seen to contribute to large merchantable stands with sufficient reproductive capacity (Arno and Allison-Bunnell, 2002; Arno, 2017; Vinyeta, 2021). Secretary of the Interior and former Commissioner of the General Land Office Richard A. Ballinger and arch enemy of Pinchot's conservationist stance argued for light burning saying, "we may find it necessary to revert to the old Indian method of burning over the forests annually at a seasonable period (Ballinger qtd in Pyne, 1982, pp. 262-263)." Ballinger's comments cannot be taken to mean that he supported Native cultural burns. As an ardent capitalist, he fervently and officially lobbied for business interests and deregulation of extractive industries and was mired in scandals involving preferential bids on public lands for banks, hydroelectric, coal, and copper monopolies. Pinchot was fired when he accused Ballinger of corruption (Taylor, 2016; Miller, 2001; Pyne, 1982).

As Hudson (2011) attests, fire suppression on a national level as well as in the states occurred against a backdrop of cut-and-run timber harvesting with long-term stagnation and persistent unemployment and underemployment. The Forest Service promoted fire suppression as a conservation measure in the face of incredible forest destruction with a view toward long-term economic use. Neither preservationists, like John Muir, who wanted the wilderness preserved from any human influence, nor the conservationists like Gifford Pinchot, who believed in government oversight of forests, waterways, and soil in the interest of economic growth, believed that Native people should have land management rights. dismissed their critical role in ensuring forest resilience through fire.

Support for light burning was led by rapidly emerging monopolies such as Southern Pacific Railroad. The motivations of the timber, railroad, and energy monopolies could not have been more divergent from Indigenous interests or land management regardless of rhetoric. While the discursive battle over light burning drew on pejorative descriptions of Indigenous burning on the USFS's side and acknowledgement of Indigenous land management through fire on the other, their sole focus was on profitability. The timber barons and practical foresters proposed enlisting fire as a *servant*, not an honored relative, to produce exchange values and higher profits. Certainly, these groups supported and used seasonal firing of natural residues associated with their industries, which they saw as an efficiency method, but their economic interests lay in stealing and clearcutting vast acres of Indigenous land that they had acquired illegally through the 1878 Free Timber and Stone and Timber Acts (Barton, 2004; Godfrey, 2005; Arno, 2012; Taylor, 2016; Middleton Manning and Reed, 2019). The squabble between the monopolists in favor of light burning and those opposed to it resembles what Marx (1989 [1863]) described as the equalization of competition by a band of warring "hostile brothers" who "divide among themselves the loot of other people's" stolen land and exploited labor "so that on an average one receives the same amount of unpaid labor as another (p. 264)."

By 1910, the federal government had set aside millions of acres of forest to protect them from timber monopolies when the debate over light burning raged in the pages of *Sunset* magazine and elsewhere. While some of the articles in *Sunset* and forestry journals from that time mention "Indians" or "Piute" burning such as William Greeley's "'Piute Forestry' or the Fallacy of Light Burning," and Boerker's "Light Burning versus Forest Management Northern California," the focus is on economic values. George L. Hoxie, a California timberman associated with the Southern Pacific Railroad, campaigned to urge the Forest Service to allow timber companies to engage in burning, because, in his practical experience, he had seen the benefits of fire on timberlands firsthand (Rothman, 2007). In August, just before the 1910 fires, Hoxie published an article in *Sunset* magazine arguing for light burning and warning that if underbrush were not burned periodically, fire would become a master of humans rather than a servant. Hoxie (1910), acknowledged Native cultural burning since time immemorial, and

argued that practical foresters also had recognized fire's importance as a preserver of timber's exchange value, but he did not argue that fire has intrinsic value aside from its utility to capital as a servant. Hoxie, thus urged fellow timber barons to invite the

aid of fire as a servant, not as a master. It will surely be master in a very short time unless the Federal Government changes its ways by eliminating the theoretical and grasping the practical (Hoxie, 1910, pp. 145-146).

Pyne (1982) observes that support for light burning as fire prevention among timber and sawmill owners such as Hoxie was curious but attributable to the fact that many of them were not impressed with the credentials of professional foresters and opposed the protectionism of the federal government. Proponents of light burning called into question the Forest Service's credibility as a repository of technical forestry expertise and its focus on conservation as well as its ability to engage in systematic fire suppression. Foresters, like Hoxie favored burning because of the material conditions on the ground in which wholesale cutting and burning had left large amounts of slash and even-aged trees that were easily destroyed by the next dropped cigarette or sparks from a passing train, destroying profits. The kind of burning done by Miwok and other Native Sierra Nevadans was not uniform and industrial but created mosaics of species rather than the uniform, economically valuable, even-aged monocropped trees foresters needed to maintain profit. Hoxie's argument has to do with economics and reads,

... how keen has been the speculative spirit to acquire these burned over forest areas – so much so that the Federal Government saw fit to take a hand and withdraw them from sale and incidentally raise the price of stumpage to more than double that for which private owners of timbered areas would be glad to sell their stumpage, and this in the face of the fact that private holdings are subject to state and county taxation (Hoxie, 1910, p. 146).

Light burning opponent Richard Boerker (1912), estimated that 2,000,000 acres of land covered by brush represented a loss of \$50-\$100 (~\$1,600 - \$3,000 today) that could be growing timber and direct losses of \$700,000,000 (~\$22 bn. today). Boerker raises the issue of forest extinction while also betraying at least a partial, if racist, understanding of cultural burns when he states that

Of all the methods of using fire as a servant, the "light-burning" theory is the oldest, the most important, and at the same time the most undesirable and the most mischievous, from the standpoint of Forestry. The term "light-burning" has been used to denote many different kinds of burning. "Light-burning" must be distinguished from all other uses of fire, in that it aims, by means of a light, rapid burn to rid the forest of needles, small dry branches, brush, weeds, and reproduction, in order to improve the pasture; or sometimes to make travel through the woods easier, or to drive out the game. This is the so-called Indian method of "light-burning;" this object was not forest protection, it was far from that, it was forest devastation pure and simple. Like all pioneers, his object was to destroy the forests so that he could make the soil serve his purposes (pp. 184-185).

In condemning the "Indian method" of using fire as a servant Boerker was responding directly to comments made by entrepreneur and lumber mill owner George L. Hoxie,⁵² who railed against government stumpage fees and attempts to regulate the industry's rapacious land acquisition and cutting. Hoxie and other timber barons advanced light burning as a way to efficiently eliminate competition from saplings and brush to maximize tree growth, making it easier to log. They approvingly mentioned Native fire practices not because they felt any affinity for Native people but because establishing a history of innocuous past fires set by humans strengthened their position in favor of light burning which they saw as an avenue to lowered stumpage fees, simplified logging, and more profits.

Foresters also favored voluntary and county protection over comprehensive fire suppression, as they feared that public laws and funding would eat into their profits through higher taxes on land and forest products. Increasing technological efficiency created a crisis of overproduction, lowering prices, lessening consumer demand, and forcing timber holders to liquidate forests quickly to lock in profits, leading the industry to resist attempts at environmental regulation (Baran and Sweezy, 1966; Blackford, 1975). According to Blackford (1975) in the many years previous to Hoxie's call for returning fire to the land and acquiring burnt over forests, lumber companies bought California's forest land at low prices and logged them off. Firms maximized their profits by clear cutting their timber stands, exploiting their

⁵² Hoxie's 1932 book *Men, Money and Mergers* was an unalloyed celebration of monopoly capitalism and an argument against government regulation and anti-trust legislation. His defense of industry conflated democratic individualism with the right of public monopolies like PG&E, Great Western Electric, and Southern Pacific to do as they pleased.

workers, refusing to pay the annual state property taxes, and eventually forfeiting thousands of acres of cut-over, slash-filled land back to the state at no cost (Blackford 1975). According to Blackford (1975)

Most lumbermen initially resisted forestry legislation as uneconomical, given the nature of their industry. In the late 19th and early 20th centuries California lumbermen operated in an industry plagued by chronic overproduction and low prices. This situation proved especially troublesome as the costs of production began to rise because of the expenses of acquiring increasingly complex logging and milling machinery and of growing demands by labor for higher wages (p. 68)

Having accrued an economic surplus and contributed to uncontrolled fires, California's foresters faulted the federal government for attempting to ameliorate the problem accusing it of removing forests from commerce by taking them into the public domain, imposing strict environmental regulations, and charging high taxes. While some lumber and railroad executives did recognize the ecological importance of fire in the Sierra Nevada, economic interest and a desire to avoid stricter federal regulation, primarily motivated all industries.

Rules of The Master

In *Dialectics of Nature*, Engels (1925/1987 [1867]) highlights the interdependence of humans and nonhuman nature and the importance of allowing for the natural regeneration of forests in dynamic relation to sustainable social metabolism. Tracing historical monumental works by various civilizations, he warns that human arrogance and unsustainable withdrawal risks the revenge of nature

Let us not, however, flatter ourselves overmuch on account of our human victories over nature. For each such victory nature takes its revenge on us. Each victory, it is true, in the first place brings about the results we expected, but in the second and third places it has quite different, unforeseen effects which only too often cancel the first. The people who, in Mesopotamia, Greece, Asia Minor and elsewhere, destroyed the forests to obtain cultivable land, never dreamed that by removing along with the forests the collecting centres and reservoirs of moisture they were laying the basis for the present forlorn state of those countries. When the Italians of the Alps used up the pine forests on the southern slopes, so carefully cherished on the northern slopes, they had no inkling that by doing so they were cutting at the roots of the dairy industry in their region; they had still less inkling that they were thereby depriving their mountain springs of water for the greater part of the year, and making it possible for them to pour still more furious torrents on the plains during the rainy seasons. ... Thus at every step we are reminded that we by no means rule over nature like a conqueror over a foreign people, like someone standing

outside nature—but that we, with flesh, blood and brain, belong to nature, and exist in its midst... (pp. 460-461).

Engels concludes the passage observing that the chief advantage of humans over our animal relatives is the ability to make scientifically informed, long-term decisions subject to nature's laws and its needs. Unfortunately, in the early 20th century the unscientific and economically-driven policy of swift and complete fire suppression directly subverted the sustainability and needs of western forests.

By 1909, under aegis of scientific forestry, almost 28 million acres, or 25% of California's land was under public ownership with support from Progressive politicians, city dwellers and the agricultural sector following decades of open access by large corporations, entrepreneurs, and anyone passing through the forest, whose casual and careless use of the landscape, frequently caused fires. The 1910 Big Blowup, a series of catastrophic wildfires in Idaho, Montana, Washington, and Oregon, profoundly changed fire policy ushering in support for complete fire suppression. Whereas, Native fire knowledge was developed with an aim to enhance the growth of trees and plants to provide sustenance for human and non-human communities in an atmosphere of reciprocity, capitalist economic priorities fostered a debate between the timber industry and the Forest Service over the correct approach to insuring long-term economic sustainability at the least cost. Ironically, scientific forestry as it was envisioned by the USFS under Pinchot, in contrast to the practical forestry version of the timber industry, was (faintly) attempting to mediate the egregious environmental effects of capital accumulation.

After the Big Blowup, leaders within the Forest Service opposed the viewpoint that fire could be used to clear slash, undergrowth, and smaller trees to prevent disastrous forest fires. The 1911 Weeks Act provided money for the purchase of land by the federal government, funded forestry science, and mandated the cooperation of states with the Forest Service (Pinchot 1914). Acreage administered by the federal government through the Weeks Act stands at about 20 million acres today. The Act's fire protection provisions effectively banned most fire-setting, especially the cultural burns of Indigenous people (Norgaard, 2019). Hudson (2011) observes that industrial lumber companies were initially

vehemently opposed to the acquisition of land by the government but supported the fire provisions in the law as they realized that public monies would now be supporting fire suppression on their own lands enabling them to increase their stumpage values. This is partly the case but, in reality with money going to counties and voluntary fire suppression taken on only by the largest timber owners, fires were common and opposition was still fierce in the face of an unstable labor market and low lumber prices. Berry (1917) observes that in the face of a volatile market, the cost of protecting the timberlands from fire was “a charge for carrying stumpage rather than for logging (92).” Additionally, a “considerable proportion of the firefighting done by (p. 92)” companies was for the protection of chutes, cables, trestles, camps (p. 92),” and other infrastructure.

Despite all the efforts of the agency in California, the timber industry was divided. The redwood owners closer to the coast resisted fire legislation because they continued to use fire to clear their lands while the Sugar and White Pine Manufacturers that represented companies like the California Door Company favored fire control, as they had had several bad fire seasons that damaged timber. It wasn't until the advent of World War I that fire suppression won complete support from capital in California. Blackford (1975) argues

It was the outbreak of World War I, more than any other single event, that made scientific forestry and, in particular, forest fire prevention measures, acceptable to California lumbermen. Throughout the prewar years most lumbermen opposed strict scientific forestry legislation as too expensive, given the over-production and low prices endemic to their business. The war dramatically changed this situation. It boosted demands for lumber and caused a sharp rise in the prices California lumbermen received for their product ... The war furthered the cause of scientific forestry in other ways as well. Most important, it riveted attention on forests as resources essential for national security and made the prevention of their destruction a matter of public concern (p. 73).

Following the catastrophic 1910 fires, the federal adoption of aggressive measures aimed at extinguishing all wildfire did not provide for any complementary programs for reducing fuel loads with vegetation management (Busenberg, 2004; Pyne, 1982). Schiff (1962) observes that once full suppression was accepted, technocratic solutions ruled over scientific evidence and took on the proportions of a crusade

In the field of fire protection, as one critic of Forest Service policy remarked, ‘twenty years or so of iteration and auto-suggestion has made of complete fire protection, in all circumstances and regardless of conditions, not a theory but a religion, an *idée fixe* ...’ Thus had evangelism subverted a scientific program ... (Schiff, 1962, p. 115).

In response to the Big Blowup, Coert DuBois published (1914) *Systematic Fire Protection in the California Forests* argued for scientific management of fire suppression aimed at preventing fires like the ones that had occurred in 1910. The manual included fuel compositions, calculations for potential rates of spread, six different gaits for horses matched to the appropriate situation and terrain, fire crew ration lists, advice on coordination of fire tool use, and recommendations for the best types of communication systems such as the Myer code, favored by the Army Signal Corps. Pyne (1982) has observed that DuBois’s manual’s “passion for Cartesian logic, its quest for ‘mathematical certainty’ (p 266)” highlighted the emphasis on mechanization that led to joint cooperation between the Forest Service and the Army Air Service in 1919.

Despite DuBois’ passion for total control over fire, there was not sufficient funding or a labor force to carry out the ambitions of the agency to stamp to banish all fire from the woods until the advent of the Great Depression which saw a great number of dislocated, young, workers who were desperate and restive. This group of impoverished men became the first truly organized and professional force to serve as dedicated wildland firefighters. The zeal for control within the agency depended on the USFS’s linkage of production values with a disciplined and obedient workforce and public voluntarism and social control through the application of the social sciences to normalize total suppression. Without the New Deal, it is doubtful that the agency could have secured funding for fire suppression or would have the type of organization that it does today.

CHAPTER IV

THE INCENDIARY OTHERS: THE RESERVE ARMY OF LABOR

The current wildfire catastrophes represent an accumulation of historic catastrophes linking the destruction of forests with the displacement, criminalization, and exploitation of so-called surplus populations (Marx, 1976 [1867], p. 782)” which are connected to the “violent fluctuations (p. 782)” and crises of capital. The institution of fire suppression accompanied fierce competition and mergers among monopolies that caused dramatic crises and stagnation leading to displacement. Massive extraction of natural resources in the West developed along with industrialization in the East. From the late 1800s through the institution of the Forest Service, firms chronically overproduced goods and faced price deflation, but by the turn of the century monopolies began to cooperate through agreements on production and prices, and later control of patents as well. Concentration of capital through the financial system, governed by the likes of J.P. Morgan, drove the assets in stocks and bonds from single digits in the late 1800s to nearly 50% or higher by the early 1900s. To circumvent gains in earnings by workers

In his well-known work, *The Condition of the Working Class in England*, Engels (1892) meticulously examines the environmental and epidemiological record of Manchester’s textile mills. He documents the horrific effects of life in and around the slums at the close of the 19th century. In that work, Engels outlines the relationship of ethnicity and other factors that segmented the working class into various strata. He describes the misery and degradation of the immigrant Irish relative to the native English slumdweller and emphasizes how this absolute debasement lubricates the functionality of capitalism by mobilizing large numbers of free laborers willing to work for meagre wages. Engels observes that the more impoverished and desperate the workers are, the more likely they will be to take work at lower wages, and he showed that the existence of the subproletariat Irish enabled capital to push down the standard of working and living conditions along with wages for the entire workforce. In the countryside rural poor farmworkers vented their rage against the landlords, farm and mill owners by resorting to social warfare by “incendiarism (Engels, 1892, p. 266)” during times of unemployment when

they were nevertheless expected to pay rent. Many of these workers were displaced by mechanization, high rents, tithing, and other forms of expropriation. The U.S. was no exception, where USFS officials raged against worker-set fires that were sometimes ignited out of outrage at union-busting and at other times, desperate attempts to secure employment as firefighters. The deforestation and large amounts of slashing drying on hillsides around logging operations, mills, and rail lines afforded plenty of fuel. Officials rarely distinguished between Indigenous cultural burns, so-called “job fires (Conners, 1998),” and fires of protest; all fires were treated as a threat to production of wood, water, and recreation values, and the agency sought the help of the newly emerging social sciences, particularly the Durkheimian normative strain, a spoonful of sugar, to educate and instill in its employees and the public the view that free-burning forest fires were to be avoided and controlled. Surplus populations were a valuable resource to fire agencies in times of crisis and it was imperative that they be disciplined to accept the values of clean forests, hard work, and patriotic duty. Anti-social and unproductive behaviors were characterized in negative terms and seen as an obstacle to the functioning of economic and the ecological systems that were to be condemned and corrected.

In his provocative article “The Case for Letting Malibu Burn,” Mike Davis (1995) exposes capital’s disingenuous linkage of class and crime. Davis documents the sharp contrasts between hysteria over wildfires that burn the mansions of the suburban rich and the blasé approach to the apartment fires of the poor and uses the term, “incendiary other” to describe the how wealthy white suburbanites conflate their fears of disaster with terror of homeless people, people of color, and others

The homeless also cast fiery shadows in Southern California's social imaginary. The Eaton Canyon fire, accidentally triggered by a transient, seemed to confirm mountain and canyon homeowners' worst fears of an invisible army lurking in the brush. Clandestine hobo encampments, like those in Tuna Canyon along the Malibu coast, were singled out as intolerable fire hazards. Blazes of indeterminate origin were routinely ascribed to the homeless (p. 22).

He observes that capital is in a constant search “of an ‘incendiary Other’” who in the early 1900s “was portrayed as an Indian, sheepherder, or, most frequently, a tramp” and later as a Wobbly, migrant farmworker, an Okie, or “Axis saboteurs (p. 23).” This chapter observes that it was precisely these types

of surplus people that the nation enlisted to carry out fire suppression in times of stagnation and crisis. From its early beginnings fire suppression has relied on a majority of seasonal employees. Despite the relatively recent inclusion of permanent and semi-permanent personnel, wildland firefighting has primarily relied on the dislocated workers, the poor, and convicts – what Marx termed the reserve army of labor – to save towns and natural resources. There are numerous ways that wildfire suppression by the federal government enables private interests to realize increased profitability and federal policies that govern labor dynamics is of particular interest to capital.

The Environmental Proletariat: Wildland Firefighters Today

One of the taken-for-granted features of the devastating forest fire complexes that have now become the new normal includes the massive mobilization of personnel and hardware organized to fight them. Every fire season, news media is awash with images of roadside banners reading “Thank You, Firefighters!” and lauding the women and men fighting wildland fires as heroes. According to Feldman (2017), in the rural communities of the U.S. West affected by wildfire, “wildland firefighters are not heroes abstractly, but in a directly personal way – landscapes bear the charcoal scars of fires past, and residents remember which crews saved their properties and open spaces. (p. 1).”

While Desmond (2007) cites the job as dangerous, the largest percentages of firefighter fatalities from 1990-1998 were due to aircraft and auto crashes which both hover around 20%, followed by medical events such as heart attacks and strokes, also around 20%; burnovers were about 28.5% (Mangan, 1999). By 2007, deaths did increase by 26% – from plane and auto crashes. Moreover, the National Wildfire Coordinating Group (2017) reported that by 2012, the leading cause of death was not burnovers but was instead “medical events, such as heart attacks and strokes ... followed by vehicle-related incidents and aviation-related incidents (p. 1).” Fatalities from burnovers, the only fatality rate to drop, went down (to 14.5%) after the Forest Service underwent a “culture shift” and implemented anonymous firefighter safety reporting, leadership training and other measures (NWCG, 2017).

In the last few years, as megafires have become increasingly destructive, filmmakers have sought to capitalize on the tragedy, the transcendent heroism, and the redemption of being a wildland firefighter. For instance, in 2017, Columbia Pictures' *Only the Brave*, fictionalized the fatal entrapment of the 19 Granite Mountain Hotshots on the 2013 Yarnell Hill Fire in Arizona. Also, in 2017, Netflix featured the Leonardo DiCaprio-produced *Fire Chasers*, in which firefighters themselves documented work on the line during the 2016 fire season with hardhat-mounted cameras. And in 2018, *Wildland* filmmakers trained alongside formerly incarcerated men, adventure seekers, recovering addicts, and ordinary people working for Oregon's private firefighting company Grayback Forestry. As one fire boss tells his crew in *Wildland*, "Fighting fire is just long hours of hard, boring work punctuated by moments of sheer terror."⁵³ The hero myth obscures the ignoble beginnings of the profession and the mundane labor relations common to all jobs under capitalist societies. Pyne (2015) observes that, "for all the flushes of adrenaline, it was a life of daily hard labor based on stamina and a strong back (p. 12)."

Historically, fire crews, have been manual laborers and remain so today. As the 2021 fire season got underway, the USFS and other agencies were struggling to find personnel. In some districts, understaffing was as high as 20% despite vigorous recruiting leaving forests and nearby cities vulnerable. Enter U.S. Representative Tom McClintock (Republican, California) whose district is located in the former goldmining area known as the Mother Lode that includes multiple areas of national forestland and two national parks along the Sierra Nevada mountains. One of the forests, the Stanislaus National Forest, was facing a 25% deficit of firefighters. McClintock blamed the shortage of wildland firefighters on overly generous COVID-19 benefits that he opposed as a "massive wealth transfer." On his website, McClintock argued:

... If the aid were targeted to those who have been devastated by the lockdowns, it might be justified. But the bill makes no such distinction. Neither the personal nor first-time PPP grants are contingent on the recipient being financially harmed by the lockdowns. (Although the second round PPP grants do to some extent). The aid is wholly inadequate for those who were harmed and wholly unnecessary for those who weren't. In effect, this becomes a massive wealth transfer from victims to non-victims. ..."

⁵³ <https://www.youtube.com/watch?v=icgEDDr1R28>

Earlier in the year McClintock explained his refusal to vote for COVID relief because it amounted to a \$32,000 yearly salary. Drawing on Bank of America data, the Congressman argued

for a job that gives you 365 days a year off and you are your own boss ... Wildfire firefighting is hot, miserable work, but it is not skilled labor. ... This is one of the principle reasons I voted against these enhanced benefits. ... Once the labor market returns to normal, then we can determine a wage that will fill those vacancies.

Wildland firefighting is marked, like the majority of work in the U.S., by increasing precariousness.

Research by the advocacy organization *Grassroots Wildland Firefighters*, found that the majority of wildland firefighter from entry-level (GS-03) to highly trained supervisors (GS-09), could not afford to live in most western US counties. The study used US government data for rent, food, and transportation and applied the 50-30-20 budgeting which allocates half of income to necessities like food, housing, and utility bills, a third more on non-essential items such as vacations and nights out, and roughly a quarter for savings or retirement. GWF deemed counties whose cost of living amounted to less than 50% of the salary to be affordable. Using wildland firefighter salaries available from the U.S. Office of Personnel Management for 2022 and assuming a full annual salary during a 6-month fire averaging 65-hours per weeks to account for overtime, GWF analyzed 2022 salaries of the analysts found that, “the price of a 1-bedroom rental, monthly food costs, and the total monthly costs of owning a car” accounted for more than 50% of wildland firefighter salary for GS-03 through GS-09. Utilities, healthcare, childcare and retirement costs were not included in the analysis, meaning that some basic requirements for work were not covered. By refusing to provide a living wage to wildland firefighters who are protecting, not only public lands but their own towns and reservations as well private business, the federal government enables capital to realize extra profit with no additional costs to itself which are borne by firefighters and their families. During the 2021 fire season *The Guardian* published a series of articles focused on the rash of massive wildfires affecting the US West including wildland firefighters’ mental health problems, higher suicide and alcohol abuse rates, homelessness, and relationship stress. *Grassroots Wildland Firefighters*, an advocacy of group of federal wildland firefighters has identified a number of labor

concerns including injuries, pay disparities between other federal employees and other fire services, and health issues.

From its beginnings the Forest Service, has been a utilitarian arm of the state assisting capital in the aim to maximize profitable production from the land while also cleaving to bourgeois social reformism that is fraught with contradictions. Foresters affiliated with the Forest Service, affiliated as many of them were with the political capitalism of Teddy Roosevelt which sought to cultivate the U.S. capitalist economy, but passed antitrust legislation (Kolko 1977). Progressives called for women's suffrage, campaign finance reform, and shorter hours and better wages for workers while at the same time moving to expand trade and investments abroad and project U.S. imperial (Pinchot, 1905, 1910, 1914; Pyne, 1982; Clary, 1988; Bankoff, 2009; Smith, 2017). At its outset, the USFS adopted fire suppression in a contradictory battle with timber interests, attempting to regulate the industry's wasteful and dangerous practices by federalizing firefighting to protect timber resources on private and public land while also pursuing timber sales as a form of revenue. As Schnaiberg (1980) explains "the Roosevelt-Pinchot era in early twentieth century America ..."

had two forms: conservation-efficiency and conservation preservation. The first dominated the Roosevelt period. In conjunction with other regulation, it helped increase the intensity of political capitalism rather than restraining monopoly capital expansion (p. 379).

Desmond (2008) observes that "it is the poor and the working class who hold the line" in wildfires. Most of social scientific analyses of labor in wildland fire are ethnographies focused on identity and cultural implications of masculinity and organizational logic (Desmond, 2006, 2007, 2011) and gendered harassment and discrimination (Ericksen et al., 2016). Interestingly, the most extensive literature deals with incarcerated wildland firefighters, dealing with topics such as self-definition (Feldman, 2017, 2020), racialized identity (Goodman, 2012; 2014) and discursive characterizations of prison labor as economical (Polick-Kirkpatrick, 2019). These examinations do little to explain the role profit accumulation plays in shaping labor arrangements in response to wildfire. Foster, Clark, and York (2010) comment that these types of examination "result is an inability to conceive of adequate causes, which are invariably

structural, operating ‘behind the backs’ of individuals (p. 23).” Wildland firefighting, despite the relatively recent inclusion of permanent and semi-permanent personnel, has primarily relied on vagrants, convicts, and the poor – what Marx termed the reserve army of labor – to save towns and forest reserves.

We know that being a wildland firefighter is considered heroic and is a male-dominated job with ample helpings of gender discrimination for women who enter it. And we can guess that being a firefighter gives an incarcerated person a sense of agency and pride, and provides a sense of belonging outside the prison walls. However, as Burawoy (2017) argues in a review of Desmond’s brand of relational ethnography, these types of studies, enlightening as they are, eschew a theoretical structural analysis. Moreover, this attempt to describe and analyze particular groups of people, finding a unique typology or habitus replicates the liberal practicality C.W. Mills (1959) denounced in *The Sociological Imagination*. Mills argued that “American sociologists have tended strongly to take up one empirical detail, one problem of milieu, at a time” pursuing numerous causes while eschewing structural analysis in favor of discrete, piecemeal reforms (Mills, 1959, p. 85). We must examine how fire suppression work became formalized in relation to capital, because as we have established, fire suppression originated as a way to protect forests exchange values. The first and only reason that wildland firefighters join fire suppression crews is under the conditions of what Marx (1976 [1867]) called the “silent compulsion of economic relations (p. 899)” which spring from the “natural laws of production (p.899)” – in other words, in a capitalist society, if you don’t work, you won’t eat. The rhetoric of fire suppression as the mainstream view that developed at the turn of the 20th century and was harnessed by the USFS has certainly had an enduring imprint on Americans’ view of wildfire and the deployability of firefighters, but the brutal objective conditions of labor, coupled with the physical, psychological, and legal control developed by sociology and psychology present the most convincing coercion.

Marxist analysis recognizes that capitalism produces inequalities and exploits them for its own ends. People who work produce surplus value, which is the amount of productive labor that generates more than is absolutely necessary to maintain the subsistence of the worker. Marx argued that the capitalist labor process, though historically-conditioned, produces surplus value that is appropriated by

capitalists. In a monopoly capitalist system such as that which came into existence in the late 19th century and proceeded to the up to the 1970s, gains in efficiency through technological advancements such as the steam engine, railroads, planes, and, other processes, caused the real economy to endure boom-bust cycles and periods of stagnation. The continual motion not just of capitalist accumulation but also of the environmental crises it engenders dislodges and mobilizes workers and remakes the workplace. Speculation booms put workers in the mills and forests while stagnation and depressions push them out. Every improvement in efficiency and mechanization creates a different class of workers with different skills that must be learned and honed leaving others behind. Meanwhile the rampant cutting and waste of materials as more timber is cut and more slash accumulates serves to mobilize unemployed workers to fight fires at a fraction of the cost of true ecologically and socially sustainable production. The increasing wealth and competition of the individual capitals depends on a surplus labor force that becomes “the lever of capitalist accumulation, indeed it becomes a condition for the existence of the capitalist mode of production (Marx Vol. 1: 784)” as it forms a disposal labor force – a reserve army – of unemployed and semi-employed workers.

Much criticism has been leveled at Harry Braverman’s concept of deskilling as a fixture in monopoly capitalism but insufficient attention has been paid to the historical sweep of his analysis (Foster, 1999; Jonna 2015). Braverman followed Baran and Sweezy (1966) in recognizing that the development of monopoly capitalism resulted in the crushing of craftwork and small business, dispersing and diverting the working population into the large workforces laboring in the various industries. The large influx of labor is overseen by a growing managerial class and pitched to by advertising departments turning workers into just so many “interchangeable parts (Braverman, 1974, p. 125)” to be taken up or discarded, as large corporate entities accrued ever-growing economic surpluses. According to Braverman (1974), the crises and stagnation that monopoly capitalism unleashes on the economy affects the labor process in two ways: incessant change in working conditions and infrastructure and redistribution of workers of various industries and occupations.

Capital benefits from fire suppression by not paying the full cost of dealing with the environmental problems it produces. These include deforestation and large amounts of slash, biodiversity loss, siltation of streams from erosion. Since having its resources protected by the government's employees' suppression efforts. Additionally, capital needs a mobile workforce that can be called into service when needed and dismissed when no longer necessary. However, to remain competitive, monopolies must increase efficiency using technology and workplace discipline to speed up production. Braverman called this discipline process habituation. Efficiency measures shrink the labor force, throwing people out of work and leading to increased mobility of workers, but this coincides with increased control over the workplace and even reaching into workers' private lives. Examples of this type of management are separate, highly specialized departments within the workplace with little crossover and production targets. With regard to social reproduction, or activities that workers engage in while not at the workplace, drug tests and background checks enforce discipline. Since monopoly capitalism is prone to crises of stagnation and dramatic crashes that inevitably affect workers visiting upon them various economic vicissitudes such as inflation and higher prices, lower wages, higher debts, etc., unemployment and underemployment serve as a whip to drive people back to work. While not well-documented, there is some evidence that Braverman's most valuable contribution is not just in recognizing that this process strips workers of valuable knowledge and skills, but also in revealing the dehumanization required to extract more profit from workers. He observes that dehumanization is never personal, it's just business,

management is not interested in the person of the worker, but in the worker as he or she is used in office, factory, warehouse, store, or transport processes, this view is from the management point of view not only eminently rational but the basis of all calculation. The human being is here regarded as a mechanism articulated by hinges, ball-and socket joints, etc. (Braverman 1974, 124)

It is a short step from viewing people as packets of labor power to attempting to manage them just as one would a machine in order to make them more efficient or to force them, even in their spare time away from work, to conform to social norms that protect the interests of capital. Braverman observes that beginning in the 1900s, psychologists were employed to study the motivations of individual workers. But

eventually, in the 1930s, sociologists were employed to study the collective work environment and worker attitudes by devising research methods such as questionnaires and climate surveys in order to manage exploitation in more equitable ways. Of course, regardless of what workers feel, they are subject to the evaluations and productivity standards of their employers and can be “let go” at any time for not measuring up. The state manages social reproduction of workers, that is unpaid labor that maintains the laborer, through jobs programs, unemployment insurance, and other programs that directly benefit capital enabling it to lower wages, or obtain habituated laborers with the skills it needs to perform new jobs.

Piven and Cloward (1971) argue that such work relief is an ancillary feature of the economy whose function it is to regulate labor. Monopoly capitalism is beset by crises, stagnation, and underemployment/unemployment, which occasionally becomes so unbearable for working people that they rebel. Relief programs absorb surplus populations while at the same time restoring order. Additionally, the inevitable contraction of relief reveals the cruelty of the system as older people, those with mental illnesses, and otherwise unemployable people are publicly subjected degrading and punitive treatment instilling fear of the same fate in the laboring population. Thus, to punish and humiliate “those who do not work is to exalt by contrast even the meanest labor at the meanest wages (Piven and Cloward, 1971, p. 4).”

Finally, as Davis (1995) mentions, capital adeptly deploys stereotypes and ideological justifications to gin up hatred and inspire loyalty to country, nationality, affiliation with certain groups, and racialized and gendered identity expectations and norms to divide the workforce, making it more pliable and easier to control. Taylor (2016), has observed that conservation and preservation movements were dominated by upper class college-educated men others used racist tropes to justify inequality and to crush dissent on the fireline. Early conservationists, such as Pinchot, many of whom adhered to the New Nationalism espoused by Theodore Roosevelt that wove together a populist rhetorical stew that linked national and racial affiliations to resource use and production as a way to reduce political violence, strikes and other class strife.

Desmond (2008) observes, that spectacle of destructive wildfires and the myth of heroism hyped by media reports and the praise of the community obscures “the social inequalities that force firefighters onto the line (p.58)” in the first place but Desmond does not specify what these social inequalities are or name the system that perpetuates and feeds on them. Magdoff and Foster (2023) do answer that question stating, that while “outright expropriation” or complete destitution is always present in capitalism, its hidden and inner dynamic arises from exploitation of labor power, an invisible form of robbery, whereby

A significant disadvantage that most workers face is that they are not able to make a living on their own, lacking the money, capital, tools, and facilities with which to engage in production ... Thus workers are forced to take jobs where and when they can find them (Magdoff and Foster, 2023).

Most wildland firefighters know that the implement unique to their work is the revered and preferred pulaski, a cutting and digging tool with a combination mattock/axe head. While a similar tool was actually in existence prior to its introduction in wildland firefighting, USFS assistant ranger Ed Pulaski is immortalized for developing the tool. But he is also known as the first hero of the profession for his actions during a complex of fires that ripped through the Rocky Mountains in 1910. In the midst of a firestorm so strong men struggled to stay upright, Pulaski led 45 of his crew of casual laborers to the hidden and abandoned War Eagle mine. Covering the mouth of the cave with wet blankets, Pulaski drew his pistol to keep them from running out in panic, and commanded them lie down and cover their airways while he kept the fire at bay. All but 5 of the men limped out of the mine because of Pulaski’s selfless and heroic act (Pyne, 1982; Krake et al., 2021). But over 85 people died, 78 of whom were firefighters and most if not all of those were homeless pick-up laborers quickly pressed into service. At its inception, the USFS relied on temporary, contract firefighters, because it did not have the budget or staff to field a force year-round. Pinchot’s (1905) *Use Book* is specific in its requirements and limitations:

If the best interests of a reserve require the temporary employment of men for work on forest fires, fire lines, roads, trails, cabin construction, and other work distinct from the ordinary patrol

and protective duties of guards and rangers, such men may be employed by the supervisor at not over \$60 a month (except in case of fire, when not to exceed \$2.50 a day may be paid) and for a period of not over six months (pp. 91-92).

The 1910 fire complex swept through an area that was the scene of labor unrest by the Western Federation of Mines. In Idaho and Montana immigrant workers were earning between \$2.50 and \$3.50 per day in copper and silver mines and the Army was often sent in to arrest the “agitators” and break the strikes. In the years 1908 and 1909, the West endured severe drought but 1910 was worse – there was no rain from April to July. The fires began in April and came in the aftermath of a series of recessions in the years 1893, 1907, and 1910-11 as the result of land speculation and monopolization by trusts (extensive corporate holdings) associated with railroad, mining, and timber firms which caused a series of financial crises, called panics, that contributed to widespread misery for working class people in the form of high inflation rates, unemployment, and commodity scarcity.

Economic troubles hit the U.S. West beginning in the 1800s as banks invested heavily in land development for mining, timber, and railroad expansion. These speculative bubbles began collapsing with the Panics of 1857 pushing defaults as land prices declined. Another economic downturn followed in 1893 and again with the panic of 1907. In 1907 manipulations of stocks in copper metal by the East Coast-based Knickerbocker Trust Company brought on the first major worldwide financial crisis of the 20th century, similar in characteristics and effects to the 2007-2009 Great Financial Crisis, as stocks lost value sparking massive unemployment and leading to the creation of the Federal Reserve. As the government sought to enforce antitrust laws, productivity dipped in the Panic of 1910-11 throwing more people out of work.

Weinberg (2003) notes that between 1910 and 1919, 59-69% of income earners made less than \$2,000 a year which was considered to be enough to modestly sustain two adults. Unemployment averaged between 10.5% and 12% from 1908 to 1915, and there was high demand for unskilled labor, but jobs were miserable with insecure tenure, low pay, long hours, and awful working conditions. Weinberg suggests that the situation for some workers was an example of expropriation, or the theft of even the

worker's ability provide for bare necessities, as there is evidence that unskilled workers didn't have enough to eat and at this time average life expectancy was about 53 years old. In 1910, these superfluous workers regularly quit in search of better wages or were let go as capital's needs changed. They were often cheated by police courts, lodging house owners, post offices and others (Stricker 2020). It was this surplus population that the USFS tapped to fight the fires erupting in the Rockies.

While fires had been burning all summer in many parts of the West, a series of lightning-torched fires began at the end of July burning across Montana and Idaho. Then in August, a combination of factors including railroad sparks, logging operations, and camping led to a wide-ranging and explosive complex fire called the Big Blowup threatening numerous towns. In the chaos, USFS fire bosses scoured town streets, taverns, brothels, and the railroad tracks rounding up men in Idaho and Montana and offering them 25¢ an hour to fight the fires. Most of the men had no money at all and wanted to be paid immediately but there was no government money available, forcing rangers, who were paid \$2000 a year, to draw from their own accounts repeatedly.

Many of the newly deputized firefighters were drunk and so poor most of them did not even have their own bedrolls. These casual laborers were immigrants and homeless itinerants displaced by the numerous financial crises and labor strikes that had wracked the country. Nearly all of them had been to jail and, as one ranger (Koch, 2019) put it

Such transients were almost like children – unreasonable, irresponsible and acting purely on impulse. They had absolutely no feeling of obligation or responsibility to their employers, which was perhaps natural, since few employers of that time felt any responsibility toward them. Time and again a whole crew would walk out at a critical time for some trivial reason (p.101).

The Forest Service did not gather much information in its race to sign the men up, so in many cases family contacts, addresses, previous work histories, and other details were unknown. They were given meals before setting out to fight the fires. Many did not know each other, spoke English as a second language, and most had little or no fire experience. In many cases they had or were provided with inadequate clothing and footwear. They were rapidly deployed into the field with little planning and ad

hoc decision-making and many of them died in the mountains, unnamed and unclaimed. Coeur d'Alene and St. Joe Forest Supervisor W.G. Weigle (1911) filed the official report of the fatalities to the federal government. Weigle's report documented the actions of USFS fire bosses and the loss of lives. One young man, a bricklayer named Oscar Weigert, committed suicide at the approach of the fire's front. Despite the official report, Weigert's grief-stricken mother had his body exhumed and examined claiming he had been murdered by the crew boss. On a separate crew, a group of 18 panicked men took refuge first in a cabin and afterwards outside the building when the cabin caught fire. The men were burned beyond recognition and died alongside 5 horses and 2 large black bears. Weigle reported that they were sewn up in canvas and "buried where they perished." According to Weigle (1911),

Many of the men who perished in the fires on the Coeur d'Alene National Forest in August, 1910, are still unidentified, and the chances are that we never will be able to identify them. The fact that we are unable to identify them may seem strange to anyone not familiar with the conditions. Of the men used in fighting forest fires were men who were floating around through the country apparently having no home. Many of the men passed under assumed names, and through the great stress for time the precaution was not taken when they were hired to have them give a statement concerning their relatives or home address, if they had any. ... There are no claims against the Government at the present time for the death of any of the men who perished on August 20 and 21, 1910, with the exception of the amounts due the men for labor at the time of their death, and in very few cases has this been requested ...

The death toll would have been much higher if not for the leadership of 7 companies of buffalo soldiers, who took charge of the civilian evacuation and coordinated firefighters in town. The famed all-African American 25th Infantry Regiment, free black men in segregated infantry and cavalry units who had fought Native Americans and ensured the safety of strikebreakers, were also called on to fight the fires. They were stationed in Fort Missoula and fought fire as well as organized and evacuated the residents on trains out of Avery, Idaho. They ultimately set backburns in a desperate attempt to save themselves and the remaining citizens (Fletcher 1972). In the aftermath, the affected towns got little government help for reconstruction or expenses related to the fire and had to rely on mutual aid.

There is little information about how many or how severely civilians and firefighters suffered from physical and mental illness in the aftermath of such a traumatic event. Many of the firefighters who

survived the conflagration were severely burned and had lung and eye damage. The army initially provided medical supplies, but according to records, even though 101 men were treated by hospitals, there were no appropriations or authorization for the treatment of the men which created problems for their care. The Forest Service held an employee fundraiser that raised \$1,700 and the Red Cross contributed \$1,000 toward the emergency care. At the time the Employee's Compensation Act did not exist, but two years later Congress passed a general deficiency fund to help cover the costs of their immediate care. Ed Pulaski was lionized by the USFS and the public, but he suffered from temporary blindness and scarred lungs that caused him to have bouts of pneumonia the rest of his life. One of the lessons drawn from the 1910 fires was that the agency needed a better-trained and stable workforce if it were to achieve its goal. Pulaski and other local rangers represented a thin layer of middle class, permanent employees with stable work. The 1910 fires highlight the profession's reliance on mobile, impoverished labor and its lack organizing principles and a coherent scientific program.

Getting War-Like: Taylorist Fire Science

The Big Blowup cost the federal government over \$1 million to combat prompting fire suppression zealot Coert DuBois' angry response, "Unless we can handle fire on the forests entrusted to our care, we cannot practice forestry. It's time we got war-like (qtd in US Forest Service, 2009, p. 190)." DuBois's (1914) invective against light-burning in *Systemic Fire Protection in the California Forests* operationalized Taylorism which still continues to have an outsized influence on current fire management. DuBois's research entailed four elements: 1. better social science to understand where and why fires start; 2. performing cost-benefit analysis of firefighting resource distribution; 3. implementing effective mobilization of fire operations; and efficient organization of firefighting forces (Smith, 2017). DuBois was the first to apply statistical methods to fire reports, oversaw the first case study of a fire, and was also the first to perform observational research on fire behavior and effects. Since its founding the agency had moved toward administering the national forests using scientific principles aimed at wise use and Taylor's

methods appealed to fire managers looking to keep burned timber resources to a minimum with the least amount of labor. DuBois, while not actually mentioning Taylor, argues that, in the same way that a bond must yield dividends, so must a forest produce “an income in the shape of wood (p. 5).” DuBois calls for efficient fire detection, reporting, attack, and suppression with the goal of the least amount of acreage burned in an average time and with as little expense as possible (Pyne, 1982; Godfrey, 2005). *Systematic Fire Protection* is filled with detailed charts, calculations, diagrams, lists, and recommendations for equipment that aims to maximize the efficiency of human labor power in the performance of fire suppression at the lowest cost.

Frederick Winslow Taylor’s program of scientific management maximizing labor efficiency in order to maximize profits is, in Braverman’s (1974) words, “nothing less than the explicit verbalization of the capitalist mode of production (p. 60).” Taylor (1911) proposed that managers research the best way to accomplish a job, standardize the method and set work expectations to that level, careful selection of employees based on personality and efficiency, manager-worker cooperation, a concrete and uncrossable division of labor in which managers act as labor process planners. Taylor denounced the “almost criminal” act of “soldiering” or the regulation of the work pace, conservation of energy, and more deliberate actions by workers to control their labor power. He observed that relations with other workers lead to systemic soldiering in which all workers agree to regulate the pace of work to the level of less efficient workers slowing down the whole enterprise at the same payrate. Drawing on neo-Malthusian, Taylor argued that soldiering and other poor practices were an ingrained, collective habit among working class people. This slothful habit of life, Taylor explained, has deleterious effects that trickle down to the individual worker’s family and translate into increased rent and multiple avoidable expenses that, with organization and willpower, could be avoided. To eliminate soldiering, Taylor urged getting the maximum efficiency from workers through simplification of tasks, evaluation of individual workers, standardization of tools, isolation of workers and separation of individual assignments, surveillance, and a hierarchy of expertise within the workplace that fragmented workplace skills and knowledge.

In addition to the implicit Taylorist focus on statistics, measurements, and efficiency, DuBois (1914) specifically invokes *Principles of Psychology*, written by the liberal pragmatist William James. James' functionalist text was inspired by his personal religious beliefs, engagement with evolutionary theoretical concepts, and grounded in his study of physics. Most references to James are limited to his 1910 essay "The Moral Equivalent of War"⁵⁴ which is commonly invoked (Pyne 1982, 2015; Norgaard 2019) when describing the policy of wildfire suppression that occurred after the Big Blowup. But this reference does not apprehend the intellectual, economic, and political terrain James was traversing and how it influenced fire science and policies, the agency's message, and the control of its labor force.

C. Wright Mills (1962 [1942]), in his doctoral thesis, *A Sociological Account of Pragmatism*, outlines the circumstances surrounding the development of pragmatism that greatly influenced modern sociology:

James represents the "modern liberal." His type may be contrasted with Weber's classic account of the Puritan. Generally, the attitude toward the present order, on the part of the Puritan was defiance and an attempt to remake it. The modern liberal accepts it with some discrimination and makes an effort to "better" it. The representative groups of Puritanism were members of the old middle-class; whereas the public of modern religious liberalism is made up of professionals and intellectuals situated, in the main, among the larger middle groupings of the cities. The source of religious authority for Puritanism is the individually interpreted Bible, whereas the modern liberal will admit "tested experience." In James "experience" becomes the keystone to religious reality. The end of life for both the Puritan and the religious liberal of James' variety is individual salvation. Modern liberalism has replaced the trinitarian Puritan God with a Unitarian and then with a nebulous notion (p. 242).

The liberalism in DuBois' *Systemic Fire Protection* can, in part, explain the organizational discipline of its labor force and the agency's strong adherence to fire suppression.

⁵⁴ Based on James' 1906 speech at Stanford University in which James argued that service in a fight against non-human nature would redirect the national unity generated by war toward more noble political aims while at the same time maintaining a masculine hardihood in the body politic.

There are much deeper connections to James that have remained unexamined by American sociology partly because of its renewed embrace of liberalism. As mentioned in the previous chapter, the same cultural strains, rooted in Progressive-era social reform, that led to the creation of the USFS and gave rise to a program of wise-use conservation and fire suppression also drew on American (and British sociologist Herbert Spencer) sociology. Fire science (and exclusion) were directly influenced by sociologist and liberal social reformer Lester Frank Ward whose concept of the organism-like society was drawn on directly by Frederic Clements' theory of succession (Lee 1987).

James' *Principles of Psychology* explores the connection between individual psychology and external behaviors and solidified the field of psychology as a science gaining wide influence among the rising managerial class including DuBois whose manual aimed to establish fire suppression as ingrained agency impulse. Following James' logic, *Systemic Fire Protection* breaks down the psychological motivations of 18 types of fire starters including train crews, campers, light burning advocates, Native people, "malicious incendiaries," and "irresponsibles." The manual counsels USFS rangers to carefully assess the personality types of such individuals in order to pursue the best course of action in spreading the message of "care with fire." While persuasion is one method, the manual also includes coercion, imprisonment, and for Native people, "coercion through agent" and showing "a better way to accomplish the same object (pp. 24-25)."

Vinyeta (2021) extensively documents the racist Forest Service reports written by rangers documenting the Indigenous cultural burns practiced by Karuk fire practitioners in the Six Rivers National Forest, their home territory. In Six Rivers, where cultural burning persisted, despite official fire suppression rangers conflated slothfulness, ignorance, and simple-mindedness with cultural burning and thus Conners (1998) states,

ignorance of Native American cultural practices coupled with equating Klamath River 'incendiaries' with 'Indian,' and the prepossession against an entire racial group had the effect of clouding problem-solving and of poisoning relations for years to come (p. 112).

In the case of the Karuk, rangers even sought funding to hire special crews composed only of tribal members to basically act as snitches on their own people while patrolling for "incendiaries" – a tactic that proved very effective according to Conners (1998).

The repugnant view expressed by the local rangers of Six Rivers is congruent with the allegations of incendiarism during the rise of unionization as the U.S. entered World War I and poor rural people, led primarily by radical immigrant labor, revolted against years of exploitation and poverty with massive strikes in the timber industry. It must also be viewed as part of a process that discursively displaces continued accumulation onto the "historically-shifting embodiments of privileged whites' fears (Collins 2009, p. 592)" or as Mike Davis (1995) has argued, political rhetoric, "as distinct from scientific,

discourse in each generation has been obsessed with the identification of an ‘incendiary Other’ responsible for fire destruction (Davis, 1995, p. 23).”

Additionally, DuBois outlines criteria for selecting firefighters and strategies for making the work effective and satisfying. Like Taylor, he argues

No matter how scientifically correct each piece of equipment may be, no matter how mechanically perfect the communication system may be, no matter if protection plans are drawn to forecast and provide for every possible contingency – the machine is effective only when the men who compose it are of the right caliber. The supervisors who have developed the best protective systems are the ones who have been able to instill into their men a strong spirit of competition – not only with each other, but with each fire. On the Forests where jumping onto a fire in the greatest possible hurry is considered an absorbing game, where every man is up on his toes all summer long —there the best protection records are made. The older men in the Service must make the new men understand that protection work is not a job they have hired out for, but a game they have agreed to play, and slovenly work on the part of any one man will make the whole Forest organization the loser. The very nature of the protection game indicates certain qualities that must be present in the men who will play it well. By questions and a few simple tests, the employing officer, whether he is a supervisor or district ranger, should satisfy himself that the applicant possesses the natural mental qualifications of a good fire fighter. One is the ability to think quickly, to size up immediately a number of possible courses of action, and instinctively select the right one without consciously going through a logical train of reasoned thought. The applicant might be asked, for instance, what he would do with a fire fighter who broke his leg when on the fireline. Without seeming to apply a test, the time taken and the judgment shown in answering may be mentally noted. Self-reliance is an essential qualification, and its possessor usually has the corollary – ability to take care of himself and others in critical situations. Whether the applicant has it or not is indicated in his general bearing and can be further brought out by questions as to his personal experiences (DuBois, 1914, p. 35).

At first glance, Desmond’s (2007), country boy masculine competence seems to be what DuBois is recognizing – a man that the “Forest Service did not need to exert much effort in sculpting (Desmond, 2007, p. 266)” to deploy in the field and that may be deployed to the field fully formed. DuBois even uses the metaphor of fighting fire as a game, suggesting the Bourdieusian habitus’ feel for the game (Bourdieu, 1990).⁵⁵ However, this requirement is subordinated to DuBois’ primary concern – the

⁵⁵ “The habitus as the feel for the game is the social game embodied and turned into second nature. ... The habitus, as society written into the body, into the biological individual, enables the infinite number of acts of the game—written into the game as possibilities and objective demands—to be produced; the constraints and demands of the game, although they are not restricted to a code of rules, *impose themselves* on those people—and those people alone—who, because they have a feel for the game, a feel, that is, for the immanent necessity of the game, are prepared to perceive them and carry them out (Bourdieu, 1990, p. 63, original emphases).”

economical and efficient suppression of fire in which men of “the right caliber” are components of a well-oiled and fast-running machine.

Many articles in *Fire Control Notes* hint at the influence of Taylorism on fire suppression, but a 1940 article (Fireman’s Guide, 1940) directly links research using Civilian Conservation Corps labor to DuBois’ call for greater efficiency emphasizing speed, economy of motion, and maximum performance:

Numerous demonstrations by trained CCC crews and calculations of trench constructed per man-hour under all conditions, have proved definitely the "progressive step method" is noticeably superior to many older methods. Not only is speedier work accomplished, but also a finished trench is assured when the last man passes any point, and in addition the output of each individual is evident at all times. There is no opportunity for "soldiering" on the job (p. 177).

But having triumphed over the light burning advocates and implemented official policy of total suppression, fire control was afflicted with shortages for the next 30 or so years. After the fires in 1910 there was a shortage of resources, capacity and access to remote areas. The CCC provided a source of cheap labor to carry out the fire suppression ambitions of the agency (Pyne, 1982; Klade, 2006). DuBois’s program was not able to be fully implemented until the Great Depression when millions of out-of-work men were mobilized to serve as cheap labor for the USFS.

Reds in the Forest: The Threat of Bolshevism

Stating that the assemblage of unskilled and semiskilled drifters who were recruited to fight the 1910 fires lacked proper clothing, adequate footwear and were “*insubordinate by nature* (emphasis SD) and generally unknown to those who worked beside (p. 364)” them, Pyne (1982), observes that the USFS looked longingly toward the military units such as the Buffalo Soldiers fighting fires in the national parks. From 1914 – 1919, labor strikes wracked the country and large amounts of acreage burned under “the dark suspicion that fire control was being sabotaged by incendiaries affiliated with the IWW (Pyne, 1982,

p. 256).” From the agency’s perspective the effectiveness of emergency firefighters or EFFs depended on rigid discipline. Pyne (1982) observes that

Success depended on the tough, seasoned foremen who ramrodded them. After World War I the IWW was rumored to have infiltrated the work pools and to have agitated EFFs to further insubordination and, even more ominously, to outright sabotage. Small wonder that most fire officers looked upon EFF labor as a last resort, though for a major conflagration it was more often than not the only resort (p. 364).

According to Koch (2019), displaced timber workers affiliated with the International Workers of the World (IWW or the Wobblies) formed large percentages and even entire fire crews and were quite knowledgeable about fighting fires. Timber and mine workers, supported by the IWW, the International Union of Mine, Mill, and Smelter Workers fought for shorter working hours, decent wages (\$2 per day was standard), better food and housing, bathing facilities, and against company unions.

During the violent strikes of 1917, 90% of lumberjacks in Oregon, Washington, Montana, and northern Idaho walked out of the forests and mills, halting wartime production of timber. In Butte Montana, IWW agitation following the deaths of 168 men in the Granite Mountain/Speculator Mine disaster and the lynching of antiwar and IWW union organizer Frank Little stopped wartime copper production. The unions in Butte fought to end to the “rustling card” system introduced by Anaconda Copper Mining Company, taken up by mill and mining companies, was essentially a work permit that enabled the company to identify and blacklist union members. According to Kotok and Hammatt (1942), following Little’s death, out-of-work lumberjacks and miners “refused even to fight forest fires” and “resented and denied charges of incendiarism which had been brought against them (p. 246).” The lumber companies, through their organized associations, refused to drop rustling cards or institute an 8-hour day and “claimed that it would be ‘dangerous’ to recognize demands (Kotok and Hammatt 1942: 246)” for better food and living conditions. Additionally, in an attempt to deny striking workers jobs and wages, the timber companies requested that firefighters be drawn directly from the company, as they owned exclusive management of the labor force. An exception to the anti-union sentiment among many of the USFS supervisors who called IWW members “I won’t works (Tugwell, 1940, p. 304),” was Chief

Ferdinand A. Silcox who ignored requests by capital during the terrible fire season of 1917, stating that the agitation was a direct product of the intransigence of the timber, agriculture, and mining companies. Unions sought safer working conditions in industries with injuries and work-related deaths 18 times higher than the current rate in those same industries today (Kotok and Hammatt, 1942; Conlin, 1979; Weinberg, 2003; Loomis 2015a). Loomis (2015a) documents the fierce condemnation the leadership of the International Woodworkers of America leveled at timber industry's wasteful deforestation in the Pacific Northwest during in the 1930s. The IWW equated the ravages of forest with the exploitation of the timberworkers and fought for selective logging, reforestation, and fire control. Many of these workers were available to fight fires because timber companies closed down lumber camps and ejected their striking workers, leaving them homeless and hungry. On firelines, the "One Big Union" as the IWW called itself, agitated for wages related to travel time. In 1919, according to Koch (2019), living conditions were especially bad and men were more willing to work for the government than for private capital. A forester on the Nez Perce-Clearwater National Forest in Idaho admitted that rangers lied to new hires to get the most out of them and recalled,

The Forest Service had a rule about work time that must be put in at actual firefighting before the worker could expect to receive pay for time spent in travel back to the place of hire. Either the fire must be controlled before travel time, and transportation would be allowed or he must have worked a minimum number of days--in this case, as I recall, 15 days. The pay was 30 cents per hour and board and transportation to and from the fire, if the fire was controlled or minimum met. The Wobblies used this rule as an excuse for causing us all the trouble possible, and it was a constant source of wrangling in every fire camp. There were some cases where a fire foreman let guys scare him into giving travel time where it was not earned. It could, on occasion, get pretty rough; but there were only a few cases where the foreman or Forest officer fell for it (Fickes, 1972, p. 64).

While getting paid for travel time might seem trivial by today's standards, hiking to a fire in the 1900s could mean carrying a 40-50-pound pack over rugged terrain through brush, not established trails, for miles before getting close to the fire. Forest Service rangers rode horses while firefighters walked with tools and packs, although there were mule trains as well. In one case, a Wobbly foreman and crew proved

inadequate to the task and the entire crew was fired with the ranger deducting “the cost of the ride back to the town besides half a day’s travel time each way (Koch, 2019, p. 105).”

Many fire bosses, like Koch, viewed socialist and union affiliated workers who demanded better pay as troublesome and sometimes resorted to violence to force them to accept the USFS work standards. When enforcing labor discipline using cuts to wages wasn’t enough, Koch stated that sometimes violence was necessary to get firefighters to stop arguing about their labor time and comply with orders. He recounted how, on one fire, he hit an Irish immigrant in the arm with a mattock handle, declaring blandly, “I thought I had broken his arm but I didn’t care (p. 105).”

Following World War I, there was a surfeit of available laborers and worker discontent was high in both in private industry (Loomis, 2016) and the Forest Service where at least some of DuBois’s proposals were deployed against angry rangers who were attempting to organize. The agency was faced with questions regarding economic viability such as how peace would affect timber sales and revenues and the “successful anti-fire propaganda and the fire law campaign (Godfrey, 2005, p.158).” Magdoff and Foster (2023) observe, the common logic of the general public, but most assuredly by most managers, regardless of institution, is one of equal exchange between worker and employer, but this assumption is incorrect, as workers are at a significant disadvantage, having nothing to exchange but their labor power.

The early stages of Forest Service history were dominated by cronyism in which the higher reaches of the agency consisted of college-educated, well-connected men from wealthy families, comfortable with timber capital and high society (Hudson, 2011). As agency veterans, many of the supervisors, like Coert DuBois, returned from war to their former jobs, a “virus” of “unrest, discontent, doubt, spirit of knocking, and destructive criticism (1917 *Supervisors’ News Letter* qtd in Godfrey, 2005, p. 158)” spread through the USFS among the lower ranks. In California, the supervisors’ newsletter warned that changes were imminent as the prospect of replacing temporary employees to make way for the veterans loomed. A follow-up newsletter appealed to American exceptionalism stating

If we can succeed in resisting the people who want to do our thinking for us and who will try to put catch words in our mouths and catch ideas between us and the truth: if we can hear

always the call of the men who fill graves in the mud of France and Belgium in order that the World may be a better place for all kinds of people to live in: if we can remember tolerance and patient work is necessary to find any solution for the problems which will arise when great industries and whole classes of people clamor insistently for the righting of their real or fancied wrongs: if we can do these things we can help public opinion to find and take a safe and just middle course between the tyranny of an autocracy of economic power and the tyranny of Bolshevism (1918 *Supervisors' News Letter* qtd in Godfrey, 2005, p. 158).

As Godfrey (2005) explains, in December 1917, men living for extended periods of times in isolated winter camps with bitter weather conditions and little to do were frustrated with their forced idleness and low pay, such that a “Bolshevism threat spread among rangers who were dissatisfied with wages and working conditions (p. 168)” Additionally, they argued that work was monotonous, standards were inconsistent, the workplace itself was contentious, and experienced men were unable to advance because of a salary cap that kept all federal employees from being paid more than \$2,500. They returned to work inspired by the October victory of the Bolsheviks whose slogan was “peace and bread” and embracing Marxist ideals of equality. According to Godfrey (2005), agency supervisors were aware of the issue of compensation and other concerns but argued the problem was contained among a few troublemakers who were stirring up the others.

Ideological arguments continued when rangers began suggesting that a direct democracy model using secret ballots to select new supervisors and assistant foresters be used. In the past, overhead was not vetted by official support among rangers but only through an informal consultation process that included the friends and former college classmates of supervisor. In response to the restiveness in the ranks, a USFS Supervisor defended DuBois specifically for having “proved himself time and again” asking, “Who ever heard of a successful business organization choosing their superintendents and foremen by the popular vote of employees? (1918 *Supervisors' News Letter* qtd in Godfrey, 2005, p. 159).” Rangers persisted, raising the possibility of unionization as a way to gain control over their labor time and obtain better working and living conditions as well as higher wages.

Instead of quelling the debate, supervisors found “plenty of work to keep them full of activity, including keeping everyone busy during protracted storm periods,” instituted new standards of evaluation,

testing numerous skills, knowledge and methods that incorporated faithfulness to the ideals of national forestry including timber management and fire control. Additionally, in keeping with DuBois's concern for raising the standard of education, the men through a training school to teach new recruits the agency ethic. However, none of this was effective in the fight to break labor agitation within the agency as the economy declined, workloads became onerous, and inflation outpaced wages. At the height of a period of large labor strikes, xenophobic and anti-Marxist backlash (known as the Red Scare), the USFS was in crisis. After preaching sacrifice, duty, and patriotism, most of the employees of Pinchotist authorities, including DuBois, left the Forest Service for higher-paid academic, government, and private sector jobs while the agency purged the lower ranks, determined to "get rid of the agitators (Godfrey, 2005, p. 159)," resulting in the termination or resignation of 25% of DuBois' district.

While USFS officials and their progressive supporters, especially in California, acted to reform business dealings, the utilities, and the railroads, creating regulatory bodies, in reality, the "driving force for railroad regulation came less from an outraged public" whose efforts resulted in lower rates, and more from "shippers and merchants who wanted to stabilize their businesses (Blackford, 1970, p. 307)." These men were primarily urban, middle-class, Anglo-Saxon Protestants who were fervently anti-labor and "committed to clean, efficient government compatible with their class interests (Kolko, 1977, pp. 195-196).

Regulating the Poor: Roosevelt's Tree Army

The defining features of monopoly capitalism, which emerged in the late 19th century displacing family farms and small-scale logging and giving rise to the timber barons, are stagnation, underemployment and unemployment, and idle capacity (Foster, 1983, 2018). The monopolization that took place during the Second Industrial Revolution of railroads and timber barons accelerated extraction of timber, causing a rapid accumulation of slash and raising the possibility of devastating fires like the 1910 Big Blowup. The formalization of fire suppression directly stems from Progressive attempts to limit

monopoly power and bring forestlands under the control of the federal government in order to curtail the industry's environmental destruction and ensure a long-term supply of wood. The maturation of U.S. capitalism in the 20th century saw a rise in prices and monopoly power, but was also punctuated by underemployment, depressions, and temporary rebounds in lumber production.⁵⁶ The stock market crash of 1929 imposed a long list of woes upon the economy such as a drop in national output that reached 30%, unemployment at nearly 25%, and a 42.5% fall in wages by 1933 as well as stagnant markets (Foster, 1983; Clary, 1988; Foster, 1991; Burkett, 1994). Private timberlands had been logged off, there was a glut of lumber in the market and union membership was waning in the face of anti-labor measures during and following World War I.

When the stock market crashed in 1929, the agency reduced sales and suspended attempts to regulate the industry. The rampant cutting and selling boom that peaked in 1926 left destroyed forests dangerously littered with slash and brush as the Great Depression hit. Faced with a crisis of enormous misery among the working class, extreme social dislocation, economic hardship, the government sought to extinguish a revolt by the working class. Cities and rural areas had large numbers of unemployed and impoverished people who needed relief. The CCC recruited young, single American citizens between the ages of 18 and 25 years with no criminal convictions and who were not students (Taylor, 2016). Under the authority of temporarily trained supervisors the CCC men constructed roads, thinned timber, and performed stand improvement plots, and worked on hazard reduction (Klade, 2006). The entrance of the CCC in the service of USFS projects sped up fire research in the areas of initial attack, road systems, fire and fuel breaks, integrated detection systems, and communications. Up until the 1930s, the agency had no internal method of developing and promoting tools, but the CCC workforce enabled it begin standardizing and firefighting tools, using the enrollees as real-time testers. Additionally, Wilson and Davis (1988) mention that the size of the workforce enabled fire managers to study "fireline production rates, fire behavior, and fire planning (p. 5)."

⁵⁶ Though consistently declining over time (Clary 1988; Freudenburg et al. 1999).

As per capita demand for lumber declined from 156.9 cubic feet in 1900 to below 100 cubic feet by 1920, the USFS aggressively marketed timber while also engaging in an ebb-and-flow battle with the timber industry. Progressive conservationists like Pinchot and regulation and conservation as by attempting to introduce what is now called multiple use and sustained yield practices that the industry fought vigorously. The CCC formed the labor backbone of this concept planting trees, revitalizing logged over landscapes and fighting fires (Clary, 1988). Hudson (2011) notes that between 1932 and 1933, there was a 60% reduction in commercial timber loss due to the fire-fighting efforts of the CCC.

In 1937, USFS accountant M.R. Scott broke down the costs of fire prevention, pre-suppression and suppression and law enforcement for the years 1934 through 1936, although not all costs for 1934 were available because the USFS accounting system had just been implemented. The government classified prevention as warnings to the public, hazard reduction, education and law enforcement. Pre-suppression consisted of the organization of labor and associated expenses before an organized assault on the fire began, and suppression was broken out into, not only the work of putting out the fire but also responding to false alarms, damage and fire reports and tool maintenance. Scott hastened to remind the readers of *Fire Control Notes*, that the numbers did not completely match the costs of fire response. Included in the costs, along with depreciation of infrastructure such as roads and telephone lines, was also the value of Civilian Conservation Corps and similar labor on fire control costing \$.50 per person per diem. In addition to enriching timber capital the economic crisis of the Great Depression marked a bellwether of the permanent war economy during which time the timber industry, in alliance with the U.S. Army, contracted to provide housing for Civilian Conservation Corps (CCC) under the supervision of the USFS (Duncan and Coyne, 2013). The New Deal failed to shore up the economy but World War II spurred productivity, employment, and massive profits for newly-consolidated defense contractors including timber interests. The post-war decades left a sprawling network of expanded political power, extensive defense industry capacity characterized by giant corporations, and powerful state interests, often called the military-industrial complex. The CCC firefighters were trained by US Army reserve officers (Pyne, 1982). Moreover, Army contractors transported enrollees to Army-built camps where they

underwent physical training and then to deployment zones the military also built housing for them.

Kinder (1993) argues that, while the CCC provided members with much-needed cash and meaningful work, it was also an agent of labor discipline that the military could and did draw upon for armed combat.

During the CCC era, the Forest Service had anticipated a timber famine on private lands, replanting the national forests and aggressively protecting them from fire in the event they would be needed as backstop lumber production in a crisis. World War II was a gift to monopoly capital that broke through the log-jam of economic stagnation. In the early 1940s, as during the New Deal era, fire suppression was not aimed at producing exchange values through exorbitant extraction. The Roosevelt Administration pick for Secretary of War, Republican Wall Street lawyer Henry L. Stimson, chosen as a familiar face to private industry, opined “If you are going to prepare for war in a capitalist country, you have to let business make money out of the process, or business won’t work (qtd. in Weinberg, 2003, p. 227).” In the years leading up to U.S. involvement in World War II, the Forest Service and private timber companies brokered a detente easing New Deal restrictions on clearcutting (sustained yield) ramping up the cut in preparation for war. The war broke through production lulls increasing extraction of timber. For example, in 1940 Northwestern mills produced lumber at 90.6% of capacity, a rise of 75% and 45% for 1939 and 1938 respectively. As the U.S. shifted to a war footing lumber “surpluses were absorbed fairly rapidly, and by 1940 the industry had emerged from depression to fill orders (Clary, 1988, p.110). However, the New Deal did not alleviate the poverty and economic insecurity afflicting the country, but World War I hardened the position of traditional monopolies like the timber industry who focused on increased efficiency.

Let's All Back the Attack

The timber industry of the West benefitted from a nation-wide injection of federal defense money from \$2.2 billion in 1940 to \$13.7 billion in 1941 stimulating the domestic sector as well and leading to full employment in some areas. From 1940 to 1943 unemployment fell from over 8 million to 1 million

with unemployment for men aged 20 to 64 numbering 250,000 (Weinberg, 2003). In order to protect timber resources and make up for the geopolitical effects of material scarcity, the government used captive and cheap labor, pressing into service surplus populations of women, prisoners of war, conscientious objectors, African American service members and Mexican migrant labor for free or very low-paid wages.

Studs Terkel ironically called World War II the “Good War” – the alleged victory over fascism with an undertone of 20th century savagery. Despite Germany’s invasion of Poland, Americans had little appetite for war – 90% of American public polled said they did not want the U.S. to enter the war in Europe. Yet, President Franklin Delano Roosevelt (FDR) passed a suite of legislation broadly criminalizing acts of dissent. In March 1939, he invoked the 1917 Espionage Act and added a legally dubious provision making it a crime to damage a ship clearing the way to seize German, Italian, and Dutch ships and imprison German and Italian sailors stranded in the U.S. as a result of the hostilities. Twelve hundred Italian seamen were transferred to Fort Missoula, a garrison built in 1877 to solidify U.S. statehood at the expense of the Blackfeet, Salish, and Nez Perce peoples.

In June 1940, partly in response to antiwar sentiment, the growing influence of radical labor unions, communists, and other Left organizations, and fear of the immigrant population, FDR transferred the Immigration and Naturalization Service from the Labor Department to the Department of Justice under the Smith Act clearing the way for a crackdown on dissidents and “aliens,” and possible internment (Cottrell, 2014). And on September 16, 1940, the federal government instituted the country’s first mandatory draft and, in the following 5 years, registered approximately 50 million men. After Pearl Harbor, support for war skyrocketed but approximately 12,000 men drafted by the Selective Service System declared themselves conscientious objectors (COs or conchies) and refused to go. Fire suppression was deemed especially important on the West Coast, for both national defense and resource protection. After the attack on Pearl Harbor on December 4, 1941 there was a widespread belief in both the USFS and War Department that the Japanese military would at least set fire to western forests if not directly attack cities, which led to the 1942 establishment of Aircraft Warning System (AWS) and

numerous lookout stations. In the absence of CCC firefighters – the program ended in 1942) and its funds were transferred to timber production and fire suppression projects – the agency closed some national forests to recreation to focus on production and national defense (Brown and Show, 1944).

Women Not Important Until Needed

According to the National Forest Foundation (Walien, 2022), in 2022 women comprised about 10% of the wildland firefighting labor force. Drawing on fellow feminist sociologist, Veronica Beechey, Lise Vogel (2013) argues that definitions of the reserve army must be interpreted historically, with consideration to class struggle at any particular moment in time. The machinations of trade unions, individual capitals, and state decisions and policies reflect the specific historical dynamics of the class struggle. During World War II, women were an important component of the reserve army in the U.S. with regard to fire. Vogel (2013) argues that equalization of women’s participation in the workforce reflects a “structural tendency in capitalist society toward the free availability of all labour-power” which “embodies the forward drive of capitalist accumulation (p. 167).”

From its beginnings Forest Service, has been a utilitarian arm of the state assisting capital, and its administrators’ aim to maximize profitable production from the land while also cleaving to a bourgeois social reformism that is fraught with contradictions. In 1910 Forest Service Chief Gifford Pinchot wrote *The Fight for Conservation* which outlined the Progressive agenda for forestry arguing against against monopolization of natural resources and equitable use by the people. In order to achieve this, Gifford addressed women specifically in his chapter titled “Children” in which he argued

The success of the conservation movement in the United States depends on the understanding the women have of it. ... Patriotism is the key to the success of any nation, and patriotism first strikes its roots in the mind of the child. ... And almost without exception it is the mother who plants patriotism in the mind of the child. It is her duty (p. 238).

As previously mentioned, the agency developed under Roosevelt and Pinchot who adhered discursively to the Progressive political theme of conservation for the long-term use of nonhuman nature, which they saw

as a commodity, for the permanent enrichment of the people of the nation. Symbolically linking forest production, progress, and patriotism served important political and economic purposes (Allen, 2013; Taylor, 2016). Both men were subscribers to eugenics, the racist doctrine advanced by Progressive economist-turned-sociologist Edward A. Ross whose theory of social control appealed to Jeffersonian notions of yeomanry to resurrect stable economic and social relations which were falling away with the rise of monopolies. Lovett (2007) observes that Ross coined the concept of race suicide to explain the disappearance of Anglo-American, particularly middle class rural nuclear families. He applied a dualistic analysis similar to that of Tönnies' to explain the social aspects of increasing consumerism, social disruption, rural depopulation, and labor mobility that mixed nationalism and white supremacy, resistance to women's education and social emancipation and anti-Asian opposition to immigration. Ross' answer to the imperiled white middle class was a call to voluntarism, patriotic duty, romanticization of rural life and essentialized gender roles aimed to reorient the nation away from dislocation and agitation.

In his appeal to women, Pinchot spelled out the general Victorian attitude toward women's socially reproductive labor, that of bearing and socializing children in order to preserve "Forest Service values such as the concept of the organization as a family and the importance of conforming for the sake of unity (Pendergrass, 1990, p. 17)." In transforming women, in a few short paragraphs to mothers, Pinchot revealed bourgeois women's relation to the agency and capital – the pre-capitalist realm of the household where the products of women's labor are consumed without entering the marketplace thus helping to reproduce the labor force without any cost to capital (Benston, 1969; Gimenez, 2019; Vogel, 2013).

However, women aren't a uniform component of the reserve army; historical circumstances determine which women constitute part of it. Despite official opposition to women's employment in fieldwork, during the series of depressions from 1910 to 1913 (Baran and Sweezy 1966), the Eddy's Gulch lookout post in the Klamath National Forest was open, as the man who had filled it the previous summer took better-paid work, the agency found only a few applicants to hire as fire lookouts. In 1913, having received only three applications for a fire lookout position – one man whose eyesight was poor

and another who the assistant ranger claimed was “whose reputation for the various cardinal virtues that go to make up a desirable employee of Uncle Sam’s is not of the best (M.H. McCarthy qtd in Holsinger, 1983),” the ranger decided to hire the female applicant. The agency’s first official female employee, earning \$840 per year, was Hallie Morse Daggett, the 30-year-old daughter of wealthy pioneer gold mine owner, former California Lieutenant Governor, and San Francisco Mint Superintendent John Daggett. In her 15 seasons on the job, Daggett spotted 40 fires, of which only 5 acres burned (Pendergrass 1990). Following Daggett, hundreds of women applied to be lookouts but did not serve in significant numbers until World War II when severe labor shortages hampered fire control. However, women proved to be very effective and productive lookouts and were generally preferred over men (Kline, 2021). Additionally, the agency employed women and their husbands as teams whereby the woman would act as a lookout and the man would perform fire duties (Godfrey, 2005). The inclusion of more women in the paid, if low wage, workforce indicates the loosening of social restrictions and also another wedge against organized labor. Additionally, women married to agency employees provided free or low-paid labor. Women who were the wives of Forest Service employees were expected to support their husbands and other male employees performing unpaid jobs around ranger stations such doing all the cooking and cleaning, operating switchboards during fire season as well as running fire cache and checking firefighters in and out. According to USFS historian Gerald Williams (1998) women were

often considered a convenient, necessary, and free source of labor on ranger districts short on staff and money. In fact, wives who balked at doing such free work were thought of as being unloyal (sic) to their husbands and the Forest Service (p. 4).

When the Second World War began, women returned and “served as lookouts, fire patrolmen and even as members of the fire suppression crews (Brown and Show 1944, 582).” Trinity National Forest formed the Woman’s Motor Corps, a group of 15 women organized to drive trucks, cars, and other vehicles that were needed to deliver supplies and personnel, horses, mules and water to fires and other forestry jobs. These drivers had to have specialized knowledge of how to operate the vehicles on all kinds of terrain using double clutching and downshifting (Cermak, 2005).

While unemployment was low at this time, it must be remembered that 11% of Americans left to go fight in the war. According to Pyne (1982), the war “interrupted the manpower experiment,” with the disbandment of the CCC and the loss of over 2,000 USFS employees who left on military assignments. Fire crews began to shrink and the agency introduced more mechanization (chainsaws, water tenders, and bulldozers) to deliver personnel and supplies quickly and efficiently. With the loss of a large portion of the labor force the agency began to formally employ women in various field positions providing not only unpaid domestic labor but also low-wage and unpaid fire suppression activities. As ecosocialists have observed, “capital is in many ways interwoven with social reproduction and natural resource as well as with the development of technologies to utilize them (Saito, 2017, p. 285).” In fire suppression women were cheap or free labor enabling for expanded and efficient production for the war effort and the protection of forest resources from fire.

Additionally, the agency employed women and their husbands as teams whereby the woman would act as a lookout and the man would perform fire duties (Harmon, 1981; Godfrey, 2005)

In the years of the CCC, the Forest Service had anticipated a timber famine on private lands, replanting the national forests and aggressively protecting them from fire in the event they would be needed as backstop lumber production in a crisis. World War II was a gift to monopoly capital that broke through the log-jam of economic stagnation. In the early 1940s, New Deal conservation era fell while fire suppression persisted hand-in-hand with accumulation as an aid to exorbitant extraction. Republican Wall Street lawyer Henry L. Stimson had been selected by the Roosevelt Administration as Secretary of War as a familiar face to organize private industry, who opined “If you are going to prepare for war in a capitalist country, you have to let business make money out of the process, or business won’t work (qtd. in Weinberg, 2003, p. 227).”

In the years leading up to U.S. involvement in World War II, the Forest Service and private timber companies brokered a detente easing New Deal restrictions on clearcutting (sustained yield) ramping up the cut in preparation for war. The war ended the production lull by dramatically increasing timber extraction. For example, in 1940 Northwestern mills produced lumber at 90.6% of capacity, a rise

of 75% and 45% for 1939 and 1938 respectively (Clary, 1988). The timber industry of the West benefitted from a nation-wide injection of federal defense money from \$2.2 billion in 1940 to \$13.7 billion in 1941 stimulating the domestic sector as well and leading to full employment in some areas. From 1940 to 1943 unemployment fell from over 8 million to 1 million with unemployment from men aged 20 to 64 numbering 250,000 (Weinberg, 2003). In order to protect timber resources and make up for the geopolitical effects of material scarcity, the government used captive and cheap labor, pressing into service surplus populations of women, prisoners of war, conscientious objectors, African American service members and Mexican migrant labor for free or very low-paid wages.

Fire suppression had already become the go-to forest management strategy during the CCC years but it was now also a national security issue. Fire suppression was deemed especially important on the West Coast, for both national defense and resource protection. After the attack on Pearl Harbor on December 7, 1941 there was a widespread belief in both the USFS and War Department that the Japanese military would at least set fire to western forests if not directly attack cities, which led to the 1942 establishment of Aircraft Warning System (AWS) and numerous lookout stations. In the absence of CCC firefighters – the program ended in 1942) and its funds were transferred to timber production and fire suppression projects – the agency closed some national forests to recreation to focus on production and national defense (Brown and Show 1944).

Disciplining Science, the Science of Discipline

In the wake of the world wars, the application of social science served numerous purposes. While examinations of labor discipline generally focus on the workplace, the connection between social reproduction labor habituation (Braverman, 1974) is undertheorized. Following the New Deal era, some social scientists and foresters, who were outliers in their fields, advocated for the intentional setting of fires to prevent conflagrations like anthropologist Omer Stewart (2014 [1963]), who is credited with researching and defending the scientific basis of Native American fire knowledge and use. In his address

to the second annual Tall Timbers conference in which he primarily established the validity of Indigenous cultural burning, Stewart argued that racial bias prevented the realization of good fire science:

Views of peasants and country folk belonging to the same race and culture as the investigator are placed below consideration, but ancient practices and explanations of red Indians and black Negroes warrant no serious thought, even if known. Usually the white scientists refuse to learn the ways of the colored aborigines, whether New World or Old World, because it is assumed such "children of nature" could contribute nothing to modern scientific inquiry (Stewart, 2014 [1963], p. 5).

Stewart had read USFS psychologist John P. Shea's (1940a; 1940b) report which derived significant assistance from the Advisory Council on Human Relations. His study of Southerners reported that they engaged in burning to kill ticks and agricultural pests, green up grass, and keep snakes away. Shea's sociological interpretation describes the participants' location within Southern society and their economic circumstances as a source of tension and frustration

Most of our forest residents belong in the third class which the South has termed "poor whites". They, too, are numerous, particularly among farm and forest residents. In general, they are characterized by lowest economic and social status, together with lack of distinguished ancestry. They are lowest in educational achievements, and possessed of little or no specialized skills. *They can offer for the most part only their physical strength as a means of survival.* ...The sociological picture of the group as a whole shows these forest dwelling "poor whites" occupying an uncomfortable place in the class and caste system of the South. They are looked down upon by the upper and middle class whites. And they fail to have the respect even of the Negroes, who, as is well known, like to gain prestige by attaching themselves to "quality folks" - especially quality folks who can give the Negro handouts as well as prestige, and who have influence to get them out of jail when they run afoul of "de law". The "poor whites" are unable to bestow any of these favors upon the blacks. The social position of our southern forest residents is one of being practically crushed between the upper and nether millstones. Economically and socially they are a frustrated group (Shea 1940b, pp. 17-18, emphasis mine).

Shea's description uses racist language and imitates the vernacular spoken by his research subjects to illustrate their backwardness, low level of education, and the incomprehensibility of their social position in relation to their African American neighbors. Shea reveals the passive acceptance of white supremacy within Southern society as he examines the family structure, education, religious beliefs, employment, etc. of these Blue Ridge Mountain residents. He puts forward remedies aimed at fire control by means of social education, material improvements, and finally criminalization. He suggests traveling trucks

broadcasting music, “contact” meaning face-to-face talks, films that convey appropriate values and attitudes toward the forest and fire. But his advice culminates with advocacy for tracking dogs approved by the Department of Justice to catch fire-setters and films that show tracking dogs in action to terrify his subjects into submission.

Stewart denounced Shea’s assertion that poor whites whose “pappies” burned the woods were stupid and thrill-seeking rather than locally knowledgeable, if poor, opining that “the U.S. Forest Service might have learned a great deal of useful scientific information if its employees had gone about seeking information from the local people (p. 7).” Stewart acknowledges the interlocking problem of knowledge claims, poverty, and racism, arguing that if scientists refused to listen to poor whites, Native fire science had a serious uphill battle. Miller (2020) who analyzed prescribed burning science and policy in California observes that there was no room for deviation from the fire suppression orthodoxy:

Others from the USFS in California, including regional forester Stuart Show and experimental station director Edward Kotok, were similarly vocal in their conclusions that fire threatened timber production; deviation from this perspective was not condoned (p. 3).

Braverman (1974) observed that in the decade after the Great Depression, another development in science was taking place – the study and use of sociology and psychology as a means of social control of workers both at work and also in their everyday relations called. The application of sociological studies of the fire habits by poor people and the characterization of the intentional fire use as culturally-backward, uneducated, and antisocial was part of a generalized pattern of social control that got its start with the CCC and other programs. The very same Dr. Shea who investigated the sociological and psychological characteristics among poor whites in the South also proposed more efficient indoctrination of Forest Service employees (Shea, 1939):

The role of scientific psychology in the Forest Service may best be interpreted if we take several specific functions of the Forest Service and limit our view to one aspect—the human relations aspect – of these functions. By human relations I understand something more than public relations. Human relations is a broader term. It includes the interrelations of our own personnel as well as those relations to the public which we abbreviate as PR (p. 148)

Despite efforts to indoctrinate USFS fire scientists and others in support of total exclusion, within a decade and a half of the full suppression policy, fire scientists were calling for a reassessment of fire's role on the landscape. For example, Forest Service supervisor, Harold Biswell, Bureau of Indian Affairs (BIA) foresters Harold Kallander, and Harold Weaver argued for light-burning to eliminate slash and deadfall and release nutrients (Levy, 2005). Their calculus fell into the rubric of scientific forestry aimed at ensuring forests of economic value, and they were even supported by *some* timber industry executives, who also wanted beetles and dangerous slash eliminated. However, there was a great deal of pushback inside the Forest Service against controlled burns as unscientific, destructive of timber values, and potentially dangerous to the public.

Non-Native fire ecologists such as Weaver, an ardent proponent of light burning, stressed the skill and scientific knowledge of controlled burn practitioners by paternalistically emphasizing that “foresters are supervising this burning – not Indians. Prescribed burning is a dangerous tool that must be expertly applied under proper conditions ... (Carle, 2002, pp. 64-65).” Additionally, the Bureau of Indian Affairs requested that Weaver's 1943 article carry a disclaimer and the journal (*Journal of Forestry*) included a rebuttal by Arthur A. Brown of the Society of American Foresters (and eventual head of fire research in the Forest Service) arguing that “To serve society, the forester must substitute harvesting by logging for nature's method of harvesting by bark beetles and fire. To do that he must intervene in the old natural cycle. The first urgent step was to control fire and insects (Weaver, 1943, p. 15).”

Weaver worked directly with Native foresters on the Warm Springs and Colville reservations under the supervision of the Bureau of Indian Affairs (BIA) and argued that stands of ponderosa pine forests “have probably been burned by Indians at frequent periodic intervals for hundreds of years” and that burning conducted by Spokane Reservation members had yielded robust stands of pine (Weaver, 1967, p.139). Both Weaver and Kallander, worked on the San Carlos Apache reservation alongside Apache foresters engaged in controlled burning there to eliminate the slash buildup from commercial logging done by the tribe and had vigorously advocated for extensive burning on the land. However, at the San Carlos reservation, economic necessity won out over sustainability and fire control “acted not as a

drain on tribal economy but as a stimulant. The San Carlos Apaches heavily staffed the Southwest Forest Fire Fighters (SWFF) program, fielding as many as 800 men a season (Pyne, 2014, p. 7).”

Traitors in the Sky: Conscientious Objectors

The government legally recognized conscientious objectors as a reserve army of labor, offering alternative work “any person who, by reason or religious training and belief, was conscientiously opposed to participation in war in any form” and the opportunity to engage in “work of national importance.” Roughly 72,000 conscientious objectors (COs) argued that their beliefs took precedence over the law or the putative objective of national defense and refused to register for the draft. Conscientious objectors applied the legal concept of necessity, or the choice of evils defense, which holds that breaking the law in order to prevent an imminent harm beyond one’s control is a morally correct choice and far less of a crime than the evil one is attempting to stop. These nonviolent resisters were composed of two groups: religious affiliates with the Catholic, Mennonite, Quaker, and others under the umbrella of the Fellowship of Reconciliation and radical pacifists such as anarchists, communists, and socialists, some of who were part of the War Resisters League (García Hernández, 2007). More than 6,000 draftees weren’t granted or refused to become CO laborers and were sent to prison (Matthews, 2006).⁵⁷

Additionally, camps were established for COs who sabotaged equipment, went on work strikes and slow-downs. During the war, fire suppression had benefitted from the wartime use of aircraft and the exploitation of the labor of conscientious objectors to build up its aerial firefighting capabilities. Missoula, in particular, had established its smoke jumping program using the forced labor of 250 conscientious objectors, mainly drawn from among the Quaker and Mennonite. suffering broken bones, concussions, ruptured discs and the hatred of their compatriots for refusing to fight (Matthews, 2006).

⁵⁷ For instance, Bayard Rustin refused to register and was promptly imprisoned where he advocated for better prison medical care and desegregation of the dining halls despite being ostracized by fellow prisoners and guards for his homosexuality. He spent many hours in solitary confinement for his agitation.

Though the Aerial Fire Control Experimental Project was initiated in 1935, it was moved to Missoula, Montana to take advantage of a perpetual easement offered by Missoula County to the USFS. During WWII, the Forest Service.

Another smaller group of conscientious objectors undertook the vital and dangerous task of forest fire fighting in remote areas in the north and west of the United States. Known as “smokejumpers,” these men were trained to parachute into remote areas to fight fires. Smokejumping had proved to be a practical, effective tool against forest fires in locations without road access as early as 1935. By 1943, the program was growing, but suffered from manpower shortages due to the demands of the war.

Conscientious objectors began to inquire about joining the program, and 70 were trained that year to become smokejumpers. By the next year more than 100 COs were part of smokejumping teams in the West. Unlike most COs in the Civilian Public Service who worked unpaid, smokejumpers earned a meager five-dollar a month salary. In the off season, they performed forest maintenance, similar to the work of other COs.

The Orange Army: Incarcerated Firefighters

The 2020 wildfire season was one of the most devastating in Oregon’s history, burning over 1 million acres, destroying more than 4,000 structures and killing 11 people.⁵⁸ In December 2021, *Prison Legal News* reported that Oregon Governor Kate Brown commuted the sentences of 41 selected from a pool of 164 people held by the Oregon Department of Corrections, who served as wildland firefighters during the 2020 season. In order to qualify to have 12 months taken off their sentences or be released early, the incarcerated people must have maintained good conduct for 12 months, had their out-of-custody

⁵⁸ Donald Schmidt, 55; Violet Lobdell, 92; Wyatt Tofte, 13 and dog Duke; Peggy Mosso 71; David Perry, 59; Justin Cook, 41; Cathy Cook 71; George Atiyeh 72; Derrick Glenn Mills, 55;

health care needs assessed and addressed, were not considered a safety risk, and had a suitable housing plan after release. In Oregon \$9/day, Washington Type 2 crews

There are approximately 1 million wildland firefighters working in any given fire season. About 15% of those fire personnel are incarcerated people earning \$1.45 per day. People under the control of the criminal justice system are excluded from labor laws; they do not receive any benefits for injury and they are limited from making any claims in court against poor treatment or discrimination. The legal framework governing prison labor in the U.S. “simultaneously denies that incarcerated workers are workers at all,” and “constrains their use as economic substitutes (Zatz, 2021, p. 133)” for free laborers. However, despite this distinction, imprisoned firefighters produce surplus value that is appropriated by capital. We know that the U.S. has the greatest number of people imprisoned or under constant surveillance by the state.

Jay (2019) argues that the state uses mass incarceration as a disciplining mechanism to wield over the working class and to contain surplus workers. Moreover, geographer Ruth Gilmore's contends that growth of the prison industrial complex in California is a "geographical solution to socio-economic problems (Gilmore in Davis, p. 14)." In her article "Globalisation and US prison growth: From Military Keynesianism to post-Keynesian Militarism" Gilmore (1999) asks what work the system does since crime rates had already peaked before any new sentencing laws came on line. She argues that two alternative explanations are institutional (particularly anti-Black) racism and "the economic development and profit-generating potential that prisons promise, suggesting that *military* Keynesianism is giving way to, or complemented by, *carceral* Keynesianism (Gilmore, 1999, p. 174)."

Prison labor serves as a wedge against organized labor's ability to make claims for better pay and working conditions, because prisoners are a powerless, captive workforce under state control and so are unusually docile and easily replaceable. In 2014, a federal court demanded that California honor a previous ruling to eliminate prison crowding by that granting early release for low-offending prisoners. But the state's attorney general, Kamala Harris, fought the order arguing that the prison laborers were needed for the wildfire season in place of publicly employed firefighters. There is also a growing number

of female inmates who are being trained to fight fire. Though, not specific to fire, we know that female inmates receive fewer services and less training than male prisoners. This area needs examination by metabolic rift theorists and ecofeminists – not to mention continuing Pellow’s work on the subject of the interrelated issues of environmental conditions, state control, and prisoners.

CHAPTER V

THE RED ENEMY: MILITARY KEYNESIANISM

In 2021, the United Nations' (UN 2021) issued a “code red for humanity” warning that the average global temperature had risen to 1.2° C (or 34 ° F) above pre-Industrial levels perilously close to the 1.5° C projected to expose all beings to devastating natural disasters such as heatwaves and forest fires. The report dropped in the midst of a sweltering “heatdome” and devastating wildfires in the Western U.S. As U.N. General-Secretary António Guterres (2020) unveiled two alarming climate reports in 2020, he declared, “humanity is waging war on nature.” Fire ecologists have found that the long-term war on forest fires has left landscapes in the western U.S more vulnerable to fire disturbances in the presence of climate change-related droughts and temperature increases (Westerling et al., 2006; Jolly et al., 2015; Parks and Abatzoglou, 2020; Hagmann et al., 2021). Climate change has extended the fire season, worsened wildfire behavior, and exacerbated the wildfire paradox which is understood as the diversion of large amounts of money and personnel to fire suppression at the expense of fuels reduction needed for wildfire prevention. Both climate change and the wildfire paradox are partly attributable to a legacy of U.S. militarization.

Accompanying the extended season and ferocity of wildfires, labor shortages have helped to increase the use of millions of gallons of water and fire retardant in the battle against fire. Following a devastating 2021 fire season, Cal Fire boasted on social media that it had dropped 12 million gallons of water and 17 million gallons of retardant in its aerial battle with the almost 9,000 fires across the state.⁵⁹ From 2000 to 2010, the USFS bombed 93,000 wildfires with 90.4 million gallons of retardant with the western states receiving 95% of the drops (USFS, 2011).⁶⁰ In the following 8 years, from 2012 to 2020

⁵⁹ CalFire Facebook Page. Friday January 14, 2022. Accessed on 26 February 2022
<https://www.facebook.com/photo/?fbid=293526276141417&set=a.222963833197662>

⁶⁰ U.S. Forest Service. 2011. *Nationwide Aerial Application of Fire Retardant on National Forest Land*. (October 2011). Washington DC United States Department of Agriculture.

(2011 numbers were not available), that total number of gallons increased to 12.4 million gallons, an increase of 37%. For reference, 12.4 million gallons would fill roughly 19 Olympic-size swimming pools.

Fighting wildfires has been described as warfare through the acknowledgement that early wildland fire suppression originated in the military. In the sense that war is the continuation of *political economic* conditions,¹ modern wildfire policy extends the ecological rift, the separation between people and Earth's ecological processes for the purpose of capital accumulation. The rift between humans and climate processes has led some scientists to propose that the current geological epoch be renamed. In proposing the Anthropocene in consideration "that the Earth has now left its natural geological epoch, the present interglacial state called the Holocene" and that human "activities have become so pervasive and profound that they rival the great forces of Nature and are pushing the Earth into planetary *terra incognita* (Steffen et. al., 2007, p. 614)." In a later paper, these Earth scientists (Steffen et al., 2015) further refine the timeline of the Anthropocene to reflect "the phenomenal growth of the human enterprise after the Second World War, both in economic activity, and hence consumption, and in resource use (p. 92)." And while they acknowledged that this rapid development is not a definitive cause of climate change, they argue that the evidence strongly points to this time period as a main driver.

Military spending can have significant impact on staving off economic crises which is commonly known as military Keynesianism, the collaboration of private industry, the military, and other public entities with the aim of maintaining economic expansion. Military Keynesianism was an economic policy pursued by the federal government in the years following the Second World War and aimed at maintaining effective domestic demand at home while countering Marxist-affiliated, decolonial struggles abroad which threatened the extension of markets for goods in the Global South. Unlike most of Europe, U.S. corporate monopolies emerged from the world wars having made a fortune filling war orders from Asia and Europe expanding their industrial capacities and workforces. During WWII in the years between 1940 and 1941, military spending rose 600%, rising to 42% of GDP in 1944, but in the years immediately

¹ Clausewitz, Carl Marie von. 2007, p. 252.

following the war, the demand for goods only lasted until the late 1940s. The economy began to falter, raising concerns about stagnation of technological capacity, foreclosed markets, rising underemployment and unemployment and slowing consumer demand (Cypher, 2015).

Baran and Sweezy (1966) observe that the “...technology of warfare and the organization and provisioning of armed forces have always – and not only under capitalism – exercised a profound influence on economic development (p. 179).” Military Keynesianism provided impetus for massive economic growth following World War II and significantly contributed to the use of wartime techniques and materials such as bombing and chemical warfare for wildfire suppression. While these approaches to fire had been explored during the world wars but perfected during the Cold War. Wildland fire suppression benefitted from the direction of public monies to the military in order to counter stagnation of investment. This is achieved through the formation of a “symbiotic coalition in the name of ‘national security’ (Elveren 2019: 28)” that serves the dual purpose of maintaining US hegemony while shoring up the domestic economy.

This coalition of corporations and institutions, in collaboration with military personnel and agencies carry out research and develop technologies that can soak up surplus capital and be applied domestically. The USFS describes the US military “as an important partner in wildfire suppression” going back to the 1880s.⁶¹ Militarization of wildland fire involves a triad of factors: access to excess and current war materiel through specific agreements directly with the military but also defense contractors and subcontractors, cooperation in research and development, and direct collaboration with the military and capital for the purposes of war. This “directorate (Mills, 1956, p. 8)” has a long history of global domination and its machinations have a lot to do with the climate change driven wildfires we see today because of the rapid expansion by monopoly capitalism of “the rapid expansion and urbanization of the

⁶¹ US Forest Service (USDA) webpage “Managing the Land,” subsection “Fire Management” embedded in text under “Partners” embedded as “US Military.” available at: <https://www.fs.usda.gov/managing-land/fire/partners/military>.

US Army “Humanitarian Relief” webpage subsection “Wildfire Relief Efforts” accessible at: <https://www.army.mil/humanitarian/wildfires.html>

world's population in response to the massive growth of the forces of production at the disposal of humankind (Sweezy, 2004).” I examine two aspects of wildfire management that exemplify military Keynesianism: 1) the logic of how the Cold War informed fire science and 2) how the current air and chemical war against fire developed through the post-war mobilization of goods, surplus materials, and services. The main agency responsible for wildfire management is the USFS whose militarized operations span the 1940s to the 1970s through coordination and collaboration with numerous corporate and economic interests and even in direct collusion with the U.S. military's imperial war in Vietnam. In order to sell its activities to the public the agency embarked on a successful propaganda campaign with the advertising industry that leveraged themes of military superiority and virtue to normalize total fire suppression.

Military Keynesianism aims to protect the US economy from stagnation by maintaining a domestic system of innovation through profitable contracting of with the private sector for both military and civilian use (Cypher, 2015). The normal state of advanced capitalism during the Cold War tended toward periodic crises and persistent stagnation, because corporations accrued economic surplus that needed to be reinvested (Baran and Sweezy, 1966). But government appropriations to the military not just toward armaments but also for research and development and other purposes helps to keep people working, ensure profitability, and leads to scientific innovations that provide more avenues for growth. Additionally, imperialism abroad through strategic support to friendly governments through aid agencies like United States Agency for International Development (USAID) and the Forest Service spread of products, organizational logistics, and conduct experiments, diffuse technical support and assistance to governments that help to create new markets.

Military Keynesianism and the Environment

Economist John Maynard Keynes “sought to explain to economic policy-makers that the level of consumption among a society's working population is not a matter to be discounted or ignored but is of

crucial importance in the maintenance of corporate profits (Custers, 2010, p. 81)” and the ability of businesses to sell their products. Following the world wars, the massive build-up of war apparatus and mobilization of labor resulted in overaccumulation of profits in the hands of a few giant industries, a sprawling industrial base, and a large labor force but no war to maintain the former rapid pace of production, Keynes proposed that government use spending to soak up the surplus while raising incomes and employment for their citizens’ well-being in order to avoid mass unemployment and to insure against economic shocks. Military Keynesianism emphasizes defense expenditures as one way to achieve that goal with the logic that any spending is good spending. While Marx and Engels did not substantively examine the role of militarization in surplus accumulation, Rosa Luxemburg observed that the “incessant technical innovations of the military (qtd in Cypher, 1988, pp. 304-305)” provide a nearly inexhaustible stream of profits for capital compared with social spending. In contrast to Luxemburg, Lenin did not view imperial wars from a developmentalist perspective⁶² but argued that they blocked social development of indigenous populations through expropriation and dispersion, and he subsequently called for destruction of all imperial relations by indigenous people.⁶³

⁶² Luxemburg argued that colonialism and settler colonialism reproduced capitalist relations of the imperial core in blueprint fashion and exported them. This position has been shown to be false by Lenin who argued that the problem was monopoly capital.

⁶³ Since the time of the Third International, a large number of indigenous decolonial struggles in the Global South have adopted some form of Marxism-Leninism as a path toward liberation. While the focus on imperialism in this dissertation might seem to have nothing to do with wildfire suppression, resistance to capitalist landgrabs is/was, in many cases, a de facto defense of the use of fire for agriculture and forestry on land occupied by indigenous people and peasant farmers.

An example of the importance of Marxism-Leninism comes from Ho Chi Minh who stated that a “revolution in the colonial and semicolonial countries is first and foremost a peasant revolution (Minh, Ho Chi. 1957, p. 300).

In addition to Vietnam, China, Cambodia, and the union of *dalit and adivasi* movements in India (Prasad 2017) embraced Marxism in some form. Prasad (2007), mentions the Carnation Revolution which saw Marxist-Leninist decolonial struggles in Angola, Guinea-Bissau, Mozambique, and Cape Verde. Additionally, the New Jewel Movement in Grenada, the Sandinista Revolution in Nicaragua, the Mongolian People’s Revolutionary Party and movements in Ethiopia, Afghanistan, Benin, Madagascar, Liberia, and Libya all “adopted Marxism-Leninism as their official ideology (209).” Most of these decolonial struggles advocated for land reform.

Since the end of World War II, militarization, has served a vital economic function pushing technological progress, promising higher employment levels, and increasing market demand. Beginning in the 1940s, U.S. corporate and state power expanded forming a network of monopolies in aerospace and chemical manufacturing, scientific bodies, politicians, and military administrators (Baran and Sweezy, 1966; Custers, 2010). Capital supports military spending because it enables companies to secure contracts for new products that can be rapidly used up and replaced without diverting too much profit to social programs that strengthen labor.

Environmental sociologists, applying Treadmill of Production (Schnaiberg, 1980) and Treadmill of Destruction (Hooks and Smith, 2004, 2005) theories find militarization is responsible for resource extraction (Downey, Bonds, and Clark, 2010), higher energy consumption and greenhouse gas emissions, (Clark, Jorgenson, and Kentor, 2010; Jorgenson and Clark, 2009; York, 2008), the growth of environmental sacrifice zones that affect primarily people of color and Native nations (Hooks and Smith, 2004; 2005; Alvarez 2020), as well as the racialized the expropriation of freshwater (Alvarez, 2016).

Marxist analysis acknowledges the importance of treadmill theories but identifies accumulation as the core function of the treadmill whose fixtures are “imperialism, war and economic crisis (Foster, Clark, and York 2010, p. 200).” The capitalist mode of production causes a divergence between social necessity and environmental sustainability outrunning ecological regeneration (Burkett, 1998) and resulting in a “technologically potent but alienated humanity—alienated from both nature and itself (Foster, Clark, and York, 2010, p. 14).” Accumulation and its accompanying rift forces shifts both geographically as environments are degraded, but also qualitatively “whereby one environmental crisis is ‘solved’ (typically only in the short term) (Ibid., p. 74)” but a different crisis arises. Fire science and policy history exemplify this ecological rift/shift dynamic as they evolved along with monopoly capital’s emphasis on technological innovation and reliance on U.S. imperial aspirations. Militarism, military expenditures (mille) have all helped to push fire science in the direction of increasingly sophisticated and aggressive wildfire suppression while simultaneously treating ecological processes as uncomplicated and

governable. Imperial hubris provides a convenient ideological framework to grease the wheels of accumulation through propaganda.

Marxist economists (Baran and Sweezy, 1966; Duncan and Coyne, 2013; Elveren, 2019) have argued that militarization helps to prop up capitalism by returning idle productive capacity to service, maintaining employment, and stimulating aggregate demand for dual purpose goods (Elveren and Hsu, 2018). Additionally, these functions foster new networks and stimulate development of technological breakthroughs through the injection of money to private industry in partnership with academic and government organizations. While new technologies of the late 20th century faced limited opportunities for economic expansion and the connection between science and industry was still tenuous, the post-war era “extended the notion of social progress through science, technology, and economic growth (Schnaiberg, 1980, p.124).” Fueled by defense spending, the treadmill of accumulation brings together an “iron triangle” of defense-related contractors, military leaders, and civilian policymakers (Cypher, 2015). Others (Foster, Holleman, and McChesney, 2008) have extended this analysis to describe the functions of the triangle as a “strong political-economic foundation” for the pervasive rule of monopoly capital in the economy. War and imperialism releases money that boosts employment in numerous sectors, including science which, in turn, raises the standard of living and results in mass production as well as waste of materials (petroleum is burned, chemicals are dropped, tools wear out). Additionally, mass communication through the cooperation of business, media, and even the film industry emits propaganda aimed at securing support for belligerent policies and also mass consumption of goods.

The Fallout Zone: Big Science

Feminist standpoint (Harding, 1991), analyses of science observe that public funding for research purported to advance humanity is frequently unevenly distributed and “not just for the benefit of the few but also for the direct oppression and exploitation of the many (p. 35).” The eradication of fire was certainly the goal, the use of wartime technologies was directly tied to the rise of big science. Rachel

Carson's observations of the widespread use of DDT⁶⁴ led to her denunciation of the use of military technology as "man's assaults upon the environment (Carson, 1962a, p. 4)," in *Silent Spring*. Rachel Carson condemned the Cold War "liaison between science and industry" that accommodated "the short-term economic gain, to serve the gods of profit and production (Carson 1962b)."

The end of WWII marked a distinct shift toward big science in fire research as the focus during the war had been on research that provided the most benefit to the war effort or projects that could be dropped without losing study continuity (Munger, 1955; Klade, 2006). In July 1945, Vannevar Bush, founder of Raytheon, a maker of wartime technology including proximity fuses, in anticipating the end of the war, turned to peacetime scientific pursuits in his book *Science – The Endless Frontier*. As Director of the U.S. Office of Scientific Research and Development, Bush initiated and administered the Manhattan Project, with opposition by at least one military official,⁶⁵ that advocated dropping atomic bombs on military targets "surrounded by workers' homes, and without warning (Kolko, 1968, p. 542)" in Hiroshima and Nagasaki. The two cities were virtually obliterated contributing to the September surrender of the Japanese Empire and ending WWII.

Bush's (1945) *The Final Frontier* called for lump sums of government money allocated over long periods of time to foster uniform cooperation between private industry and the federal government. Additionally, he called for experimental stations and deregulation of fiscal procurement through preferred government contracting. According to Owens (1994), the focus on contracting "helped fuel the engine by which the Cold War state became dependent on government, and, overall, federal money encouraged the concentration of economic power in large corporations (p. 563)," privatizing a wider area of federal responsibility. Smith (2017) reports that USFS researchers were closely following developments in Washington DC, as one of their major headaches was the cyclical nature of appropriations to the agency

⁶⁴ DDT was initially used by the military to control malaria, typhus and other insect-borne diseases.

⁶⁵ In particular, Ralph A. Bard, Assistant Secretary of the Navy, who was the lone dissenting voice argued for advanced warning to Japan.

which had plagued it since its inception. The agency now “had a new metaphor for communicating its drive to eliminate fire: it was war”

The Forest Service was paying close attention. Melvin Bradner, director of the Northern Rocky Mountain Forest and Range Experiment Station, jumped on the idea of firefighting as the new war effort, as suggested by his colleague P.D. Hanson. Bradner went even further, however, wanting to capitalize on the relationship between war research and forest fire research. In a letter to former fire researcher E.I. Kotok, who was now assistant chief in charge of all forest research, Bradner pointed to Bush’s report that called for “lump sums” of investment in research over several years. (pp. 66-67).”

By the end of the WWII, it was clear that science had delivered some of the most devastating and effective technologies to defeat the Axis Powers. But at the same time, wartime technologies helped to raise concerns about mass fire, a term coined to represent the overwhelming threats of fires that resulted from fire-bombing and from nuclear detonation (Broido and McMasters, 1960; Countryman, 1969; Palmer, 1969). To that purpose, the U.S. military contracted with the USFS to perform a series of experiments testing the ignition and blowdown potential of nuclear weapons through the classified Armed Forces Special Weapons Project (Wilson and Davis, 1988). According to Pyne (2017), the 1950s “saw the undertaking of a number of large-scale field experiments and new disciplines (p. 19)” to study fire that included meteorology, mechanical engineering, and aeronautic; this collaboration excited foresters as it gave them credibility and prestige within the scientific field. Schnaiberg (1980) argues that the Cold War ushered in a new alliance among capital and governmental agencies usually understood as big science

World War II mobilized and concentrated more scientific, technological; and capitalist efforts in military production, and reinforced and extended the notion of social progress through science, technology, and economic growth. The dramatic successes of German chemists in substituting a variety of petrochemical products for the Nazi war machine were a harbinger of later national and international efforts along these lines. Though there are many exceptions to this trend, the shift from a "little science" to "big science" or from "academic science" to "industrialized science" is frequently dated from this period. And the linkages of the atomic weapons and later military and peaceful applications of nuclear fission clearly follows from the wartime integration of scientists and technologists with their national governments and military authorities. While inventions would continue to flow from independent researchers, a new organizational form of routinizing technological development arose-research and development (R and D) (p. 124).

This Shameful Waste: Propaganda and Production

In 1950, a poster of the USFS's Smokey Bear was featured standing before a wall of flames, shovel in hand, declaring "This Shameful Waste Weaken America!" followed by the familiar maxim "Remember – Only you can Prevent Forest Fires!" Crises like wildfire and war are stimulants to the economy in an age dominated by monopoly corporations in which stagnation is endemic (Baran and Sweezy, 1966). In order to devote a large workforce and considerable public money to fighting a war or a wildfire, the state and corporate entities must capture and manufacture the consent of the populace. Advertising and other media prove invaluable in this regard, helping to marshal people to the cause while at the same time wasting pent-up economic surplus. The rise of organized advertising to promote wildland firefighting followed the advent of state-sponsored programs aimed at arousing patriotism, mobilizing labor, and especially maintaining production just before and during World War II.

In the 1920s and '30s the US shifted from a largely competitive economy to specialized markets with concentrated capital. In 1904, 25% of American producers were incorporated but they manufactured 70% of the national output by value. By the 1930s a third of all companies were incorporated manufacturers producing nearly 88%. In some sectors, large corporations controlled 70% of market share for their product (Stole, 2012, p. 5). After a brief recovery from the Great Depression, the consolidation of powerful monopolies brought economic stagnation, high unemployment and drop in per capita income of 42% between 1930 and 1938. Following on the heels of the Great Depression and New Deal, polls showed that most Americans were interested in universal programs and social spending not mass consumption. The majority of residents wanted full employment, regulation of the banking industry and more government spending on public works, universal health care, and social security. This state of affairs led the nascent *Advertising Age* magazine to remark, "The American people do not want new 'systems' or new ideologies, but they want jobs, public works, medical care, and social security. ... They want the deed, not the word (qtd in Stole, 2012, p. 41)."

Propaganda was and still is an integral part of the militarized aspect of wildfire as seen through the lens of military Keynesianism. The familiar character of Smokey Bear's messages and image appears on roadsides, in magazines and social media and the network news is supposed to educate and alert people about wildfires. But Smokey and most of this media programming is part of the capital modern accumulation process described by Marxist social scientists. While media campaigns aimed at wildfire education and news coverage of firefighters protecting of homes and forests appear to be helpful for people and the environment, they are both a product and a waste product of the accumulation process. The wartime buildup of industrial capacity enabled the associated industries to further consolidate their power and realize massive profits. The advertising industry is a collective pouring of excess profitability into an ephemeral activity that absorbs economic surplus and acts as conditioning. That doesn't mean that firefighting efforts and educational programs do not achieve some short-term social or environmental benefits like helping people prepare themselves for wildfires, informing the public of fire hazards, or enabling firefighters to do their jobs more effectively. But on balance, these efforts generate more profits for corporations, degrade the environment, and manufacture consent for a way of dealing with fire that is not socially just or environmentally sustainable.

The only goal of capitalism is accumulation of more profits. Wildfire communication and advertising achieves two important economic objectives for capital: it soaks up economic surplus through the sales effort which enables advertisers and others to market their products and by normalizing the optics and practices of suppression as the most rational solution to wildland fire, it maintains consumption by the government and the public. Contemporary American media and advertising with regard to wildfire do not inform people about fire ecology and the importance of a sensible approach to fire as an integral environmental necessity. Rather, the main aim of advertising and news coverage is to shift the focus away from informed and informed democratic environmental decision making to voluntary conscription in the fight against fire.

According to Hudson (2011), wildland fire suppression became tied to the rhetorical and systems of national defense during World War II as the USFS entered into agreements with the Office of Civil

Defense and the Department of Defense (p. 27).” Additionally, federal money fire suppression was released in order to rally the public behind the war effort but also to massage individual voluntarism in the interest of protecting forest resources from fire. After the start of World War II, a Japanese submarine shelled the Ellwood oil refinery in general proximity to the Los Padres National Forest near Santa Barbara, California, giving “protection of the nation’s lumber supply new importance (Lewis, 2018, p. 13).” The high draft and enlistment, (61.2% and 38.8% respectively) of men left a dearth of qualified and knowledgeable foresters and firefighters, forest protection became a national defense priority and the bear was invented as a symbol to mobilize patriotic Americans in protection of the homeland. The Forest Service formed the Cooperative Forest Fire Prevention Program with help from the Association of State Foresters and the newly formed War Advertising Council to produce posters and other ads. The first posters stressed fire suppression as part of the war effort with some melding racist stereotyping with national security by featuring a buck-toothed grinning caricature of Japanese Prime Minister Tojo with captions like “Careless Matches Aid the Axis” and “Our Carelessness Their Secret Weapon.”

In 1950, as lumber production climbed and fire control predominated forestry, advertising experts argued that the Smokey Bear program, a creation of ad agencies and the timber industry, “could be greatly broadened through a well-controlled commercial program (Davis, 1954, p. 23).” The 1952 Smokey Bear Act commercialized fire control through patenting and production of full sets of branded clothing and ranger kits with badges, membership cards and window decals. A 1959 Smokey ad linked the Cold War with fire declaring, “A Match Can Be a Deadly Missile (Huber, 1959, p. 66)!” Smokey became the face of fire suppression and his presence was part of an overall focus on absorbing surplus through advertising and boosting productivity.

In 1947 and 1954 the top 100 manufacturing corporations in the U.S. accounted for 23% and 30% respectively of the total economic value. By 1962 the top 100 manufacturers controlled 58% of the land, buildings and equipment in the country (Baran and Sweezy, 1966). Military contracts expanded the research and development divisions within monopoly corporations whose innovations and techniques were adapted for non-war purposes. According to Cypher (2015), military Keynesianism protects the US

economy from stagnation by maintaining innovation through profitable contracting of military goods in the private sector for both military and civilian use.

In the late 1940s, U.S. military dominance became an integral component fire management and funding, as several USFS fire research and development centers formed partnerships with the military, private industry, universities, other government agencies with the purpose of total forest fire suppression. The goals of the 10 A.M. Policy initiated in 1935, were renewed with vigor as Cold War funding through the Department of Defense (DOD) and Office of Civil Defense (OCD) became available making fire control “nearly a paramilitary service of national defense” as “wildfire tended to be typed as enemy fire (Pyne, 1982, p. 287).”

According to Harding (1991) a science with the pretension to dominate nature often conceals its actual function and motive, regardless of what individual scientists intend - providing the material resources that enable some people’s domination over others. Military Keynesianism internationalizes domination of nature and other human beings, as direct and proxy imperial wars enable capital to put its industrial capacity to work, use up materials, invent advanced technologies, and open markets abroad.

Following the two world wars, populations in western cities increased dramatically and existing industry boomed and diversified. For example, in California between 1947 and 1954, more than 7,000 manufacturing plants were established. According to Godfrey (2005),

Much of this growth came from federal expenditures that were closely related to the Cold War and America's involvement in the Far East, such as the Korean War. California took full advantage of this federal largess. California's salubrious climate, available space, established factories and science-oriented universities all combined to broaden the state's economy even further. Federal funds poured into California's defense industries, and the so-called military-industrial complex dominated planning, research and manufacturing in Southern California, transforming that part of the state from a leading aircraft manufacturer to a research and development complex for missiles and space vehicles (p. 327).

This rapid development helped to initiate suburbanization and automobilization across the West as well as providing a large increase in fire science research with reciprocal benefits to capital and the military.

In the post-war years militarized wildfire suppression was made possible by numerous national government agencies such as the Forest Service, US Air Force, US Weather Bureau and a mix of big industry players in aviation, chemicals, and electronics who benefitted from the economic expansion in the post-war years. From the 1940s on, fire suppression became a policy fixture and an economic necessity; it also extended the international reach of U.S. fire science. Arnold (1992) recalled that the State Department did not handle international forestry; “Forest Service Research had the full responsibility. The published papers and national meetings were important (p. 25).” The evolution of fire science in the 1950s featured the embrace of a network of military, universities, defense contractors collectively known as Big Science. Fire managers used war technologies to change local weather patterns, simulate nuclear fires, expand detection and surveillance of fires, and explore fire suppressing chemicals (Chandler, Storey, and Tangren, 1963).

Key Forest Service professionals, such as David Godwin director of Fire Control whose military service and connections enabled the agency to acquire military equipment and technology and conduct experiments in the control of mass fire with the military and S.B. Show who hosted profusion of Big Science money and expertise in the Cold War years led to the rise of a technocracy among fire researchers in West. The horrific and largely forgotten firebombing of Tokyo which killed 100,000 people and made 1 million homeless was overseen by Henry “Hap” Arnold who had also been Army district commander for the CCC (Show, 1965) and who later was involved in the Allied firebombings of German cities such as Hamburg and Dresden. Fire science further developed using knowledge gained from the nuclear terror the U.S. had unleashed on the Japanese cities of Hiroshima and Nagasaki during World War II as both a reservoir of technical expertise and motivation for increased production of war technology for use in “peace-time” against forest fires (Pyne, 2017). Much of this war technology was directed toward using planes and chemicals to attack fires but also included early radio technology and navigational systems developed during the wars.

While patrolling the forests with military aircraft had served the dual purpose of Army aviation training and fire detection since 1919, Cold War associations between U.S. Air Force personnel and foresters spurred new funding and an emphasis on aerial suppression through the Aerial Bombing Project. Through World War II military connections, USFS employees who had overseen the incendiary bombing of Japan were reassigned to quenching forest fires using water bombs. From 1946 to 1948, the Air Force and USFS fire managers with the Fire Sciences Laboratory in Missoula Montana collaborated in bombing experiments using war-time bombsights and military technologies (Klade, 2006).

The Air Force provided officers, aircraft – a B-29, a B-25, and two B-47s – and facilities to conduct the experiments using “World War II techniques in bombing forest fires with water and chemicals (Barrows, 1976, p. 4).” Modified B-29s were fitted with homemade water bombs and top-secret proximity fuses for water bombing runs on fire pairs. While the joint research paper was classified, as the fuses were a military secret, the exploits of the B-29 dubbed the “Rocky Mountain Ranger” were favorably and frequently covered in the local newspapers (Klade, 2006). However, as funding dried up, the experiments ceased and it was not until 1954 that aerial application of water and retardant became a vital part of fire research and control efforts throughout the world (Barrows, 1976; Graham et al., 2014).

Post-World War II, the Air Force budget was cut so severely that aircraft manufacturing, which relied on government contracts, dropped from the 16th largest industry in 1944 to the 44th in 1947 and was near collapse (Domhoff, 1991). According to Cypher (2015), the crisis was manufactured by the industry in order to maintain lucrative follow-on agreements. In 1948, the industry established the Finletter Commission (1948) which held hearings aimed at securing a market and issued its *Survival in the Air Age* report. The report observed that civil aviation was in an overproduction crisis with operating losses amounting to \$22,000,000 and argued for \$2 billion in government procurement contracts to which President Truman responded with approximately \$740 million (Cypher, 2015).

In 1950, the U.S. National Security Council released its top-secret foreign policy report, NSC-68, calling for three times the yearly defense budget originally requested by the Pentagon. Conjoining economic, ideological, and military objectives, NSC-68 advocated, “A more rapid build-up of political, economic, and military strength ... (p. 54)” in order to counter the growing influence of the Soviet Union and “its championing of colonial peoples ... (p. 14).” Its economic objective in countering communist liberation struggles was to increase the “gross national product by more than the amount being absorbed for additional military and foreign assistance purposes (p. 58).” Despite official anti-communist rhetoric, Congress refused to fund NSC-68 until the U.S. went to war to prevent the possibility of a united Korea under a communist government. The war helped to open a new avenue of accumulation tied to the military with defense contracts rising from \$14.8 billion in 1950 to \$51.1 billion in 1951 with Pentagon programs accounting for 15.1% of GDP (Cypher, 2022, 2015).

In line with NSC-68’s rejection of U.S. isolationism, long-time USFS fire suppression zealot S.B. Show was instrumental in establishing the Forestry Branch of the United Nations’ Food and Agriculture Organization, becoming its Chief of Forestry and Forest Products Division in 1953. Show co-authored *Forest Fire Control* for the FAO, exporting the U.S. approach to fire management around the world with an emphasis on aggressive suppression. Show and Clarke devote one page to controlled burning, which they generally discourage, but argue that it can be used on logging slash and in some landscapes such as for the production of Loblolly pine (*P. taeda*) in the U.S. South, ignitions and hold up Australia’s use of fire some cases. The overwhelming emphasis is of *Forest Fire Control* is on fighting fires using firebreaks 20-40 meters wide, planned grazing, roadbuilding, and agricultural development (Show and Clarke, 1953; Show, 1965). The next year following the deaths of 14 firefighters, Operation *FIRESTOP*, held at Camp Pendleton, highlighted multiagency coordination with the aim of testing the effectiveness war-time equipment in suppressing fires “in urban areas after atomic or other attack (FCDA 1954: 30).” According to Hudson (2011),

funding for preparedness and research, the other great boons that resulted from the Forest Service’s military connections were access to surplus machinery and equipment development. The military conducted joint tests with the USFS to check the capabilities of helicopters and air

tankers for wildland fire fighting. Once their potential was established through field experiments (such as the creatively named “Operation Firestop”), they became a mainstay of backcountry fire suppression (p. 29).

FIRESTOP was a year-long joint exercise overseen by the USFS bringing together eleven federal, state, local agencies, and private industry in the West to develop and “test various methods, equipment and materials for preventing, controlling, and suppressing mass fires (FCDA, 1954, p. 30).” *FIRESTOP* incorporated information gained from firebombing in Europe and the nuclear bombardment of Japan tests incorporated analysis of nuclear and incendiary attacks on urban and rural areas with aviation support and chemical warfare to research mass fire control in the U.S. West (Cermak, 2005; Wilson and Davis, 1988). The USFS used surplus military equipment, such as helicopters supplied by the U.S. Marine Corps, and included studies of backfiring techniques, local wind and fire behavior, and aerial bombardment using water and chemicals.

The Federal Civil Defense Administration funded the project, providing \$50,000, but the research had corporate sponsors in aviation and chemical manufacturing. A chief USFS participant confirmed *FIRESTOP*’s dual program of fire suppression and economic expansion, recalling the use of Douglas Aircraft Company’s DC-7 bombers - “They were flight testing it with tanks of water in it to simulate loading and distribution of passengers (Arnold 1992, 9).” While this connection seems coincidental and tenuous, Douglas Aircraft’s passenger test flights provided information regarding weight distribution and other factors for water drops and inspired the Los Angeles County Fire Department to arrange water bombing tests with the USFS’s Angeles National Forest District, Arcadia Equipment Development Center and the California Division of Forestry (Arnold, 1992).

FIRESTOP enabled fire officials to test the capabilities of aircraft and demonstrated the potential for using aerial warfare against wildfire. Officials made a film dramatizing the air war by showcasing a Hollywood stunt pilot flying an ex-Navy Grumman TBM-1C Avenger torpedo bomber modified with dual 600-gallon water tanks supplied by the U.S. Weather Bureau (Cermak, 2005). Following on the heels of *FIRESTOP*, early research on drone technology was performed using low altitude retrievable

probes (LARPs), radio-controlled aircraft, that were designed to fly into smoke columns and collect data such as humidity, temperature, and barometric pressure. In the wake of FIRESTOP, appropriations for fire suppression rose 30% each year and spurred the National Science Foundation to embark on a fire science program (Godfrey, 2013). According to Wilson and Davis (1988), FIRESTOP “not only stimulated prompt acceptance of research results, but also encouraged interest in expanding research budgets through both Federal appropriations and cooperative funds (p. 6).”

Passage of the Forest Pest Control Act charging the agency with preventing and eradicating pests on private and public forests added another arrow in the quiver of fire suppression (Lewis and Miller, 2018). Following Operation *FIRESTOP*, the USFS introduced intensive use of herbicides and fire retardants for fire control using free-flowing water, weed killers and retardants to ensure wider coverage. During World War II the secret discovery of the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D), a co-constituent, along with 2,4,5-Trichlorophenol (2,4,5-T) of Agent Orange, led prominent scientists associated with the National Academy of Sciences, to request permission from the War Department to explore the possibility of biological warfare (Peterson, 1967). Throughout the 1950s, the USFS California Forest and California Forest and Range Experiment Station began testing 2,4-D as a weed killer to eliminate competition with valuable plants and to reduce the threat of wildland fire and maintain firebreaks and roads used by firefighters (Godfrey, 2013; Pyne, 2015). *FIRESTOP* laid the ground work for direct USFS collaboration in misadventures abroad as well as destructive practices at home, some of which are still in use today.

Rain on Demand - Weather Modification

At the present time the USFS does not use weather modification to fight fire, mostly because it is expensive and technologically limited. However, *Project Skyfire* complemented the Forest Service’s early air war and its cooperation with defense research and development, geophysics departments, and other organizations and illustrates its immersion in the permanent war economy. In the late 1940s the USFS

approached Vincent Schaeffer and Irving Langmuir the General Electric researchers and co-founders of the National Defense Research Committee-supported weather modification and chemical warfare program Project Cirrus, to assist in research aimed at quenching forest fires in the lightning-dominated firescape of the Rocky Mountains. One of the investigators at the time observed that around 9,000 lightning strikes occur in the United States with 85% occurring in the western states and argued, “the lightning fire problem calls for intensive research on lightning phenomena (Arnold, 1964, p.121).”

The project trained fire lookouts on how to take the meteorological data of thunderstorm activity, duration, and lightning production, analysis of the jet stream using detailed manuals and time-lapse photography. The project included 22 research stations in Idaho, Arizona, Montana and New Mexico. These experiments led to the formalization of *Project SkyFire* in 1953 with the ostensible goal of understanding how lightning affects fire activity and interrupting strikes. But it also explored how to change thunderstorm patterns by modifying the composition of cumulus cloud by shooting silver iodide into them with the goal of causing rainfall (Fuquay and Wells 1957).

Skyfire was a multiagency experiment conducted under the aegis of the Intermountain Forest and Range Experiment Station bringing together the Advisory Committee on Weather Control, the General Electric lab, the U.S. Weather Bureau, Meteorology Research Inc., Montana State University’s School of Forestry, Boeing, University of Washington’s Department of Meteorology and Climatology, the U.S. National Park Service, and California State Forestry. The Munitalp Foundation, begun by former researcher General Electric Vincent J. Schaefer and funded by an anonymous mining executive provided funding (Arnold, 1964; Barrows, 1954,1957,1961; Gisborne, 1931; Graham et al., 2014; Havens, 1952; Schaefer and Dieterich, 1959; Smith, 2012).

According to Harper (2017), formal governmental impetus for weather modification arose as an attempt to circumvent drought in the arid West that had forced hydroelectric plants to shut down. Accordingly, cloud seeding was popular with utilities. As hearings got underway, to introduce regulation and formalize funding, the Pentagon initially objected to private industry encroaching on an experimental field that they had been secretly exploring for years. Weather modification can contribute to soil run-off,

floods, and landslides with lasting geological effects. These considerations led farmers and people concerned about local environmental conditions to vociferously resist interference with weather patterns.

The Department of Defense stepped aside and despite resistance from local communities, *Skyfire* garnered more funding when legislation was enacted in 1953 under the Eisenhower Administration. By 1956, the project had perfected cloud seeding equipment and was testing a number of techniques to study thunderstorms with the aim of preventing or reducing the severity of lightning fires using military radar for data collection (Fuquay and Wells, 1957).

SkyFire tests in 1960, 1961 and 1965 through 1967 had yielded some results but called for additional research and noted that the DoD assisted in supplying the program and underwriting some of the work. Between 1959 to 1972, the federal government devoted \$109 million in funding from 1959 to 1970 to weather modification. However, the U.S. Comptroller found the numerous agencies' efforts to be poorly coordinated and self-directed, prompting the USFS Chief to stress *Skyfire*'s utility in areas of mutual benefit to other agencies such as the Naval Weapons Center from which it obtained silver iodide flares (Staats 1972, 1974). At least in one case *Skyfire* technology was secretly used over a fire in southern California resulting in a "gully washer thunderstorm (Arnold, 1992, p. 42)."

According to Roslycky (2004) the US admitted to conducting over 2500 secret weather modification operations during the Vietnam War with missions over Vietnam, Laos, and Cambodia. Declassified government documents published in *The Pentagon Papers* (Ellsberg, 1971) revealed that the technology was subsequently tested with *Operation Popeye* and executed through *Operation Compatriot* in the Vietnam. Using RF-4C Phantom II and WC-130 Hercules aircraft, the U.S. engaged in weather warfare to hamper the progress of the communist armies of resistance in Laos, North Vietnam, Cambodia, and South Vietnam triggering mudslides, trapping soldiers on the ground and leaving standing water in farmers' fields.

In Senate (U.S. Senate, 1972) hearings aimed at banning weather modification as a weapon of war, Maryland Republican Congressman Gilbert Gude called weather modification "a Pandora's box" that could increase tensions between the U.S. and U.S.S.R., contribute to environmental problems,

negatively affect nearby communities, or lead to interpenetration of military and civilian activities. By way of example, Gude mentioned an instance of the USFS's direct involvement in Vietnam

The U.S. Forest Service already has been drawn into the Vietnam conflict and in a most disturbing manner. Who would have thought that the same agency that teaches "Help Smoky (sic) stamp out forest fires!" would be contracted by the Pentagon to help create firestorms in Vietnam. It is a sign of the pervasive influence of this mistaken war (p. 59).

For the agency, this was an opportunity to experiment with new technologies that it could deploy domestically and to maintain its relationships with funding sources. Turse (2013) observes that

By the mid-1960s, the American military had turned war making into a thoroughly corporatized, quantitatively oriented system that the sociologist James William Gibson astutely calls "technowar." The philosophy behind it was simple: by combining American technological and economic prowess with sophisticated managerial capacities, the Pentagon meant to guarantee ultimate success on the battlefield. The country's unmatched military capability would allow it to impose its will anywhere in the world, with the war machine functioning as smoothly and predictably as an assembly line (p.41).

Smokey Bear was developed as a patriotic symbol during WWII by the advertising industry to appeal to the public's sense of duty at home, but with Vietnam, he went to war. The war enabled the agency to conduct "important programs in support of both civilian and military interests in forest management, fire control and employment, and defoliation (Hartzer and Clary qtd in Lewis and Miller, 2018, p. 8)."

Drafting Smokey: Agent Orange

One of Reverend Dr. Martin Luther King's (1967) most important speeches revealed in stark and eloquent terms the position of the U.S. during the Cold War. In "Beyond Vietnam" King rhetorically linked the irony of a nation "gone mad on war" watching in "brutal solidarity" as the U.S. military unleashed fire on Vietnamese indigenous people while fires of rebellion burned across the country in response to poverty, racist police violence, disenfranchisement, and despair over the war. King condemned the "giant triplets of racism, materialism, and militarism" and observed that the "need to maintain social stability for our investments accounts for the counter-revolutionary action of American forces" in newly decolonizing and communist countries.

With regard to the development of fire suppression during that time, Stephen J. Pyne's (2015) *Between Two Fires* alludes to this period with a surprising passage in which he examines "America's great cultural revolution on fire (p. 33)"⁶⁶ and the agency's reevaluation of fire suppression. He links together cultural factors such as the "long wave of civil rights legislation and court decisions (p. 63)," the expansion of baby boomers into the suburbs, and the "largest surge of immigrants" in history, whereby "10 percent of Mexicans were living in the United States (p. 62)." The transformation in rhetoric on fire exclusion coincided with Native American agitation in urban centers (Smith 2012),⁶⁷ but the coincidence occurred against the backdrop of the Vietnam War, in which the "massacre at My Lai, in particular, struck some as reminiscent of Indian massacres at nineteenth-century Western sites such as Sand Creek and Wounded Knee (Smith, 2012, p. 100)." At the time, the USFS was experimenting with fire and chemicals as a counterinsurgency tactic abroad which eventually partially replaced full suppression at home (Lewis and Miller, 2018). Commenting on the U.S. international approach to the post-WWII decolonial period, Métis Marxist historian Howard Adams (1995) observed that the U.S. uses a neocolonial strategy of destabilization through the Central Intelligence Agency (CIA) to overthrow indigenous governments that insist on self-determination and/or anti-capitalist organization of their economies and install indigenous leadership loyal to capitalist expansion in newly constituted client states. Vietnam was an early attempt at this strategy, and the Cold War linkage of an anti-decolonial mission and anti-communism in Vietnam was an inherent part of U.S. imperialism playing out on a global stage (Estes 2019).

⁶⁶ This is also the title of the chapter and a reference to China's protracted revolutionary process of moving away from capitalism which has been significantly stigmatized and misrepresented in the U.S. Pyne also mentions Red Guards – which most likely is referring to those of China and not the Asian American revolutionary group, that along with the Brown Berets, Black Panther Party, the American Indian Movement, the Young Lords, the Young Patriots and others that included radical internationalism as part of their struggles in the U.S. This is characteristic of Pyne's purple prose that mixes breezy allusions to historical developments in bewildering and sometimes offensive displays.

⁶⁷ Smith (2012) documents the enormous groundswell of the Red Power Movement that drew supporters from numerous parts of the Left and led to changes in national policy. She contrasts the Alcatraz occupation with the Pit River Tribe's takeover of PG&E land as an example of how urban protests such as in Washington which proved more effective than rural ones.

The second chapter of Pyne's (2015) aforementioned book that describes the USFS's 1970s-era fire revolution bears the title "Let a Hundred Fires Bloom,"⁶⁸ a riff on Mao Zedong, Chairman of the Chinese Communist Party, who called for a flowering of Chinese arts and sciences for the benefit of the Chinese people in his 1956 speech before the Politburo. Pyne, sickeningly juxtaposes epigraphs by the agency's directors of aviation and fire science, Henry W. DeBruin and Craig C. Chandler, respectively with his reference to Mao. Throughout the book, Pyne refers to Chandler, recognizing him as "the primary conduit for Defense funds (p. 225)" and examining his changing position from support for full suppression to advocacy for allowing fires to burn and even consideration engaging in prescribed burning. But Pyne does not mention that Chandler was a war criminal who actively participated in Project EMOTE,⁶⁹ a campaign of ecocide of against Vietnamese armed forces and civilians. Despite his numerous references to the changing diversity of the Forest Service, Pyne does not reflect on the perversity of the agency's use of fire as a weapon of war abroad and the putative softening of that war at home. Even though not one of Pyne's books mentions Operation Ranch Hand or Operation Sherwood Forest, it evident that Chandler came by at least some of his fire expertise by collaborating with the U.S. military to starve and murder Vietnamese farmers. Declassified documents reveal that Chandler, along with other USFS fire scientists, experimented with Agent Orange and other chemicals and directed fire-setting operations during the war – knowledge he brought back to the States as agency's top fire scientist.⁷⁰

⁶⁸ 百花齊放，百家爭鳴 – "Let one hundred flowers bloom, one hundred schools of thought contend." https://www.youtube.com/watch?v=QL1_UY5RFWE&t=8s

⁶⁹ A project by the Advanced Research Projects Agency that included a "wide-ranging programme that explored not only forest fires, but also forms of environmental 'modification', including the alteration of rain and weather patterns in South-east Asia (Martini, 2012, p. 273)" whose acronym stood for Environment Modification TEchniques.

⁷⁰ Pyne is well-aware of Chandler's role in this capacity. Chandler was Pyne's mentor enabling him, in 1982, to complete his encyclopedic *Fire in America*. He never mentions Operation Ranch Hand in his books even though Chandler's 1970 *Forest Fire as a Military Weapon* was declassified in 1983 and widely available by 2006 (Baird 2006). When Chandler died, Pyne (2018) bragged with casual unconcern: "Craig and I met again for follow-up questions, and this time he opened his office safe and showed title pages for some of the classified research he did. ... He went to Vietnam as an advisor on weaponizing fire (a program that led to agency disavowals after it became public). ... The black-funded research stayed in the office safe." <https://www.stephenpyne.com/blog/posts/27927>

It was just months after the publication of *Silent Spring*, that the military drafted Smokey Bear to fight a counterinsurgency war against communism in Vietnam. Before U.S. military involvement, Forest Service employees under the auspices of United States Aid for International Development (USAID) had been supporting the soft war against communism in South Vietnam by training Montagnards in forestry.⁷¹ However, during Operations Hot Tip, Ranch Hand, and Pink Rose, FS fire managers and technicians directly assisted the U.S. military in waging a brutal war of ecocide in Vietnam that included defoliation and fire (Lewis and Miller, 2018).

The U.S. military maintained that the anti-colonial peasant army of Vietnam did not have popular support among average people who needed to be protected from its communist propaganda. Dunbar-Ortiz (2014) has argued that the conflation of U.S. empire and liberty is necessarily dependent on indigenous dispossession and acts as a portable myth and a template in the service of wars of conquest and genocide that can generate a “populist imperialism (Dunbar-Ortiz, 2014, p. 106)” with the promise of democracy, economic opportunity, and freedom. In Vietnam, areas deemed too dangerous for American ground troops came to be called “Indian Country,” and were targets of the herbicidal assault in a reference to the so-called Indian Wars, in which ecocide, forced relocation, starvation and the destruction of arable land all played a part in the attempted erasure of indigenous people (Cecil, 1986). Affirming the right to self-determination and non-interference in the peripheral states, communist leader and Prime Minister of Vietnam, Ho Chi Minh had argued that “revolution in the colonial and semicolonial countries is first and foremost a peasant revolution (Minh, 1957, p. 300).⁷²

Chandler and Bentley’s *Forest Fire as a Military Weapon* (1970) echoed the ideological justification that firebombing was necessary to contain the contagion of communism and gain control of

⁷¹ Montagnards are indigenous groups who were dispossessed of their lands by U.S.-backed President, Ngo Dinh Diem who abolished their land tenure in 1955. In the North, the Population Montagnards du Nord (PMN) had formed the greater part of Ho’s army. But with victory, the Montagnards have not regained their territorial rights.

⁷² During WWII, Ho and his Viet Minh had expelled Japanese forces and French administrators from the country with the help of the U.S. At the end of the war, Ho quoted the U.S. Declaration of Independence in a speech to his countryman. But by 1953, the U.S. provided 80% of the funding to help the French recolonize Vietnam against the fierce resistance of the Viet Minh (Turse, 2013).

the countryside from the peasant army. They describe forests as a central obstacle to locating enemy troops in forests and villages during the guerilla warfare

The Vietnamese insurgency has placed heavy reliance on forest bases since the first stirrings of rebellion during the Japanese occupation. The Viet Cong is not really Chairman Mao's "fish who swims in the sea of peasants". he more closely resembles a jungle cat who lives hidden in the forest but preys on the surrounding villages (p. 1).

Throughout the war the U.S. military contended with the dense jungle that sheltered the revolutionary forces of Vietnam. In order to flush them out, kill them, and otherwise disable their capacity continue the war, the USFS's mission was

To provide technical advisory service to the military units responsible for conducting the operational test,

To upgrade existing information on fuel and weather potential for area incendiary operations in South Vietnam, and

To determine by instrumented field trials the rate of dehydration of Jungle growth following desiccant application and other characteristics of fuels and microclimate that affect the buildup and behavior of fire under South Vietnamese jungle conditions (Bentley et al., 1966a)

Operation Ranch Hand was a defoliation program that used the dioxin-laden herbicide Agent Orange in order to deny the communist peasant-led National Liberation Front (NLF) and its supporters travel and supply routes and expose them to strafing. With the consent of the U.S.-aligned South Vietnamese government, Ranch Hand expanded its list of targets to include 500,000 acres of food crops and 5 million acres of forest in a campaign of starvation to drive peasants into strategic internment camps, called hamlets. The aim of this operation was to separating average people from the revolutionary forces. As sociologist James Gibson explains, this was a violation of the Geneva Conventions Rule 53⁷³ prohibiting starvation

While bombing and shelling produced refugees by threatening immediate, violent death, chemical destruction of Vietnamese crops produced refugees by threatening slow starvation. The program was known as Operation Ranch Hand. The U.S. Air Force used American aircraft, but Vietnamese markings were put on the planes and a Vietnamese was

⁷³ <https://ihl-databases.icrc.org/en/customary-ihl/v1/rule53>

required to fly along in each aircraft. This slight subterfuge was undertaken to avoid problems with international law forbidding destruction of food intended for civilian consumption (Gibson 1986, p. 230).

The USFS researchers' presence overseeing the mission led the light-hearted "Cowboy (Cecil, 1986, p. 79)" pilots at their airbase nicknamed "The Ranch" to modify a Smokey Bear poster changing the U.S. hero's motto to "Only you can prevent a forest" (Lewis and Miller, 2018).

In 1965, led by Chandler, who worked directly with the Pentagon on numerous Advanced Research Projects Agency (ARPA now known as DARPA) projects, Forest Service fire technicians were critical to Operations Sherwood Forest and Pink Rose. Sherwood Forest attempted to create a firestorm by chemically defoliating target areas with Agent Orange and other herbicides, followed by the release of incendiary bombs containing napalm, magnesium, and phosphorus in the Bồi Lồi Forest. The bombs, it was hoped, would ignite fires and reveal enemy positions, expose troop movements, and cause long-term destruction of the tree cover. Chandler's team evaluated the effects of herbicides on foliage and also collected forest samples in Vietnam which they sent back to the newly inaugurated Northern Forest Fire Laboratory (now Missoula Fires Sciences Laboratory) where agency fire scientists tested them for flammability. However, the researchers lamented that "the heat release rate of the Vietnamese fuels was 75% of the standard, and flame heights only 60% (Bentley and Chandler, 1966a, p. 5)."

Chandler and Bentley nevertheless discussed the merits of directly burning communist troops alive by starting crown fires

Crown fires will destroy or seriously damage all equipment and supplies not stored underground or in clearings at least one-half tree height from the edge of the forest. Crown fires can also be expected to produce casualties, particularly to troops who are unfamiliar with forest fire behavior. Intelligence reports following Operation Hot Tip in 1965 listed two hundred VC casualties out of an estimated population of two thousand VC in the 21 square kilometer target area. Since only 17 percent of the target area burned as a crown fire, this seems to substantiate the thesis that casualties will be limited to, and closely correlated with, the areas burned by crown fires (Chandler and Bentley, 1970, p. 6).

Chandler and Bentley (1970) provided a detailed explanation of the steps required to generate large, complex fires using chemicals, weather conditions, and other factors as aids

In addition to treating live vegetation with desiccant chemicals, and timing incendiary operations to take every possible advantage of the weather, forest fires can be made to spread more rapidly and burn more intensely by igniting many small fires in a predetermined pattern. This technique, known as multiple ignition, utilizes the fact that two approaching flame fronts will interact and reinforce each other. To see how multiple ignition works, let's look first at a fire as it develops from a single ignition, and then at what happens when we set two fires properly spaced (p. 65).

Operation Pink Rose targeted war zones C, on the border of Cambodia and D around the Dong Nair River; both missions failed (Chandler and Bentley, 1970; Lewis and Miller, 2018) as the dense, humid forests did not ignite as planned. However, the agency gained valuable knowledge about the effects of defoliation techniques, which it later used domestically as part of its campaign to kill insects and brush that contribute to tree mortality, light fuel buildup, and greater forest flammability.

As Schnaiberg (1980) observes, military underwrites technological developments in the private sector that have military and non-military uses, such as Agent Orange. In 1940 the market for herbicides stood at about \$2 million but by 1962 it had grown to over \$270 million thanks to the massive wartime buildup of biological warfare chemicals and aggressive marketing by corporations American Chemical, Sherman-Williams (later Monsanto), and Dow (Peterson, 1967; Frey, 2013). By 1960 50 million pounds of 2,4-D and 2,4,5-T (better known as Agent Orange) were sold. After the war, the US Department of Agriculture programs including the Forest Service, benefitted from war-time chemical research and manufacturing capacity as well as its applied research in Vietnam. Despite the agency's long overdue evaluation of prescribed burning and let-burn policies at home, it nonetheless extended its policy of chemical warfare against peasant farmers and communist soldiers to Vietnam (Buckingham, 1970; Stephens and Ruth, 2005; Martini, 2012).

The U.S. military sprayed over 20 million gallons of herbicides on Vietnamese forests, over 13 million gallons of which were Agent Orange which contained 794 pounds of dioxin in concentrations 50 times the concentration recommended for normal weed control (Ngo et al., 2006; Hammond and Toàn, 2023). By 1969 over half of the arable land in South Vietnam had been sprayed, and the air reeked with the sickly-sweet aroma of herbicides in all 44 provinces, leaving a legacy of ecosystem disruption and

human health problems (Lewis, 2006). Population data reveals that 3,200 Vietnamese citizens were directly exposed to pesticides and at least 2.1 million and as many as nearly 5 million people were present in the areas targeted by Ranch Hand as well as thousands of U.S. troops. Dioxin, the most concerning of the chemicals used during Ranch Hand persists in the environment for years and has been linked to cancer, birth defects, and disabilities. Laotian survivors described moving back and forth between Laos and Vietnam to avoid the bombing and living for years in caves and forests during the war. Villagers reported poisoned soil and accelerated plant growth that destroyed food crops and the inability to grow rice for years leading to starvation (Black and Anderson, 2021). After its involvement in Vietnam, the USFS waged a losing battle on insects and weeds using components of Agent Orange in the interest of wildfire prevention and turned its chemical expertise creating foam retardants for fire suppression.

Witch's Brew: Fire Retardant

Accompanying the extended season and ferocity of wildfires, labor shortages have helped to increase the use of millions of gallons of water and fire retardant in the battle against fire. Usually, retardants are dropped by aircraft but are also sometimes applied by firefighters spraying high-risk areas with hoses or from vehicles. Previously, retardants primarily containing halon were used, however they were phased out in favor of ammonium phosphate, a fertilizer, in an attempt to limit their effect on humans and the environment. Phos-Chek, developed by Monsanto in 1962 and now distributed by Perimeter Solutions, is the retardant of choice for aerial firefighting.

Contemporaneous with the agency's involvement in Vietnam, killing and burning forests, fire researchers tested chemical fire retardants for "conflagration control (Wilson and Davis, 1988, p. 6)." Air attack revealed that streaming cascades of liquid retardants could be applied in strips to slow the spread of fire creating a chemical fireline. Retardants are sprayed onto potential fuel sources in advance of a fire; as heat from the fire touches the coated vegetation, the retardant releases steam causing the fire to cool and slow enabling hand crews a closer approach to attack the fire.

The USFS had experimented with retardant as early as the 1930s, but their development was hampered by primitive pump technology, cost of chemicals and logistics (Davis, Dibble and Phillips, 1961). In the 1950s *Operation FIRESTOP* shifted the ideological and economic approach in the agency's mission, promoting fire suppression and emphasizing applied rather than basic research. Some of the first tests involved viscous water – water containing various thickening agents – that researchers assumed would prove superior to water in slowing flame spread. In a 1960 study, tanker crews complained that they felt like witch doctors mixing the vats of chemicals obtained from corporate giants, Monsanto, Dow, Dupont, and U.S. Borax. However, technicians discovered that some of the chemicals were effective at slowing a fire's spread, particularly diammonium phosphate, which they stated, “can make some forest fuels almost fireproof for a long period of time (Davis, Dibble, and Phillips, 1961, p. 2).”

Following a devastating 2021 fire season, Cal Fire boasted on social media that it had dropped 12 million gallons of water and 17 million gallons of retardant in its aerial battle with the almost 9,000 fires across the state.⁷⁴ From 2000 to 2010, the USFS bombed 93,000 wildfires with 90.4 million gallons of retardant with the western states receiving 95% of the drops (USFS, 2011). In the following 8 years, from 2012 to 2020 (2011 numbers were not available), that total number of gallons increased to 12.4 million gallons, an increase of 37%. For reference, 12.4 million gallons would fill roughly 19 Olympic-size swimming pools.

Phos-Chek, a Class A retardant, a substance that forms bubbles when aerated facilitating its uptake of water by soil and fuels when it is applied, is a mix of about 10% ammonium phosphate, coloring chemicals, and 80% water. Although, the Forest Service maintains an approved products list and maps no-go areas, unintentional and careless drops are not uncommon and they affect wildlife, particularly salmon. Toxicology research in 1977 on four different retardants, Fire-Trol 100 and 931, which contain ammonium sulfate, and Phos-Chek 202A and 259, which contain diammonium phosphate, showed that Phos-Chek killed or severely impacted coho salmon (*Oncorhynchus kisutch*) and rainbow

⁷⁴ CalFire Facebook Page. Friday January 14, 2022. Accessed on 26 February 2022
<https://www.facebook.com/photo/?fbid=293526276141417&set=a.222963833197662>

trout (*Salmo gairdneri*) fry and fingerlings, with fry suffering the greatest mortality in both static water and moving water tests (Johnson and Sanders, 1977).

Commercial variants of the chemical were also found to affect young Chinook salmon at amounts much smaller than one teaspoon per quart damaging gills and reducing saltwater survival rates. Phos-Chek affects young Chinook (*Oncorhynchus tshawytscha*) salmon. Ocean-type Chinook migrate from estuaries and coastal waterways to the ocean at three months old, while, stream-type salmon overwinter in large freshwater rivers and outmigrate as yearlings. Follow-up research evaluating the effect of Phos-Chek 259F and LC-95A using doses of 140.5 mg/L (0.029 teaspoon to 1 quart) and 339 mg/L (or 1/16 teaspoon to 1 quart) to respectively, on the ability of young chinook salmon to adapt to seawater conditions, known as parr-smolt, found that the chemicals damaged gills and significantly reduced their saltwater survival rates to about 50% which could potentially limit the fish's abundance. Additionally, the two retardants were toxic to smolt in both the freshwater and saltwater life stages at a dilution below 1% the fire application strength and even had a delayed effect, killing them weeks after exposure. (Dietrich et al., 2013).

CHAPTER VI

ON FIRE! THE FINANCIALIZATION OF NATURE

Fire managers and ecologists recognize three major drivers of wildfire. The legacy of militarized and aggressive suppression, and reforestation efforts in the service of profit maximization have left unhealthy forests with a build-up of even-aged sometimes diseased and drought-stricken trees. Higher than average temperatures associated with climate change have led to drier fuel loads and lengthened fire seasons raising the possibility of wildfires starting earlier, burning longer, and exhibiting more dangerous and unpredictable behavior than in the past. Militarized fire suppression beginning in the mid-20th century coupled with the real estate monopolization has enabled human expansion and activities in corridors shaped by fire. This has also increased the likelihood of human-caused wildfire activity leading to loss of human and nonhuman life, and devastating ecosystem and infrastructure damage.

Stephen J. Pyne's (2017; 2021) latest proposal to create a "Grand Unified Theory" of fire features a biologically-inflected fire-centric perspective that relabels the current geochronological age the Pyrocene. Pyne (2017) argues that

Abstraction is the bane and blessing of academic study. If fire wants a place in the academy or the realm of high culture, it will have to be more than the sum of individual subdisciplines. It's not just that fire-related topics need a place to go, but that they need a place to flourish together, not merely wander in and out of the intellectual equivalent of a homeless shelter (p.1).

In a certain sense, Pyne's statement with its unappetizing reference to human misery and proposal of a substitute age are illustrations of the "end of ideology" thesis that C. Wright Mills (1960) condemned in his *Letter to the New Left*. Mills was responding to Daniel Bell's (1960) book *The End of Ideology*, which held that earlier sociological theories such as historical materialism in the face of a post-industrial world in which the division between the working class and the ruling class were shifting in favor of political classes. Bell contended that the total realization of modernity freed society up to engage in "political

pluralism (p. 404)” and a “rough consensus among intellectuals (p. 403)” that included a mixed economy, economic development, some acceptance of the welfare state, decentralized power, and liberalism. Mills (1960) also assumed that the material gains of post-war society had rendered American society complacent, but he strenuously condemned intellectuals in the NATO countries for their milquetoast declaration that the defeat of fascism signaled the end of all ideological contradictions. He particularly criticized ignorance of class divisions and refusal to support decolonization struggles taking place at the beginning of the Cold War. Mills (1960) observed that

The facts are duly weighed, carefully balanced, always hedged. Their power to outrage, their power truly to enlighten in a political way, their power to aid decision, even their power to clarify some situation—all that is blunted or destroyed. So reasoning collapses into reasonableness. By the more naive and snobbish celebrants of complacency, arguments and facts of a displeasing kind are simply ignored; by the more knowing, they are duly recognised, but they are neither connected with one another nor related to any general view. Acknowledged in a scattered way, they are never put together: to do so is to risk being called, curiously enough, “one-sided” (p. 18).

Pyne applies his understanding of pyric transitions, or our changing relationship to fire, revealing his conception of three approximate historical pyric characters: first fire is completely independent of humans, second fire such as charcoal and swidden (slash-and-burn) farming was/is used by our ancestors and contemporaries cook food and shape the landscape,⁷⁵ and third fire is that of fossil fuel burning which initiated the Industrial Revolution (McGranahan 2023). Pyne (2021) argues that this third fire must be seen as more than an epiphenomenon of the Anthropocene

If considered, fire is seen as an epiphenomenon, not an essence. It is typically used to promote alarm over shocks like climate change, rather than identified as the mover behind those changes and the narrative driver behind their understanding (p. 92).

Pyne’s insistence that we engage in less fossil fuel burning and more cultural burning is clearly important. However, *The Pyrocene* is economically and politically agnostic and engages in conceptual stretching with regard to physical science. For instance, though Pyne refers to the Stockholm Resilience Centre scientists (Steffen et al., 2007, 2015b) who significantly developed the concept of the Anthropocene, fire

⁷⁵ Pyne argues that second fire has disappeared.

is nowhere mentioned among the 12 indicators for human enterprise and the 12 characteristics of the Earth System that mark the age. What is significant in their research is the close connection between the rise in economic activity and the decline of natural systems leading Steffen et al. (2007, 2015b) to explicitly link the Anthropocene's biophysical trends with *socioeconomic* indicators, specifically economic growth. Following Steffen and colleagues, Soriano (2018, 2020) is even more explicit in naming capitalism as the main driver of climate change and proposes renaming current epoch, the Capitalian, to reflect the widening ecological rift. Pyne's refusal to elucidate how the economic system has played such a key role in contributing to the destructiveness of wildfire renders his concept of the third fire sociologically incoherent in addition to its scientific inaccuracy.

Fire use and its historical change over time has been a deeply an unequal process, and wildfires are accompanied by disproportionate benefits and impacts depending on where one is standing. Fully a third of the world burns biomass for cooking and warmth because of extreme poverty and global unequal exchange – the disproportionate extraction of materials and exploitation of the periphery internationally and domestically (Amin, 2018; Foster and McChesney, 2012; Foster, 2022). As I have shown, U.S. military supremacy and intervention has played a large role in maintaining and expanding global capital by suppressing liberation struggles for land reform, wealth redistribution, and more rational metabolic regulation between humans and nature. However, despite rigorous attempts by capital to push development through corporate-financed initiatives, rural farmers, foresters, and Indigenous people of the Global South use fire regularly for agriculture, forest management and cultural obligation. These communities are increasingly becoming testing grounds for international experiments in the name of development and climate mitigation like Reducing Emissions from Deforestation and Forest Degradations (REDD+) led by elites supported with financing by international big business (Böhm et al., 2012; Lohmann, 2012; Dehm, 2016). These facts raise uncomfortable questions and point to potentially unsettling solutions that go beyond simply living with fire.

Explaining the dialectical relationship between the socioeconomic factors and the biophysical indicators that make up the wildfire paradox is critical (Foster, 2016). Because it is the elders and poor

people living in the older houses and mobile home parks of Gallinas, Paradise, Talent, El Porvenir, Lahaina,⁷⁶ and Greeley that die more often or, when they do survive, struggle with case workers and insurance companies. It is they who populate the homeless shelters and uninhabitable FEMA⁷⁷ trailers after a wildfire, while the likes of Microsoft, PG&E, and others are able to secure reinsurance, enrich their shareholders, outsource their emissions and fuels management and avoid prosecution for their crimes (Collins, 2008; Davies et al., 2018). In 2004 Pyne argued that fire institutions had undergone an “era of decolonization (p. 876)” in the last 50 years as the result of redefinition, institutional fragmentation, and privatization. It is true that the relationship between fire agencies and wildfire has changed to include more burning and acceptance of Indigenous cultural burning but the ecological fact is that climate change has helped to influence fire severity (Miller and Thode, 2007; Keeley and Syphard, 2019). To Pyne (2021) wildfire is connected to the use of fossil fuels, but “footloose capitalism (p. 100)” has a lot more to do with the wildfire paradox than just the release of CO₂.

Wildfire is connected to the economy through financialization of industrial pollution, increased trade of insurance-linked securities, and real estate speculation. Financialization treats ecological processes of the entire Earth such as the water cycle that purifies and recharges groundwater, the growth

⁷⁶ Laurie Allen, 65; Dale Ann Richter, 66; Leslie Smith, 80; Michael Mahnensmith, 80; Jeanne Eliason, 57; Felimon Quijano, 61; Luz Bernabe, 64; Joel Villegas, 55; Adela Villegas, 53; Angelica Baclig, 31; Junmark Quijano, 30; Matsuyuki Osato, 83; Michael Morinho, 61; Edimede Pavian Castillo, 35; Alfred “Alfie” Rawlings, 84; Maria Victoria Recolizado, 51; Justin Recolizado, 11; Eugene Recolizado, 50; Terri Thomas, 62; Kirk Carter, 44; James Smith, 79; Revelina Tomboc, 81; Bibiana “Bhing” Tomboc Lutrania, 58; Morris Kaita, 74; Richard Kam, 88; Linda Vaikeli, 69; Rex Cole, 64; Janet St. Clair, 75; Douglas Matsuda-Boucher, 65; Michael Gordon, 68; Carole Hartley, 60; Marilou Dias, 60; June Anbe, 78; Keyiro Fuentes, 14 and his dog; Maurice Buen, 79; Buddy Carter, 85; Glenn Yoshino, 75; Rafael Imperial, 63; Floyd St. Clair, 75; Leticia “Letty” Constantino, 56; Louise Abihai, 97; Tim Nakamoto, 69; Nicholas “Nick” Turbin, 71; Anthony “Tony” Simpson, 43; Glenda Yabes, 48; John “Thumper” McCarthy, 74; Leroy Wagner, 69; Joseph Lara, 86; Gwendolyn Puou, 83; Edward Sato, 76; Mark Kaminsky, 59; Po’omaikai Losano, 28; David Nuesca Jr., 59; Carolyn Ono, 73; Coleen Jones, 59; Pablo Pagdilao III, 75; Roxanne Ibara-Hinau, 68; Rogelio Mabalot, 68; George Hall III, 67; Todd Nakamura, 61; Bernard Portabes, 75; Tony Takafua, 7; Salote Tone, 39; Faaoso Tone, 70; Maluifonua Tone, 73; Bette Jo Dyckman, 73; Rebecca Rans, 57; Tau Ponali, 66; Valerie Kauffman, 78; Salvador Coloma, 77; Carlo Tobias, 54; Albert Kitaguchi, 62; Lynn Manibog, 74; Clyde Wakida, 74; Todd Yamafuji, 68; Antonia “Toni” Molina, 64; Freeman Tam Lung, 80; Theresa Cook, 72; Joseph Schilling, 67; Narciso Baylosis Jr., 67; Vanessa Baylosis, 67; Douglas Gloege, 59; Juan de Leon, 45; Conchita Sagudang, 75; Danilo Sagudang, 55; Rodolfo Rocutan, 76; Jonathan Somaorang, 76; Angelita Vasquez, 88; Donna Gomes, 71; Melva Benjamin, 71; Virginia “Vergie” Dofa, 90; Alfredo Galinato, 79; Buddy Jantoc, 79; Frankie Trejos, 68 and his dog Sam; Becky Wells, 57

⁷⁷ <https://www.opb.org/article/2023/06/15/modular-home-southern-oregon-wildfire-victims-uninhabitable/>

of plants and trees that take up carbon dioxide, and other ecological processes as ownable and tradable assets. As previously noted militarized fire management shores up accumulation by enabling defense contractors and other private companies to pour resources into innovation that serves the purposes of surplus absorption and fosters the research and development of equipment that aid in war-making and wildfire suppression. While militarization is a key feature of wildfire suppression, the threat of wildfire provides abundant opportunities for speculative profit-making that extends the role of wildfire in the accumulation process. Previously, I described the way in which wildfire suppression was used to defend timber resources and also enabled expansion of human settlement into areas historically prone to burning. Historical materialist analysis is important in breaking out of the incomplete understanding of how certain institutions key to capital accumulation (Foster, 2006, 2011), shape wildfire.

Wildfire joins war as another site of accumulation in this contradictory and dangerous scheme. Capitalism is predicated on growth – growth of production, growth of consumption, and growth of profits for shareholders. Increasingly, FIRE has sought to green capitalist accumulation by turning nature, in addition to human labor, into a source of profit to shore up economic downturns and recapitalize areas previously degraded by industrial production and subsequent deindustrialization. The Bootleg, Camp, and Marshall fires exemplify how financialization intensifies the contradictions of capitalism and produces dangerous environmental and social consequences that result from trade in carbon offsets, insurance-linked securitization, and real estate expansion. Accompanying rising climate change threats, financial institutions, insurance companies, and real estate companies, collectively known as FIRE, have begun marketing natural processes as a way to make money. In November 2021, world leaders gathered in Glasgow Scotland for COP26, a climate conference billed as “the world’s best last chance to get runaway climate change under control (UN Climate Conference 2021).”⁷⁸

The FIRE economy is a web of financial and non-financial companies who rely on the predatory state in or order to extract value from land, governments, and households through various types of credit

⁷⁸ 2021. “What is COP?” *UN Climate Change Conference UK 2021*. Accessed at: <https://ukcop26.org/uk-presidency/what-is-a-cop/>

and transactions. Over the last 40 years or so the FIRE economy has grown dramatically and serves as countervailing force to economic stagnation as debt is an increasing percentage of U.S. Gross Domestic Product (GDP) while production has fallen since the mid-1960s (Foster and Magdoff, 2009). The business cycle is related to natural processes as is vividly demonstrated by the parallel rise of CO₂ emissions and the smashing of planetary boundaries, leading climate scientist to propose a new epoch of Earth's history – the Anthropocene (Steffen, Crutzen, and McNeil 2007). A recent study by the Union of Concerned Scientists reveals that, since 1986, 37% of the total 20 million acres of forestland burned in the U.S. West and southwestern Canada is attributable to the greenhouse gas emissions of 88 of the world's largest fossil fuel and cement producers (Dahl et al., 2023).

In a nod to Karl Polanyi, the originators of the Anthropocene designation the term Great Acceleration to capture the “comprehensive and interlinked nature of the post-1950 changes simultaneously sweeping across the socio-economic and biophysical spheres of the Earth System, encompassing far more than climate change (Steffen et al., 2015b, p. 82).” The Great Acceleration is associated with the now familiar hockey-stick shaped graphs of economic and environmental change in different sectors including energy and water use, fertilizer consumption, dam construction and other areas from the mid-twentieth century to the present (Angus, 2016).

Fire suppression accompanied the rise of industrial production and monopolization of industrial sectors of timber, energy, and construction in order to ensure further accumulation. In the post-war era, large non-financial monopolies such as the wood products, energy, and real estate industries had relied upon the permanent war economy, advertising and even government taxation to absorb massive economic surplus and shore up demand (Baran and Sweezy, 1966). However, in the last forty years, as the result of the consolidation of their industries, technological efficiency, outsourcing, union-busting have given and environmentally destructive practices, monopoly firms need other outlets in which to invest accumulated wealth (Foster, 2006, 2008, 2022a). Advanced capitalism generates economic surplus and excess productive capacity associated with systematic shortfalls in effective demand. Mature markets are generally saturated, and there is a continual search for new markets. The resulting stagnation of

production or the “real economy,” gave rise to financialization as a means of stimulating asset creation. This gave rise to monopoly-finance capital, which can be conceived as a structural reliance on FIRE to open new avenues of investment and accumulation. Dubbed “profiting without producing (Lapavistas, 2013),” financialization is the growth of novel financial products and the expansion of invisible capital through financial transactions. Since the early 2000s, giant corporations have shown ever-greater interest in the financialization of nature (Sweezy, 2004).

Proponents of the financialization of nature argue that capital markets can help curb global greenhouse gas emissions on a global scale, enhance watersheds, empower Indigenous communities, and reduce wildfire risk in local areas. Financializing damaging environmental practices, such as CO₂ emissions and deforestation, into tradable vehicles enables monopolies to reap profits by making new capital investments while neglecting already existing infrastructure, putting humans and non-human nature at risk (Clark and York, 2005). The FIRE economy is not disconnected from the capitalist economy, but rather shifts the economy from an emphasis on production to the speculative increase in financial assets. In this way it moves further away than ever from any rational structure that considers use values or requires sustainability. It is therefore even more parasitic on the environment, because it obscures the damage associated with its creative destruction increased production behind the cold logic of the dollar.

Multinational corporations are able shift their damaging activities from one place to another using green investment and carbon offsets as tools to avoid mandatory caps on emissions. The booming trade in insurance-linked securities enables these same entities to distribute financial and biological risk unequally and avoid responsibility for causing social and environmental harm. The securities market, assisted by state and corporate austerity gives capital access to private pension funds representing the retirement money of millions of workers. Real estate speculation in economically-depressed communities with extractive histories continues to move suburbs and human ignitions closer to areas likely to burn.

Marx (1993 [1894]) observes that capitalist nations “are periodically seized by fits of giddiness (p. 137)” in their quest to jump from money to profit without engaging in the bothersome production process. This circuit of money capital is known as financialization. An easy example of financialization is the charge you have to pay for withdrawing money from an automatic teller machine (ATM) – nothing is produced but profit for the bank, as there is usually a fee for the transaction. The term, financialization, was introduced by Kevin Phillips in his 1993 book *Boiling Point* to describe the separation of the real economy in production to the spectral realm of finance (Foster, 2007). A good working definition comes from political sociologist Greta Krippner (2005) who states that financialization is an accumulation-centered process “in which profit making occurs increasingly through financial channels rather than through trade and commodity production (p. 174).” According to Lapavistas (2011, 2013) who described financialization as profit without production, this late 20th century phase of capitalism replaced an earlier era dominated by giant monopolies quickened by capital accumulation and concentration. Lapavistas (2013) credits scholars associated with the journal *Monthly Review* (Baran and Sweezy, Braverman, Foster, Magdoff, and McChesney) for charting a “innovative path by claiming that financialization reflects an epochal shift in the balance between the spheres of production and circulation, in favour of the latter (p. 795).”

Baran and Sweezy (1966) state monopoly-capital avoided direct competition in favor of profit maximization through price-setting, large volume production, creating multiple product lines, and internationalization of operations. Additionally, corporate giants increased labor rationalization through scientific-technological innovation, task simplification and monopolization of production knowledge (Braverman, 1974). The tremendous centralization and concentration of accumulated capital, products, and profits leads to crisis periods of slow effective demand that have only three possible resolutions: consumption, waste, and investment. Military spending, advertising, and financial expansion help break the stagnation impasse (Baran and Sweezy, 1966; Braverman, 1974; Foster, 2018).

Marxist environmental sociologists argue that ecological analysis formed the natural-material basis of Marx's critique of political economy. Marx attended the scientific research and debates of his time to arrive at his concept of the "universal metabolism of nature (Foster, 2016, p. 403)" which holds that humans are embedded in nature and in continuous interchange with it as we incorporate it into our bodies and modify it the physical and spiritual act of appropriating sustenance for ourselves. In Marx's conception, the interaction of humanity with nature through labor and production process constituted "social metabolism." Where the alienated metabolism of capitalism came into conflict with the universal metabolism of capitalism, a *metabolic rift*, or ecological crisis was generated. Along with Marx, ecosocialist sociologists argue that it is not the unity of humans and nature that need explaining but the *separation* between these inorganic conditions of human existence and this active existence.

One of the founding works in environmental sociology, Schnaiberg's (1980) *The Environment*, focused on how capitalism's rapid and irrational growth drives environmental decline in the form of withdrawals and additions. The treadmill of production (TOP) draws on the Marxist theory of monopoly-capital to explain how the contradictory expansionist and stagnation crisis tendencies inherent in capital accumulation affect humans and nature. Schnaiberg describes a treadmill of workers and capital on a squirrel cage of production, profits, and wages with some (owners of capital and shareholders) more invested than others (workers who need jobs). The acceleration of the treadmill results in harmful additions or wastes such as water pollution and withdrawals such as deforestation and reduction of habitats. However, even with efficiency measures such as labor rationalization and technological advances, energy intensification and expansion of an increasingly insecure working class serve to stimulate not slow the pace of production. The long-run problem of surplus capital disposal sharpens the contradiction between capital and environmental sustainability by "increasing corporate reliance on debt (especially short term) for financing production expansion (Schnaiberg, 1980, p. 224)" and inducing high consumer debt in order to ensure the reliability of the workforce. The state plays a key function in the accumulation process by eliminating restrictions on capital mobility, expanding military spending,

deregulating, retrenchment of services and pursuing anti-labor measures (Clark and York, 2008; Burkett, 2017; Foster and McChesney, 2012).

Financialization of nature escaped out of the Pandora's box of neoclassical economics in the twenty-first century as an attempt to measure various additions and withdrawals to and from the natural world and/or enclose non-human nature within its accounting system (Schnaiberg, 1980). It is rooted in the weak sustainability concept of substitutability in which declining or exhausted natural processes can be offset by conservation somewhere else therein treating the Earth as a "abstract global ledger that can be essentialised into newly conceived exchangeable parts (Sullivan, 2013, p. 202)" so that the environmental problem is reduced to the proper apportionment of capital investment (Clark and York, 2008). Ecological economists, properly so called argue, in contrast, that nature is irreducible to pricing and thus incommensurate with economic value. Environmental economics proposes that various ecosystem services such as the hydrological cycle produce goods with economic value such as clean drinking water (Burkett 2003, 2006). Today, however, the notion of environmental services has been incorporated within economic accounting allowing for the financialization of nature. According to Foster (2022a, 2022b), despite their putatively humane attempt to ameliorate disciplinary damage, the concept of "natural capital (long a critical concept related to use values) has been reduced within conservation finance to a pure economic exchange category and was seized upon by financial institutions as early as the 2012 UN Sustainable Development conference in Rio de Janeiro. At that summit, the CEO of Unilever, the Anglo-Dutch multinational that made its fortune plundering Africa and Southeast Asia,⁷⁹ declared, "The world urgently needs a shift to a more sustainable, equitable form of capitalism, but we cannot do this without the financial sector whose lending and investment decisions determine whether our natural capital is further depleted or enhanced (World Bank, 2012)."

⁷⁹ Unilever helped to establish the palm oil industry in the early 20th century colonization of Africa with development of the so-called Palm Belt from The Gambia to Angola as well as the brutal colonial system of plantations in Malaysia and Indonesia that has recently come under fire for environmental degradation, child labor, slavery, and rape (GRAIN. 2019; Mason and McDowell 2020; Schneider 2020).

In the concluding remarks of his *General Theory of Employment, Interest and Money*, Keynes (1935) envisions a responsible capitalism in which the aggregate returns from the production of goods cover their labor costs with a small remuneration to the corporation for skill, supervision, and distribution resulting in the “euthanasia of the rentier (p. 376)” – the extinction of runaway profits and the chasm between rich and poor. However, monopoly capitalism results in overaccumulation of goods and capacity, soaring profits, inequality, and tremendous waste. Goods are dispersed through the creation of new markets, advertising and planned obsolescence, inequality widens as firms advance creative financing schemes, and entail extensive environmental impacts such as air pollution, deforestation, groundwater contamination and greenhouse gas emissions, particularly CO₂ (Schnaiberg, 1980; Baer, 2012).

Private landowners hold 137 million acres or 19.5% of the country’s total forestland, excluding interior Alaska (Sass et al., 2021). Large land-owning corporations have turned to the financialization of nature as a novel profit-generator and also a new marketing device. Carbon offsets are one part of this market whereby a company that produces emissions avoids penalties for releasing them by paying another company to manage ecosystem services that absorb or avoid emissions. Foster (2022) explains that

Although a given state would normally continue to have sovereign ownership of the land, the financial vehicle managing and disposing of the ecosystem services would profit directly off the income streams associated with these “tradable” assets (p.)

This is what Keynes meant by “the rentier,” the use of rent on capital to realize profits while not significantly contributing anything to society.

Finance: “A Hot Market”—Bootleg Fire

In May 1990, a pipe bomb exploded under Earth First! and Wobbly organizer Judi Bari’s car seat as she was on her way to Redwood Summer, a gathering of timber workers and environmentalists protesting union busting, pesticide-spraying, and clearcutting of Northern California’s redwoods. Their

targets were Louisiana Pacific, Simpson Timber and especially Pacific Lumber, owned by the Texas-based Maxxam Group. Fifteen years earlier, the financial company, used high-risk, high-yield loans from junk bond king Michael Milken to stage a hostile takeover of Pacific Lumber, a long-standing business that practiced selective cutting. The timber companies all sprayed 2,4-D and 2,4,5-T on their holdings and engaged in union-busting, but Maxxam liquidated the employee pension plan and clearcut the lumber company's holdings to pay off its \$900 million debt. Maxxam's actions were part of a larger trend of fighting environmental regulation, downsizing, and increasing financialization in the timber industry beginning in the 1990s. These developments further intensified centralization of market subsectors as corporations shed non-essential assets, and focused on growing shareholder value. This restructuring led to mill closures and massive job losses in rural areas where 1 in 3 employees were let go. As Gunnoe (2012) explains,

the shareholder value conception of control is not simply a means to increase corporate profits, but is most directly concerned with the enrichment of a particular sector of the capitalist class. To this end, managers engaged in a series of activities aimed at increasing returns to shareholders. Furthermore, these returns were not necessarily drawn from profits, but were most likely the result of share price inflation driven by financial maneuvers and rising debt. In short, financialization and shareholder value are not about *making* things, but *taking* them (pp. 233-234).

Bari rejected the evacuation of class analysis present in environmental resistance to the timber industry by directly linking working class exploitation, unsustainable forestry, and contraction of jobs pursued by multinational timber corporations (Shantz, 2002).

Six months after the bombing, John L. Walker the president of Simpson Timber (now known as Green Diamond Resource) gave a rambling speech on the pros and cons of sustained yield at the University of California, Berkeley on the 100th birthday of his company. Following a review of his company's history, Walker blamed the Endangered Species Act and attacked environmental for sustainable forestry contrasting the U.S. government's eagerness to enter the Gulf War to secure oil reserves with its dereliction of duty in defending Big Timber against environmentalists' "modern witch

hunt.” Environmentalists, he declared, wanted to liquidate sensible timber management, destroy free market capitalism, and eliminate private property rights. Similar to today’s climate deniers who argue that the long-standing scientific consensus on climate change is an ideology and anti-business political agenda, Walker linked economic hardship to sustainable forestry. Walker invoked an article in the libertarian *Reason* magazine titled “The Green Road to Serfdom,” which claimed to have uncovered ideology of “Marxist and non-Marxist Greens” among “some serious scientists” whose concerns about ozone and resource depletion, runaway industrialization, and climate change were “based on pseudoscience or no science at all (Walker, 1990).” Walker concluded his speech with the hope that “radical emotion-charged response to environmental issues will, like the earlier witch hunts, run its course. ... I'd like to still be around when this storm has past (sic).” Three decades later a firestorm called Bootleg ripped through Green Diamond’s own pseudoscientific forestry project – carbon offsets.

The 2021 Bootleg Fire distinguished itself, along with other wildfires of the last two years, by wiping out the world’s largest carbon market in which oil and computing giants British Petroleum and Microsoft owned carbon offsets. Yet, in the wake of the global 2021 fire season that saw thousands of people displaced, homes destroyed, and costs in the tens of billions of dollars in Africa, Europe and the Middle East, the website *Ecosystem Marketplace* (2021) reported that “Carbon credit projects and retailers are struggling to keep up with demand in a hot market.” Making polluters pay to release carbon appears to be a beneficial way to cut carbon emissions while also reducing the risk of devastating wildfires. The carbon market is an additional avenue for corporations to project their soulfulness and accountability to an increasingly critical public (Baran and Sweezy, 1966). However giant corporations and private timber owners have looked to the voluntary carbon credit market as another way to financialize their destructive practices. It is now an article of faith among climate scientists that we must achieve net zero carbon dioxide emissions which would require a balance between anthropogenic greenhouse gas release and removal of CO₂ from avoided emissions or natural processes enhanced by human intervention to stabilize global temperatures and dial down climate catastrophes (Allen et al., 2022). A decade ago, climate scientist, James Hansen (2009) described the market in avoided emissions

as modern-day indulgences, a way for the wealthy and wasteful to “avoid punishment for their sins (Hansen, 2009, p.206)” and shift the horrors of climate change, such as catastrophic wildfires, onto future generations. Unfortunately, that future is now.

Studies in California reveal that over the last 40 years overall tree cover area declined by 6.7% from 1985 with the most rapid decline occurring after 2000 from more frequent and larger wildfires (Wang et al., 2022), while studies in the Pacific Northwest show forests declining as the result of wildfires, climate variability, and selective logging of fire-resistant trees like oaks (Halofsky et al., 2020). In innumerable cultures, trees particularly oaks, are viewed as a symbol of life, fidelity, and wisdom (Leroy et al., 2019). In the western U.S. among many indigenous groups, oaks are revered as a tree of life, a source of food, fuel, medicine, and shelter (Anderson, 2005, 2007, 2012; Lake, 2013, 2021; Long et al., 2016). However, in the case of carbon offsets, trees are stripped of their spiritual value and are treated as “capital,” rented out much like factory capacity or parking structure. Financialization of forests through carbon offsets, well-known and resisted by Native people in the Global South. Many western tribes have actively sought or have been approached by monopolies whose negligence and active resistance to regulation are responsible for the loss of lives, property, and the health of millions of people (Blunt and Gold 2019a, 2019b; Blunt, 2022; Dahl et al., 2023). Many of these projects have met resistance not just from environmentalists but also within Native communities, because they require limited sovereignty immunity agreements for the duration of the projects (Kormann, 2018). Tribes use the money to buy back land and to maintain traditional forestry and cultural burning, but offset projects are ecologically unsustainable.

Forest carbon credits are a subset of cap and trade markets. The idea is that one unit (generally a ton) of CO₂ emitted at the source of production somewhere in the world is taken up, or offset, by a corresponding unit of CO₂ elsewhere amounting in no net release into the atmosphere that contributes to climate change. Forests and grasslands are of particular interest to corporations, as they can be used as giant sponges to absorb industrial CO₂ emissions and economic surplus from the real economy. It is an undeniable fact that rising CO₂ emissions associated with higher global temperatures and increased

wildfire activity (Bartowitz et al., 2022) emanate directly from “high-carbon economic growth and exploitative resource use (Steffen et al., 2018, p. 8256).” Carbon offsets enable that growth and exploitation as they provide corporate polluters like the tech and oil industries to displace and financialize their emissions while continuing to realize massive profits.

About 80% of California’s cap and trade program consists of forest carbon offsets. A carbon credit is a permit issued to a company that enables it to continue polluting if it purchases an offset from another entity like a corporation or other private forest owner such as Native communities, who own timberland (Borges, 2021). In order for a project to fulfill the mission of carbon reductions, the trees in question must be at risk of being logged or otherwise removed from the landscape, since the point of the plan is to “save a tree.” The primary characteristic of carbon offset projects is known as additionality whereby land owners are paid for changing their land management practices to maximize carbon absorption, thus “adding” carbon storage to the global pool.

In exchange for the offset money, the timber owner manages the land for maximum carbon absorption. Achieving additionality could include delaying harvest of merchantable timber from a 30-year rotation to a 100-year rotation, decreasing harvest intensity, clearing brush and immature trees using fire and mechanical methods or planting tree species that absorb large amounts of carbon. The majority of California’s forest carbon offsets are in “improved forest management” projects in which timber owners agree to slow down the rate of harvesting their timber to allow absorption of the amount of carbon for which they have been paid. If a particular timber stand happens to have more carbon already stored above the regional average calculated by a CARB regulator, the owner can receive a one-time, immediate payment.

On July 6th a lightning storm ignited a fire in a thicket of drought-stricken ponderosa pine in the Fremont-Winema National Forest of southwest Oregon. The Bootleg Fire exhibited “extreme, running, torching, and spotting” behavior growing rapidly to 5,000 acres in less than 15 hours (Gabbert, 2021a). According to *Wildfire Today*, Bootleg burned over 400,000 acres in 5 weeks, required almost 2,300

personnel and exhibited “one of the most obvious visual examples of how climate change is affecting wildland fires (Gabbert, 2021b)” – it created its own weather system capable of extending its borders.

Earlier in the summer, a protracted “heat dome” hammered the Pacific Northwest pushing average summer temperatures 30 and even 40 degrees above historic high averages, killing over 1000 people in Canada, Washington, and Oregon. The unprecedented event provided further evidence of the Great Acceleration’s impact on the global environment (Buis, 2021). According to Bartusek et al (2022), climate change exacerbated existing weather conditions increasing the likelihood of a similar heat wave from an impossibility in 1950 to a 1-in-200-year occurrence. Their study concluded that even moderate global warming could significantly shorten that rate to every 10 years by 2050. The shift in temperature associated with climate change has intensified the scale of the global wildfire regime (Bartowitz et al., 2022).

A near-daily occurrence on the Bootleg fire was the formation of unstable and dangerous fire clouds called pyrocumulus (pyroCus) which carried smoke and ash 30,000 feet into the atmosphere. The intense heat and unstable weather conditions surrounding Bootleg led to a much larger and taller thunderhead called a pyrocumulonimbus (pyroCb) cloud which rose to 45,000 feet. The presence of these clouds, is a sign that the fire has created its own weather system capable of unleashing lightning strikes and fire tornadoes outside the active fire perimeter that expand the primary fire and generate new ones (Lareau et al., 2016; Wilmot et al., 2022). During its most active phase the fire caused firefighters to retreat as it released lightning and produced a fire tornado that enabled it to cross containment lines and merge with the Log fire to its east.

Putting Forests Back to Work: Green Diamond Resource Company

In its quick progression, Bootleg burned through lands owned by the Reed family, the fifth largest landowners in the U.S., whose Green Diamond Resource Company (GDRC) manages timber as an offshoot of a timber management organization (TIMO), Simpson Investing Company. GDRC entered the carbon offset market to put its forests to work for tech giant Microsoft and other corporations. GDRC is a subsidiary of the holding company Simpson Investment Company, a logging operation founded on the lands of the Skokomish and Squaxin people in the Puget Sound which now owns 2.1 million acres, where Simpson built logging rail lines and purchased and logged forestland from its inception in the late 19th century.

In the early 1900s Simpson, at the direction of the Reed family and unlike many of its competitors, held onto its cutover lands and continued to pay taxes on them rather than releasing the acreage back to the county. The company did so for the purpose of fire prevention following a massive wildfire on the Olympic Peninsula in 1902 and, following a study furnished to the company by the USFS, began to acquire logged off and tax delinquent lands (Clary, 1987; Hoover, 1978; Loomis, 2016). By 1942 Simpson owned 32% of all timber and double the acreage of its competitors, Weyerhaeuser and the Port Blakely Mill Company combined; it also virtually owned the towns of McCleary and Shelton, as their economies were completely dependent on the company's operations. As lumber production soared Simpson looked to public lands to maintain its operations, so when Congress passed Public Law No. 273, the Cooperative Sustained Yield Act in 1944, the company proposed a cooperative unit of its own lands and public forest in Washington state of with the blessing of the Forest Service. Ironically, though P.L. 273 was aimed at stabilizing faltering local economies, the deal was hammered out in secret and only revealed to the public on short notice. The Shelton Cooperative Sustained Yield Unit was created in 1946 with 111,000 acres of Olympic National Forest lands and 226,000 acres of Simpson's forest.⁸⁰ The

⁸⁰ The Forest Service tried to use P.L. 273 in other communities on the basis of local cooperation – literally buying them off with the promise of jobs. This is known as environmental job blackmail and as Schnaiberg (1980) has

agreement gave Simpson a monopoly over federal timber drawing criticism from farmers, smaller companies, and organized labor who attempted to thwart the deal and, having failed at that, asking for a reduction of the annual cut. The massive landholdings forced the company to offer new product lines to keep production going and avoid the risk of idle capacity. This Great Acceleration was characterized by a “retain and reinvest (Gunnoe et al. 2018, p. 800)” Simpson added paper, plywood and plastic agricultural piping to its product line and continued buying and investing in timberland nationally and internationally. The company bought and clear-cut redwood forests in California and agreed to manage a million acres of spruce in Canada. The monopoly also entered the Chilean export market, where it avoided nationalization of its assets under the socialist Allende government by investing in its partner Chilean paper giant CMPC and realizing soaring profits by the 1980s.

Timber companies like GDRC have financialized and diversified their operations, adding conservation to logging as financialization became the norm in the economy. Conservation finance such as easements and carbon offset programs absorb wealth from corporations like Microsoft and transfer public funds from governments and conservation non-governmental organizations to private landowners while allowing timber owners to receive up-front payments to do little or nothing (Kay 2018). In the years Bliss et al. (2010) call the “disintegration of U.S. industrial forest estates,” Big Timber companies like Simpson underwent reorganization to emphasize investment and deemphasize production. In the 1980s with Simpson became a holding company or TIMO following the trend of restructuring among U.S. timber companies as they attempted to overcome deforestation on their lands, took advantage of financial deregulation and coped with decreasing demand by laying off workers and selling their manufacturing operations. In 2002, Simpson terminated the 100-year Shelton Cooperative Sustained Yield Unit granting the company exclusive access to 250,000 acres old growth forest after it lost a 2001 court challenge to

argued, capital and labor form alliances in order to realize their interests: accumulation and distribution of the profits to labor. However, objections came from outside Shelton as small operators and local communities, such as Gray’s Harbor, realized that Simpson’s monopolistic acquisition would likely hurt their local economies. Clary (1987) reveals that community after community vehemently rejected proposals under P.L. 273 and those in the agency were shocked at being labeled enemies of “the little guy,” after years of fighting Big Timber through the Progressive era and Depression.

force the federal government to reclassify the land for maximum timber production. Simpson Investment retained its forests and spun off GDRC to oversee its timber holdings, acquire more forestland and sell rights to manage its timber for production and conservation (Gunnoe, Bailey and Ameyaw, 2018; Plywood Pioneers Association, 1999). According to Foster (1991), by the early 1990s most private timberlands were deforested containing brush and even-age trees less than thirty years old – the type of environment likely to burn more readily (Bartowitz, et al., 2022).

Taking a Principled Approach: Microsoft

C. Wright Mills (1963) observed that an overdeveloped mass society is “often a network of rackets (p. 155)” in which “the principle of fashion is built into almost everything and planned obsolescence becomes a central feature of the economic and social system. Change is very rapid, intensively promoted-and quite irrational (p. 150).” As most of us are aware, electronics typically last between 3 and 10 years before parts fail and software needs updating, enabling tech companies to constantly produce new products. Between 2010 and 2020, the tech sector’s contribution of global greenhouse gas emissions grew from roughly 1.4% to approximately 2-3%, and is predicted to grow exponentially, eventually overtaking aviation transport. Research shows the majority of Big Tech’s carbon footprint is embedded in manufacturing but companies “a strong incentive to prevent saturation from happening as this would cut their income growth,” because there “is economic pressure for them to create new technologies for individuals and organizations to buy (Freitag et. al., 2021).” While Big Tech continues to produce new gadgets at a frantic pace, it has begun to look to the financialization of nature to avoid economic and capacity stagnation. Carbon offsets present firms with new outlets to spend their excess profits, a new marketing edge, and a way to demonstrate their soulfulness before legislators and the public.

Nearly 6 months before the Bootleg Fire rolled across southern Oregon, GDRC proudly announced its carbon offset deal with Big Tech giant, Microsoft. In 2014, GDRC had acquired 600,000

acres from a timber management company and quickly moved to sell carbon credits by establishing improved forest management (IFM) units in Klamath County, Oregon. To qualify to sell credits in the California Air Resources Board (CARB) market, IFM landowners must prove that their forests can absorb an above-average amount carbon that they can sell to corporate polluters. In the carbon market, carbon credits are awarded for each potential metric ton of CO₂ that enrolled forest owners can sell to major polluters. Every ton of carbon emitted by industry is removed (or offset) by a corresponding ton of carbon stored in a sponsored forest. Researchers agree that cap and trade carbon offsets are not well-designed to work in the current context of unpredictable climate impacts such as wildfires and there is a dangerous lack of scientific knowledge of how forest ecosystems are able to sequester carbon. Haya et al. (2023) explain that the robustness of a voluntary offset system hinges on stringent rules that assess whether project actions occurred without the added income of offsets, counterfactual baselines that determine what activities would have happened without the offset money, leakage or whether the project increases emissions out of the project's offset accounting boundary, durability which is an evaluation to ensure the risk that stored carbon potentially released into the atmosphere is accounted for and will managed accordingly and carbon accounting, applying methods accurate and conservative monitoring and calculation of the dynamics of particular carbon sequestration projects.

In January 2020, Microsoft, which generates 13 million tons of CO₂ (mtCO₂) per year confidently released a statement claiming that it would achieve zero-emissions by 2030, remove its historical carbon emissions by 2050. Additionally, the company planned to develop a \$1bn climate innovation fund to initiate and accelerate technological growth and deployment of ongoing emissions-reducing products using debt finance investing and create new products using equity and debt capital. In other words, the Big Tech giant mostly financialized of its emissions reduction plan rather than committing to a limit on the physical production of its goods or extending their lifespans. The company stated that it was “taking a principled approach” to reductions by grounding it in “science and math,” taking responsibility for its carbon footprint, empowering customers, ensuring transparency, enlisting its employees in the struggle to

reduce emissions, and using its “voice on carbon-related public policy issues.”⁸¹ The tech giant partnered with Shell Corporation, Rabobank, The Nature Conservancy and others to remove an estimated 1.3 mtCO₂ of its emissions. The reduction plan was celebrated as one of the most ambitious corporate net zero programs in the U.S. aiming to offset emissions that would take years of retooling to avoid.

Bootleg decimated white fir, lodgepole, and ponderosa pine trees meant to last 100 years and remove an estimated volume of 270,000 mtCO₂ of Microsoft’s emissions planned from its operations, including buildings and supply chains. Green Diamond’s 573,23-acre parcels named Klamath East (ACR273)⁸² and Klamath West (ACR274)⁸³ IFMs were meant to “address impacts of overharvesting by previous owners ... to improve forest health, manage fire hazard, and maximize long-term forest growth” in order to increase CO₂ removal (Microsoft 2021: 15). Forestry accounted for 1.1 mtCO₂ of Microsoft’s carbon removal portfolio and its largest partner was GDRC. Economic logic demands that companies like Microsoft shop around for low price offsets to inflate the tonnage of CO₂ emissions at the lowest possible cost to the company (Joppa et al. 2021). Forest management is generally one of the least expensive ways to pursue carbon reductions and Microsoft likely paid approximately \$3.7m to rent GDRC’s forests.⁸⁴

In the California cap and trade market, CARB determines regional averages of forest carbon absorption of tree species based on standing live biomass; conifers are generally seen to hold more carbon, whereas hardwoods such as oaks hold less (Badgley et al., 2021). A baseline represents a carbon capacity above the regional average that the land owner can earn as carbon credits to sell as carbon offsets. When CARB issues credits to a project, it assigns 20% of its credits to a buffer pool to ensure against loss by drought, insects, and wildfire. Credits in the buffer pool can never be sold in order to preserve the integrity of the CARB market. Additionality and baselines are difficult to distinguish from one another with regard to projects like GDRC’s, because knowing whether certain forest management

⁸¹ <https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030/>

⁸² <https://acr2.apx.com/mymodule/reg/prjView.asp?id1=273>

⁸³ <https://acr2.apx.com/mymodule/reg/prjView.asp?id1=274>

⁸⁴ Using the rate of \$13.67/tCO₂, the average value of offset credits during the fourth quarter of 2020 in CARB (Badgley et al. 2021; Song and Temple 2021a)

practices would have occurred in the absence of offset income or what would have been undertaken without the money over a long timeframe are related questions that CARB treats as simple additionality. Microsoft (2021) stated that it

sought forestry projects in which carbon removal would not have happened without the existence of the project, also known as additionality. Unfortunately, there is no consistent market standard for additionality today, and different stakeholders rate project additionality differently. As project controversies inevitably surface, we take an approach of openness, learning, and transparency to help improve our own portfolio ... (p. 9)

Cooking the Books: Leakage

Carbon offsets garner a one-time, upfront payment to incentivize forest owners to manage their land in ways that enhance CO₂ absorption and storage above common practice, but this means there is also incentive to fudge the numbers. CarbonPlan found that every project in CARB greatly exaggerated the amount of cutting avoided and simply shifted logging operations to a different parcel, a process known as leakage. Forest managers aim for higher profits by overreporting higher amounts of potential carbon absorption above the regional averages while not actively managing their lands for forest and climate health. Researchers examining IFM units in northwestern California found evidence of activities inconsistent with the stated ecological goal of sparing forests from the saw to capture their carbon absorbing potential. Enrolled IFM programs, including GDRC's offset projects, had been logged heavily prior to enrollment suggesting that there was no intention to log them again because they were in recovery, leading researchers to observe,

For large timber company lands which have historically harvested more intensely and start with a lower initial stock, the greater incentive is for landowners to place offset projects on lands with the greatest potential for sustained growth rather than protecting carbon stocks in already-dense stands (Coffield et al., 2022, p. 6801).

Follow-up investigative reporting by *ProPublica* (Song and Temple, 2021a) reviewed the research by CarbonPlan and found that GDRC and other large timber companies enrolled in CARB,

prioritized areas that had already been logged intensively just before the CARB program began. Klamath East or ACR273 had recently been logged but had already earned more than 950,000 offset credits and the trees were not mature enough to sell, which suggests that Microsoft was renting a business-as-usual scenario – at least for the next 40 years. Additionally, GDRC’s holdings are so extensive (751,000 acres just for carbon offsets) and the company has been actively acquiring timberlands and sawmill operations through its involvement with Silver Creek Capital Management, a hedge fund manager, that there is a question of true additionality.

The evidence suggests that GDRC was able to claim it would not engage in any carbon releasing activities such as logging on parcels that couldn’t be logged anyway. In logged over units that are replanted, brush management is crucial to protect the young trees against wildfire and companies have no incentive to expend money and labor on fuels management. Related studies found that the regional average forest comparisons were ecologically and statistically inaccurate mixing forest types with vastly different absorption capacities overestimating how much CO₂ a particular unit would absorb. The Southern Cascades portion of CARB’s program contains Douglas fir (~122.5 tCO₂/acre), Tanoak (192.4 tCO₂/acre), and Ponderosa pine (~ 60.4 tCO₂/acre) all averaged together, meaning that *any* project containing primarily Douglas fir and Tanoak immediately appears to have above-average capacity just because it has those species. Research showed that of the 121,000,000 IFM⁸⁵ offset credits sold through CARB, prospective sellers of credits with large holdings containing different forest types were weighting their credits in favor of species that take up a more than CO₂ resulting in over-crediting approaching 30% representing \$410m of the total credits sold. Forests that were dense and carbon-rich were compared against forests with completely different species composition and the potential for much less stored carbon leading to over-crediting (Badgley et al., 2022; Coffield et al., 2022; Haya et al. 2023) resulting in “ghost credits (Song and Temple, 2021a,b).” Researchers concluded “that nearly a third of credits we

⁸⁵ Out of a total of 200,000,000 sold through CARB.

analyzed do not reflect real climate benefits and are, instead, the consequence of methodological shortcomings (Badgley et al., 2021, p.1442).”

While many are calling 21st century the age of megafires (Linley and Jolly, 2022). But there are A 2007 study (Miller and Thode, 2007) explored the difference between a fire’s footprint, or how much acreage it burns and its severity, or how much tree mortality and soil damage the fire causes. Their research helped to launch the Monitoring of Trends in Burn Severity, database designed to inform fire scientists, fire managers, and policymakers with maps that track the size and burn severity of large (1000 acres or larger in the West) fires across the U.S. from 1984 to the present (Eidenshink et al., 2007).⁸⁶ Knowing this information helps interested parties forecast possible future fire behavior using data from past fires. Immediately following the Bootleg Fire, CarbonPlan assessed ACR273’s burn severity. Burn severity relates to visible changes to soil, biomass, and the presence of wildfire residue such as ash and char in an area the has experienced fire. It is measured by accounting for first-order effects that occur immediately such as tree mortality and second-order effects such as delayed mortality that occurs later over one growing season (Eidenshink et al., 2007). Additionally, the USFS assigned a scale of 7 severity classes, called Rapid Assessment of Vegetation Condition (RAVG) ranging from no fire and no mortality to severe mortality representing over 90% mortality on a burned area (Whittier and Gray, 2016).⁸⁷ CarbonPlan found that a significant area of ACR273 had sustained classification 7, or over 90% mortality (Badgley et al., 2022).

Euthanasia or Collective Suicide?

At first glance, the type of forest stewardship recommended for carbon offset certification is in line with the fuel reduction goals of wildfire prevention and the values of some western Indigenous peoples (Middleton Manning and Reed, 2018; Anderegg et al., 2020; Haya et al., 2023). Protecting and

⁸⁶ <https://www.mtbs.gov/project-overview>

⁸⁷ <https://burnseverity.cr.usgs.gov/ravg/>

correctly managing diverse carbon-rich forests is an ecologically sound strategy for tackling climate change and reducing wildfire risk, but researchers with the non-profit CarbonPlan (Badgley et al., 2021) have found that because of faulty reporting and a too-limited buffer pool, there has been a net *release* of carbon in the last two fire seasons. On March 29th 2023, CarbonPlan announced the automatic termination of GDR's Klamath East project per California's rules governing reversal of carbon gains given the severity of the burn on the unit sustained during the Bootleg Fire. Paperwork filed by the GDRC put the total loss of carbon stocks destroyed by Bootleg at over 3 million tons of CO₂. Burn damage was so severe that GDRC's live carbon stocks were far below its original reported baseline – which had been clearcut as late as the 1970s. When a project is terminated automatically due to unforeseen losses, 100% of the already-issued credits are retired from CARB's total buffer pool which is 6 million credits. ACR273's loss reduced the buffer pool to 5.09 million credits at the end of the 2021 wildfire season, representing an 84% loss.

In 2020, the Lionshead Fire burned through ACR260, the Confederated Tribes of Warm Springs's offset project for the petroleum giants Chevron and Tesoro. CarbonPlan estimated that losses from the 24,000-acre ACR260⁸⁸ to be 1.38mtCO₂ and that, combined with the loss of ACR273 and other reversals, the program-wide losses amounted to 7.5 million would probably result in a complete reversal of CARB's entire carbon credit program. Also, during the 2021 fire season, the Chuweah Creek, Summit Trail, and Whitmore fires wiped out ACR255, the Confederated Tribes of the Colville Reservation's offsets for British Petroleum (BP) and administered through global investment manager, Finite Carbon Corporation. Commenting on the Colville's project, CarbonPlan (Badgley and Cullenward, 2022) observed

ACR255 is a very large project that is surprisingly close to termination. Recent wildfires caused standing live above ground carbon stocks to fall from about 82.69 to 73.24 tCO₂ per acre. The project's minimum baseline level is 62.84 tCO₂ per acre. Thus, if ACR255 were to experience future carbon losses of a similar magnitude to those reported in the latest batch of project documents, it will be automatically terminated. Termination of ACR255 would require the California Air Resources Board to retire buffer pool credits equal to the total number of credits issued to the project — about 15.2 million tCO₂ to date, or about half of the current buffer pool.

⁸⁸ <https://acr2.apx.com/mymodule/reg/prjView.asp?id1=260>

Taken together, these new data add to the mounting evidence that California's forest offsets program is unprepared to handle the magnitude and severity of climate change-fueled wildfires.

In its 2020 announcement, Microsoft promised to use its voice on carbon-related public policy issues “removal of regulatory barriers to help catalyze markets to enable carbon-reduction technologies to scale more quickly” and a month after the Bootleg Fire was declared contained, Microsoft did just that by fighting tax hikes to fund Build Back Better legislation aimed to provide cut U.S. GHG emissions by 50% by 2030 using \$555bn of the total \$1tn. Microsoft its membership in the U.S. Business Roundtable generated a brief with the title “Business Roundtable Statement on Proposed Tax Increases on U.S. Job Creators to Fund Reconciliation Package”⁸⁹ arguing that it was a step backward for Americans – the legislation was defeated. In 2022, GDRC partnered with giant Nebraska-based non-governmental organization (NGO), Arbor Day Foundation asking the NGO to help it fundraise to replant 1.2 million trees on Klamath East's parcel. Arbor Day Foundation is funding the ongoing restoration project of replanting trees on 4,800 acres of GDRC's Klamath holdings.⁹⁰ While GDRC was getting free trees and labor to restore its wildfire ravaged land following the loss of ACR273, Microsoft invested \$20m to purchase 315,000 mtCO₂ from start-up company developing unproven direct air capture (DAC). The sharpening contradictions between ecological integrity and a system that increasingly seeks to promote profitability led Foster and McChesney (2012) to observe “Rather than Keynes's ‘euthanasia of the rentier,’ we are seeing the threatened euthanasia of almost everything else in society and nature (p. 63).”

Insurance – “A Potential Gold Mine” – The Camp Fire

Mismanagement of forests by logging companies and misguided fire suppression by the federal government starved California's forests and grasslands of the regular burning that kept trees and soils healthy and prevented catastrophic fires. Human expansion into these fire-starved areas is responsible for

⁸⁹ <https://www.businessroundtable.org/business-roundtable-statement-on-proposed-tax-increases-on-us-job-creators-to-fund-reconciliation-package>

⁹⁰ <https://www.1011now.com/2022/07/09/arbor-day-foundation-helps-replant-trees-lost-oregon-forest-fire/>

96% of wildfires that are the most dangerous to human communities (Mietkiewicz et al., 2020). And while insurance has long been considered an important safety net against future damage such as wildfires, it is also a source of accumulation. Insurance companies and the real estate industry have begun to reassess wildfire and echo the new message that fire is an ecologically necessary phenomenon while recognizing climate change-related droughts and heatwaves as key drivers in wildfire severity that put human and other than human life at risk. In the 1970s and '80s insured losses from wildfires rarely topped \$100 million, but that has steadily been changing. In 1991 wildfires in Oakland Hills, California destroyed over 3,000 homes and cost over \$2 billion in insured losses (Holmes et al., 2007).

Much of the focus on climate change-related environmental disasters affecting humanity has concentrated on hurricanes and floods, wildfire has become an increasing concern for the insurance and real estate industries as each year wildfires break new records for spread and devastation. Insurance companies acknowledge the threat of wildfire to lives and property and therefore profits, but also view it as an opportunity to offer new products aimed at offsetting such losses to themselves and their clients. In recent years, insurance giants Marsh McLennan and Lloyds have issued special wildfire reports detailing the environmental and economic effects of wildfire and suggesting strategies to deal with loss of revenue due to the large payouts that occur in the wake of wildfire damage.

In the run-up to the UN's 2015 Paris the International Science Council's *Road to Paris* website criticized the trend toward convincing Global South governments to enter the high-risk catastrophe bond market as a way to mitigate climate change impacts, stating, "Investors have discovered a potential goldmine: the increasing risk of natural disasters (Phillips 2015)."

The insurance linked security (ILS) market transfers risk into the capital market through high-yield bonds enabling investors to speculate on natural disasters. Additionally, in July 2021, the world's largest global insurance and reinsurance companies, Allianz, Generali, AXA, Swiss Re, Munich Re, SCOR, and others representing over \$88 trillion in assets, formed the Net-Zero Insurance Alliance (NZIA) with aim of intensifying financialization of decarbonization investment. Among their individual commitments to finance net-zero strategies, they listed engaging prospective clients and current partners on approaches to

decarbonization and net-zero emission technologies such as “nature-based solutions” that absorb GHGs enhance claims management and integrate risk management into their frameworks (UNEP 2021).⁹¹ Insurance is seen as a necessary component of modern society’s material relations, yet it is a compensatory mechanism for economic, environmental and other crises (Foster, Clark and York, 2010). The capital market, on which ILS are traded, is a complex web of financial institutions that appears not to have any connection to production or the environment. While this “fictitious capital” is purely speculative, it is dialectically linked to production as a facet of capitalist accumulation financed by debt and investor expectations and is prone to crises of its own making (Foster and McChesney, 2012, p. 56).

Wildfires as natural phenomena also play a role in the mediation of social relations when they negatively disrupt provision of services or force people to leave their homes. Past deregulation of non-financial entities has helped to increase the danger of wildfire in western states as utilities swap unprofitable maintenance for large capital projects aimed at generating shareholder value. Additionally, insurance companies have increasingly turned to securitization as another way to maintain profitability while transferring “concentrated and hazard-specific geographical exposures (Johnson, 2013, p. 32)” from their portfolios into the larger global capital markets in the interest of preventing bankruptcies.

Wildfire damage and displacement has pushed insurance companies to consider long-term strategic planning to preserve the viability of the industry in the face of large and multiple natural disasters. According to a report by international consulting and actuarial firm, Milliman, the 2017 and 2018 wildfire season wiped out ten years of insurer’s underwriting profits and incurred combined losses of the entire 39-year period that preceded it. The researchers argued that insurance companies’ projections extend to the most recent 20-year period, so they are unable to capture the long-term effects of climate change-driven wildfires or other factors such as increased housing units in the WUI, drought conditions or brush overgrowth (Webb and Xu 2018). Insurance obscures and extends the role of

⁹¹ United Nations Environment Programme. 2021. “Global Insurance and Reinsurance Leaders Establish Alliance to Accelerate Transition to Net-Zero.” (11 July 2021). Accessed at: <https://www.unep.org/news-and-stories/press-release/global-insurance-and-reinsurance-leaders-establish-alliance>

accumulation in the creation of wildfires by accessing surplus value in the form of such things as pension funds while unevenly distributing the risks to private individuals (Johnson, 2012, 2013).

Building a Better California? PG&E

Fire suppression starved California's forests and grasslands of the regular burning that kept trees and soils healthy and prevented catastrophic fires. The majority of wildfires, and the most destructive ones in California, are started by humans, including energy infrastructure, on private land (Downing et al 2022). One of California's worst offenders is utility giant Pacific Gas and Electric (PG&E). Over the last 10 years, the utility's equipment has caused a fire a day including 20 major wildfires that burned over 1 million acres and been found legally responsible for 100 deaths. By 2018, the company had been convicted of obstruction of justice and other crimes in the deaths of 8 people after its San Bruno gas pipeline exploded,⁹² when its powerlines sparked the Camp Fire, California's most deadly fire.

On November 8th 2018 in the early morning hours north of Sacramento near the resort town of Pulga, California, 100-year-old transmission Tower 27/222 on the company's Caribou-Palermo line failed. The tower had not been serviced for 17 years, and in the 50 mile per hour east winds, its 115 kilovolt power lines broke loose from their worn-through C-hooks and showered molten aluminum on the tinder dry fuels below, igniting vegetation and the surrounding brush and timber (CalFire, 2022). Within 3 hours, the resulting Camp Fire burned a total of 153,336 acres, decimating the Gold Rush towns of Concow, Magala, and Paradise, injuring 3 firefighters, killing 85 people,⁹³ and destroying 18,804 structures.

⁹² Gregory Bullis, 50; Lavonne Bullis, 85; William James Bullis, 17; Jacqueline Greig, 44; Janessa Greig, 13; Elizabeth Torres, 81; Jessica Morales, 20.

⁹³ Joyce Acheson, 78; Herbert Alderman, 79; Teresa Ammons, 70; Rafaela H. Andrade, 84; Carol Ann Arrington, 84; Julian Binstock, 88 and dog Jack; David Bradburd, 67; Cheryl Marie Brown, 75; Larry Alan Brown, 72; Richard Clayton Brown, 74; Andrew Burt, 36 and his dog; Joanne Caddy, 75; Barbara Jean Carlson, 72; Vincent M. Carota, 65; Dennis Clark Jr., 49; Evelyn Cline, 81; John Arthur Digby, 78; Gordon Dise, 66; Paula Susan Dodge, 70; Randal Paul Dodge, 67; Andrew James Downer, 54 and his dog Bertha; Robert John DuVall, 76; Paul Ernest, 72; Rose V. Farrell, 99; Jesus Pedro Fernandez, 48; Jean Forsman, 83; Ernest Foss Jr., 63 and dog Bernice; Elizabeth Gaal, 79;

The officials of Paradise had performed the necessary changes to prepare for wildfire but these modifications were not enough, because the Camp Fire was subject to high downslope east winds, a natural phenomenon of the jet stream that may be changing as the planet warms. These fires are associated with the most human losses in lives and structures (Abatzoglou et al., 2023). In 6 hours, the town of Paradise lost most of its structures, including most of its affordable housing of older homes and in mobile home parks, many built before California's fire code (Chase and Hansen, 2020). The majority of the dead were older people with the average age of 72 years old.

The fire originated far away and upwind of the high southwest winds that accelerated its growth enabling it to develop a 2-mile flame front. The combustion of the buildings and their contents contaminated drinking water, air, and soil in the area with potential long-term consequences for the town's water supply (Woessner et al., 2018). While the fire's footprint was small, thousands of people were left homeless and displaced and insurance losses amounted to almost \$19 million (CalFire, 2022; Pyne, 2021). According to Pyne (2021) Paradise and the surrounding towns "had had warnings before the Camp fire rampaged through the town (p. 112)," as the area had suffered over a dozen large wildfires in the previous 20 years. It had experienced less destructive fires 10 years before and had obtained grant money the summer before the Camp Fire to do fuels mitigation. Pyne repeats a common message of fire managers that fuels reductions and preparation before a fire starts are the best ways to minimize losses. This message is amplified by the Firewise program which provides fire maps, free home assessments, and

Sally Lee Gamboa, 69; James Doyle Garner, 63; Richard Jay Garrett, 58; William J. Godbout, 79; Dennis Hanko, 56; Shirley Haley, 67; Anna Irene Hastings, 67; Jennifer Lynn Hayes, 53; Christina Heffern, 40; Ishka Heffern, 20; Matilde Heffern, 68; Dorothy Herrera, 93; Lou Herrera, 86; Evva Holt, 85; TK Huff, 71; Garry Lee Hunter, 67; James Warner Kinner, 83; Warren Lessard, 68; Dorothy Lee Mack, 88; Sara E. Magnuson, 75; Joanne Dolores Malarkey, 90; John Vincent Malarkey, 89; Chris Maltby, 69; David William Marbury, 66; Deborah Morningstar, 65; Helen Pace, 85; Joy Porter, 72; Beverly Ann Craig Powers, 64; Robert Quinn, 74; Joseph Rabetoy, 39; Forrest M. Rea, 89; Esther Colleen Riggs, 96; Lolene Rios, 56 and dogs Wazie, Nanuq, Moo, and Teka, and cats Tucker and Jack; Gerald Rodrigues, 74; Christopher Salazar, 76; Phyllis Salazar, 72; Sheila Santos, 64; Ronald Joseph Schenk, 75; Bernice Schmidt, 93 unnamed cat and kitten; John Christopher Sedwick, 82; Donald E. Shores, 70 and Kathy Lynn Shores, 65 and their two unnamed dogs and two unnamed cats; Judy Sipher, 68; Larry Smith, Sr., 80; Russ Keith Stewart, 63; Victoria Taft, 66; Shirlee Teays, 90; Joan Carol Tracy, 80; Ellen Victoria Walker 72; Donna June Ware, 86; Isabel Webb, 68; Marie Lorraine Wehe, 78; Kimber Wehr, 53; Carl James Wiley, 77; David James Young, 69 and two unidentified pets

instructs towns and individuals near the WUI on best practices to reduce fuels around their structures such as cutting back trees and shrubs, covering roof soffits, and other actions.

Mainstream assumptions that scientific evidence and official warnings translate into rational action and that the means for changing the situation are easily within reach of the individuals and communities ignores the historical nature of social vulnerability and as Foster (2002) puts it “are reduced to questions of individual and collective will—and sometimes to rational choice by means of the market” that “often smack of a preacher’s sermon (p.74).” Moreover, in some cases social science researchers refuse to see clear class division and attempt to develop models that ignore the ways in which spatial distribution and quality of housing is a direct result of what Ruth Wilson Gilmore (2007) has come to call “organized abandonment,” the withdrawal of services that accompanies deindustrialization and job loss that leads to economic insecurity, poor health, lower quality housing and other problems. Before the advent of the Caldor Fire, mentioned in Chapter 3, researchers did a comparative study of CWPs in El Dorado County, California that included Grizzly Flats and Auburn Lake Trails (Paveglio et al. 2009). Auburn Lake Trails (ALT) is a gated community of million-dollar homes centered on an equestrian center, a golf course, and other amenities and governed by a homeowner’s association. The researchers labeled ALT, whose dues-paying members voluntarily hired professionals to perform fuels mitigation the “New West.” Grizzly Flats, by contrast, the researchers dubbed the “Old West” because of its history of extractive industry and composition that included retirees and new members who had much lower property values and who were less organized and trustful of elected officials. These Post-Parsonian analyses almost never examine the role of capital in contributing to their subjects’ beliefs and assumptions or its actual role causing wildfires.

In the case of Paradise, a lengthy National Institute of Standards and Technology report (Maranghides, 2021) established that the town was well-prepared for a wildfire, had done a good job mitigating fuels, its infrastructure was very protected had an emergency notification system and evacuation plan in place as well as public works staff trained to respond to fire (p. 144). By contrast, just before the Camp Fire, the utility monopoly failed to maintain its aged infrastructure and take steps to

replace equipment that posed a fire danger after multiple warnings, but rather entered the insurance-linked securities market in an effort to protect itself from indemnity, knowing that it had deferred maintenance along its 1920s era powerlines.

The utility, which supplies 16 million people in California, with electricity and gas, rose to prominence as the result of fire suppression in the interest of settlement and commodity production supported by racialized and unscientific claims that indigenous cultural fires are destructive and fire suppression was necessary to protect production. PG&E benefitted from the robbery of the KonKow-Maidu and Mechoopda people's land on which Tower 27/222 stands. The dispossession of KonKow-Maidu and Mechoopda stifled their use of fire which is integral to their economic and cultural life, and like many other Native Californians. Moreover, the loss of the extensive cultural burning practiced by Native Californians, which enhanced edge effects and helped to prevent the spread of extreme forest fires has contributed to a buildup of fuel and unhealthy forests. (Hankins, 2009; Anderson and Keeley, 2018; Williford, 2022; Vinyeta, 2021). These conditions have given rise to extreme fire behavior characterized by large, complex fires, called megafires, which can develop into disasters that threaten people and ecosystems (Linley and Jolly et al., 2022).

In order to protect infrastructure in new settlements, combatting wildfires became integral to the capitalist provision of water to agriculture, hydroelectricity to urban areas and for lumber production. According to Godfrey (2005), real estate expansion in California in the 1930s greatly expanded electricity production, making PG&E "almost a complete monopoly" in Northern California (p. 164). However, California's utility companies as well as its railroads were regulated by the state public utilities commission which demanded placed some constraints on rate hikes and other operations. Through a series of mergers around the 1920s, the company acquired existing transmission lines and did little to maintain them, instead spending money on lucrative new equipment. Because, it is a regulated monopoly, PG&E is somewhat constrained by the state on how much it can profit by raising consumer utility rates, and it does not earn returns on routine infrastructure maintenance. Therefore, in order to generate a high rate of return for shareholders, the utility's core strategy was investing in multibillion-

dollar technologies rather than maintaining its equipment. In California, electric utilities are liable for damages caused by their infrastructure or their activities, yet despite that concern, the utility was able to pass safety certifications on its aging electrical grid (Blunt 2022).

The Cheshire Cat's Grin: Cal Phoenix Re

According to the *Wall Street Journal*, PG&E knew its aging infrastructure presented a wildfire risk and told regulators it would inspect the Caribou-Palermo its infrastructure but failed to do so. Despite the unprecedented drought and dangerous fire conditions that hit California in 2013, the company deferred badly-needed upgrades to its oldest equipment (Gold, Blunt, and Smith, 2019; Blunt and Gold, 2019a; Blunt and Gold, 2019b). In 2013, the utility told federal regulators it was planning to replace its old towers, lines and connecting hardware on the Caribou-Palermo line but no work occurred. The company reiterated its claim in 2014, 2015, and 2016, but put the work off again and had not replaced any equipment by June 2018 (Blunt and Gold, 2019a). In anticipation of a bad wildfire season PG&E turned to the ILS market to cover itself against future indemnity by purchasing a catastrophe bond (cat bond) in the event that its equipment caused wildfires. In a process known as hedging – transferring risk from one party to another – the utility entered a byzantine network of financial transactions administered by an offshore organization. On July 11th 2018 *Artemis.bm*, the leading source for catastrophe bond news, announced the first-ever pure wildfire cat bond and the first cat bond issued to PG&E for \$200 million or greater.

Cat bonds are a relatively new financial instrument that emerged in the 1990s following the devastation of Hurricane Andrew which hit the Gulf coast of the U.S. and cost \$27bn in damages and drove eight insurers out of business. The bonds bundle natural disaster risks into saleable portions and encourage investors to gamble on whether natural disasters will cause businesses to suffer great that losses trigger payouts from insurance or reinsurance companies. They transfer risk from issuers such as reinsurance companies (which insure insurance companies) to large-scale investors such as hedge and

pension funds. These high interest (between 6 and 9%), short-term bonds are very attractive to investors because they are fully collateralized, add diversity to traditional portfolios, have high payouts, and can be traded on the secondary market. If a natural disaster strikes, the investors will lose some or all of the principal they invested and the issuer will receive that money to cover their losses (EIM, 2018; Polacek 2018; Henry 2021).

Cal Phoenix Re Ltd (2018-1) wildfire coverage was issued by the Bermuda-registered Cal Phoenix Re Ltd (Artemis.bm 2018a). *Artemis's* deal directory remarked

This new Cal Phoenix Re 2018-1 catastrophe bond is the first to cover pure wildfire risks. The sponsor is also a first to the market, being PG&E Corporation an electrical utility provider. With the transaction, PG&E Corporation (the Pacific Gas and Electric Company) is seeking a \$200 million or greater source of California wildfire insurance from the capital markets, helped by ceding reinsurance firm Tokio Millennium Re. Being a corporate beneficiary of a property catastrophe bond exposed solely to California wildfire risks you might have thought that the PG&E cat bond would feature a parametric trigger, but it doesn't as the risk is being ceded via Energy Insurance Mutual (of which PG&E is a member) as the insured and reinsurance firm Tokio Millennium Re AG. Because of that layering of risk transfer the new Cal Phoenix Re Ltd. (Series 2018-1) catastrophe bond is an indemnity arrangement, with the sale of the notes issued by Cal Phoenix Re Ltd. set to collateralize the retrocessional reinsurance agreement with Tokio Millennium Re, which in turn provides the reinsurance protection to Energy Insurance Mutual, which then insures the PG&E Corporation risk. It's an interesting way to see the corporate risk of PG&E cascade through multiple layers of insurance, reinsurance and retrocession to the capital markets, allowing for an indemnity coverage arrangement to be put in place, backed by the efficiency of ILS capacity.

The bond which protected the company from property and third-party property liability did not include a parameter trigger which is a specific criterion, such as acreage or structures burned, embedded in the bond that triggers a payout to insurers when it is reached. Instead, the utility chose an indemnity trigger which signals a payout in response to losses rather than a particular parameter. This indicates that financial and insurance experts at the monopoly probably knew that their equipment was going to be involved in a very destructive wildfire. The indemnity trigger enabled PG&E to transfer its wildfire risk via utility insurance and energy service provider insurer Energy Insurance Mutual (EIM), of which the utility is a member. Additionally, the Bermuda-based multinational reinsurance company Tokio Millennium Re AG served as back up reinsurance creating third-party liability risk.

The cat bond added layers of risk transfer and empowered Cal Phoenix Re Ltd. to reach beyond EIM's protection to access Tokio Millennium Re's financial capacity as collateral, protecting both PG&E and EIM in the event of a wildfire. The bond generated strong interest garnering twenty-two investors primarily among traditional asset managers and dedicated ILS managers in Europe and North America. *Artemis* commented, "It's an interesting way to see the corporate risk of PG&E cascade through multiple layers ... to the capital markets, allowing for an indemnity coverage arrangement to be put in place, backed by the efficiency of ILS capacity."

The Camp Fire lasted 17 days, forcing nearly 50,000 people to flee the area. More than 1,000 residents evacuated to emergency shelters or camped in a Walmart parking lot. Most of the victims of the Camp Fire were older poor and working-class people with limited mobility and/or who lacked transportation and who died in their homes or near their cars. In the wake of the fire, the utility company pled guilty to 84 counts of manslaughter and the utility giant's liability amounted to \$30 billion rendering PG&E's cat bond a total loss for investors. In addition, the utility paid \$11 billion to insurance and hedge funds who had sold the right to sue to recoup damages to their investors (called subrogation) at substantially low prices. The vulture fund, Baupost Group, that rose from the Great Financial Crisis of 2008 via opaque investment vehicles and went on to crash the economy of Puerto Rico in 2017 collected \$3 billion from PG&E after having bought claims at 35 cents on the dollar (Celarier, 2018). The 20,000 community members of Paradise and the other affected towns were the last settlement group after government agencies and hedge funds. The corporation agreed to settle the victims' suits by creating a fund containing half of the settlement in cash and half in company shares tying the victims to the same economic logic that had been responsible for the loss of their homes.

The response of monopoly-finance capital to wildfire is aimed at protecting property, assets, and valuation through the manipulation of markets in housing and insurance. One of those is rent seeking in which transfer payments, for instance the public money allocated for wildfire suppression, are converted into wealth for individuals without an outlay of investment (Tollison 2012). This can be in the direct form of paying a special insurance premium for concierge fire crews, but it also more subtly occurs when whole

towns are wiped out and rebuilt to a much higher standard raising property values and pushing long-time residents out.

Unrepentant Repeat Offender

After PG&E emerged from bankruptcy, the Governor's office organized a team including the state regulator, investment bankers and the law firm the corporation had previously contracted, to write Assembly Bill 1054 establishing a bonded insurance fund specifically covering wildfire for California's investor-owned utilities. The California Wildfire Fund gives corporations \$21 billion in two equal halves – \$10.5 billion from a \$2.50 per month charge on customers' bills and the other half from the three largest utilities in the state including PG&E, after it pays off wildfire claims for 2017 and 2018 (McGee and Greiner, 2020). In exchange for limiting executive pay, passing safety certifications, and investing \$5 billion in safety measures not to be recovered from customers, utilities will be able to fund covers liability for claims over \$1 billion related to the destruction. As its probation for the San Bruno crimes expired, the U.S. District Judge William Alsup who had overseen the process his comments to PG&E probation for the San Bruno crimes called the company out for its criminality

Rehabilitation of a criminal offender remains the paramount goal of probation. During these five years of criminal probation, we have tried hard to rehabilitate PG&E. As the supervising district judge, however, I must acknowledge failure. While on probation, PG&E has set at least 31 wildfires, burned nearly one and one-half million acres, burned 23,956 structures, and killed 113 Californians. PG&E has pled guilty to 84 manslaughter charges for its ignition of the 2018 Camp Fire in Butte County, is facing five felony and 28 misdemeanor counts arising out of the 2019 Kincade Fire in Sonoma County (that county's largest wildfire ever), is facing pending involuntary manslaughter charges arising out of the 2020 Zogg Fire in Shasta County, and is facing a civil suit by five counties arising out of the 2021 Dixie Fire (and may face criminal charges as well). The Dixie Fire, the second largest in California history, alone required 1,973 personnel to extinguish. So, in these five years, PG&E has gone on a crime spree and will emerge from probation as a continuing menace to California (Alsup qtd in United States v. PG&E, pp. 1-2).

He further castigated the utility's continued negligence in dealing with the "staggering" number of hazard trees and demanded that the company stop outsourcing its line work. Alsup cited two reasons the utility

had been outsourcing: to save on salaries and benefits to its employees and second and more importantly to shield itself from liability, as “Time and time again, we have heard PG&E blame its outside contractors” for failed hazard tree removal.

In their analysis of neoliberalism and deregulation of the energy market, McGee and Greiner (2020) detail how the California legislature backtracked on restrictions that kept PG&E from raising rates on household bills to pay off its bankruptcy debt, they observe, that this type of action mirrors those of the financial market, but the utility’s activities don’t just mirror those ventures; they *are* part of the financial system by virtue of the casino-like nature of cat bonds. Additionally, this case reveals the deepening conflict between the biophysical conditions of climate change and the economic system that has come to exemplify the ecological or metabolic rift.

At the present time economic relations are a kind of “absolute capitalism (Foster 2019)” that has engendered a billionaire class whose total economic wealth amounts to over \$4 trillion⁹⁴ leading news outlets to report that the divide between rich and poor is the greatest it has been since just before the French Revolution.⁹⁵ These reports are nearly always accompanied by a breakdown of disaggregated data showing relative misery between identity groups, thus encouraging the transposition of class struggle to an internecine *bellum omnium contra omnes*. We are told by some social scientists that there are “variegated” risks and vulnerabilities but that class-based analyses are too simplistic to evaluate environmental impacts such as climate change and wildfires (Eriksen and Simon, 2017). In the case of the Camp Fire and other wildfires, the focus, the resources, and the remedies generally accrue to homeowners. Chase and Hansen (2021) state the obvious when they say that

people have been left out of recovery and that communities will lose diverse forms of housing access and affordability. ... Renters are, on the other hand, overrepresented in populations which depended on charity and public assistance for basic needs, and in the numbers of people who had not filed permanent address changes in the year after the fire (p. 1576)

⁹⁴ <https://americansfortaxfairness.org/billionaires/#:~:text=>

⁹⁵ <https://www.cadm.org/The-evolution-of-wealth-inequalities-over-the-last-two-centuries>

Real Estate – Building Suicide Subdivisions

In addition to the direct financialization of nature and hedging against liability, the ecological rift has a distinct spatial dimension. It is no secret that historically capitalist production has grown and prospered from uneven development, or the ability to extract value from and displace the environmental cost of production onto “the mass of the population and the surrounding environment (Foster, 2011, p. 14).” Radical geographers have coined the term “spatial fix (Harvey, 2001),” for the way capital generates heterogeneous development patterns. Napoletano et al. (2015) argue that the treadmill of accumulation at the center of the metabolic rift imposes constant pressure to accelerate the rate at which the economic system makes withdrawals and deposits from the environment, while simultaneously boosting profitability. This spatial fix postpones environmental and economic crises which unfold separately but intermingle when capital seeks to extract profit from each crisis.

Wildfire is understood as a threat to lives and property values, however growth of the real estate industry is, in great part, responsible for the unfolding fires sweeping the West. “Americans,” Pyne (2015) observes

began to recolonize their countryside through an out-migration of urbanites. ... removing a buffer zone that had mediated between wild and urban. Sprawl did to America’s landscape what deregulation did to its financial infrastructure ... Of course, they expected fire protection regardless (p. 185).

On the morning of December 30th 2021, westerly winds reaching speeds of 115 miles per hour, the equivalent of a category 3 hurricane, roared out of the Rockies, whipping up grass fires from undetermined sources in Boulder County, Colorado torching 6,000 acres within 24 hours. The smoke plume spanned 60 miles of the state’s eastern plains and, like most large fires, super-heated air rising from the ground created a localized low-pressure system that pulled winds toward the center of the fire. Despite its relatively modest size at roughly 6,000 acres, the Marshall Fire stands as Colorado’s most destructive due to the number of structures it burned. The fire began as a wildfire but quickly metamorphosed into an urban conflagration that burned 1100 structures, including 928 homes in the

towns of Superior and Louisville, killed two people⁹⁶ and displaced thousands only to be rapidly smothered by 10 inches of snowfall and temperatures that dropped to below freezing in a few hours (Colorado Fire Prevention, 2022; Gabbert, 2022). The fire leveled older homes and several 1990's-era subdivisions, including the Sagamore subdivision of tract homes just behind Superior's big box stores Costco and Target as well as another swathe of homes in neighboring Louisville.

The Marshall Fire had quickly jumped to the city from a grassy abandoned coalfield-turned-county park, leading investigators to initially raise the possibility that ignition originated from still-burning coal mine fires located underground in the park.⁹⁷ In 1884, the state mine inspector visited coal mines around Colorado and remarked that "The most fierce of these mine fires can be found in the Marshall coal fields," which he likened to "a group of burning volcanoes (McNeil, 1884, p. 38)." The inspector warned,

... as combustion is going on quickly and surely, it will evidently break through in time. It is now impossible to extinguish this fire, as it has burned so long that the argillaceous slate overlaying the coal is burned to within a few feet of the surface, and the carbon, smoke and other gases from the fire emptying themselves through chimneys reaching to the surface in many places ... (McNeil, 1884, p. 38).

Expansion into rural areas and smaller towns increased dramatically in the 1990s as a mix of retirement-age, working-class and also very wealthy people migrated out of cities like Denver to subdivisions in non-metropolitan counties (Johnson and Beale, 1994). These land-use patterns have placed humans in the path of wildfires by extending settlements into areas in close proximity or even within fire-dependent landscapes. Development in the WUI increased by 33% between 1990 and 2010 to 190 million acres. In the same timeframe, the number of houses within the interface grew by over 40% to roughly 13 million structures (Radeloff et al., 2018). Fires that occur in these areas pose a greater risk to residents, firefighters, and buildings. In 2014, fire experts met in Wyoming to discuss ways to lessen the danger of wildfire to western communities. Noting the rapid expansion of private property into the

⁹⁶ Nadine Turnbull, 91 and two unnamed dogs; Robert Sharpe, 69.

⁹⁷ It was eventually determined that the high winds caused a powerline spark and reignited the embers of week-old backyard fire.

interface with public land and undeveloped land (controversially known as the Wildland Urban Interface or WUI), one fire marshal stated that she refused to send her crews into suicide subdivisions – high-value single-family neighborhoods with narrow streets, few ingress and egress points, and little access to water (Turner, 2014).

The suburbs of Boulder originated with coal mining and boast median home values close to \$600,000 and monthly mortgages and rent far above the national average according the Census Bureau (Quickfacts, 2022).⁹⁸ The *Denver Post* reports that Superior was the second-fastest Colorado city and fourth-fastest-growing city in the United States. Superior’s population was 255 residents in 1990 and over a decade grew to 9,000 in 2001, growing at a rate over 3,500%. (Auge, 2022, Superior Colorado, 2005). One of the first major housing developments in Superior was the Rock Creek Ranch subdivision built by Richmond American Homes, whose parent company, Denver-based MDC Holdings, whose mortgage financing, insurance, and title and escrow operations cover the western US.

Original Superior or Old Town, is/was a demographically diverse, working class neighborhood composed of descendants of the mineworkers who stayed in the area after the last coal mines shut down. Old Town’s homes, dating back to the 1900s through the 1950s, were served by dirt roads and well water. Miners employed by the Northern Colorado Coal and Coke Company and its successor the Rocky Mountain Fuel Company built homes accessible to the coal mines that operated in the area until 1945 when the last mine closed (Smith, 1989; Dorsey 2003, 2008). The composition of Superior began to change in the 1980s and by the early 2000s.

⁹⁸ All median values (Quickfacts):
Superior/Louisville home value = \$576,800/\$587,000; Superior/Louisville home mortgage = \$2,458/\$217,197;
Superior/Louisville monthly rent = \$1,922/\$1,607
US home value = \$217,500; US home mortgage = \$1,595 US monthly rent = \$1,062

A Blueprint for the Future: Kaufman and Broad

In 1997, at the behest of Kaufman and Broad, the West's largest real estate giant, the town planning commission annexed a 26.87-acre open field bordering the abandoned 20th century coal mines. In 1995, the development giant weathered vehement objections from long-time residents to have the lot designated medium density use in order to build single family detached homes in the new Sagamore Subdivision. Lot sizes in Sagamore ranged from 2,997 to over 5,000 square feet containing homes between 12,000 and 21,000 square feet. Prices for the 171 residences in the development were between \$120,000 and \$190,000 making them much more affordable than nearby Boulder. Despite its affordability, or maybe because of it, Superior has a greater concentration of high-income households than the rest of Colorado and the U.S., and it also has a greater concentration of people 25 – 54 years of age with stable employment (Town of Superior, 2005). According to a local historian, the explosion of subdivisions in the area during the 1990s exacerbated divisions between working class residents and wealthy urban migrants

That's when things really started to change because Original Town and Rock Creek were quite different socioeconomically... One of the things really coming to a head before this fire was what's going to happen with the longtime people whose property goes back decades, maybe even back to the early 1900s ... When developers are coming in, buying up a chunk of land, dividing it up and putting houses on it, the people who live there get pressured to sell and then where do they go? Gentrification was really coming to a head (Larry Dorsey qtd in Hernandez, 2022).

Real estate giant Kaufman and Broad was founded in Detroit in 1957 and functioned more as a manufacturing business than a real estate company by that minimizing input expenses and streamlining the building process and turning out mass quantities of single-family homes. The company developed its own blueprints, used cheaper building materials, and sped up the construction schedule a month faster than its competitors, cornering the market in single family homes in the Midwest. Additionally, the company changed the design of houses by swapping garages for carports and omitting basements as coal heating transitioned to natural gas eliminating the need for fuel storage.

Since the 1970s, a central feature of monopoly-finance capital has been the aggressive marketing of novel investment-grade mortgage loans enabling homebuyers and owners to borrow at considerably higher rates by taking on consumer debt despite stagnating wages. Trade in home mortgages by non-bank financial institutions coupled with low interest rates fueled an explosion of suburbanization that grew by 53.4% compared with 13.4% for cities between 1970 and 1998 (Foster and Magdoff, 2009; Wu, 2007). Kaufman and Broad became highly profitable by producing a large volume of houses and developing a financing structure that kept mortgages below local rent prices to encourage buying their homes rather than renting. The corporation relocated to Los Angeles California where it subcontracted with large builders, eventually buying them out, which consolidated its building capacity and expanded its customer base. The company aggressively targeted first-time homeowners for two, three, and four-bedroom homes offering lower prices than its competitors and introduced a graduated mortgage which quickly installed it as a major agent of suburbanization in the American West. The success of the company enabled it to expand into international housing market under the name KB Home. In 1969 amid a building slump, founder Eli Broad purchased Sun Life Insurance as a hedge against profit loss when construction slowed. The firm grew rapidly expanding into France where, 10 years after building the Sagamore subdivision in Colorado, 80% of Kaufman and Broad's French market was acquired by the French private equity firm PAI Partners (McKeon, 2018; Callen, 2009).

Walker (1981) argues that the real estate industry benefits from promoting clusters of high-value amenities that can secure differential rent – the profits realized as the result of site improvements – and exploit the desirability of a site for even more profit. Newer, wealthier residents demand more amenities such as parks, running trails, bike lanes and other leisure-related features as growing cities exchange devalued land for services underwritten by real estate developers (Johnson and Beale, 1994). Local governments “proved enormously useful to capital,” as they “offered advantages to industry in terms of cost-revenue rationalization, but principally with respect to land development (Walker, 1981, pp. 388-389)” through favorable zoning and expanded infrastructure.

According to McKeon (2018), Kaufman and Broad expanded in scale as “housing provision became one of the means by which capital dealt with its internal contradictions (p. 6).” The firm is also a purveyor and benefactor of a new bourgeois logic of exclusion emphasizing autonomy, economic security, social harmony, and privacy. The kind of slice-and-dice conversion of marginal spaces into subdivisions like those built by Kaufmann and Broad sometimes places them within close proximity to abandoned industrial sites which affords those landscapes the opportunity to even the score “by consuming whole neighborhoods in raging megafires (Burton, 2018, p. 91).”

In the Sagamore subdivision, the flames were preceded by an ember storm that blew down the streets and urban cul-de-sacs of wealthy residents whose houses trapped firebrands, lighting one house after another. Eli Kaufman’s goal, according to biographers, was to promote American homeownership. Officials later determined that the conflagration used that most American symbol of suburban prosperity and possessive individualism – the wood picket fence – as a pathway between the homes (Reppenhagen, 2022).

Gentrification by Fire

In the media wildfire suppression is often compared to warfare and sometimes also characterized as an example of disaster capitalism when industry leverages shocks, to the economy and society, such as natural disasters, to capture more profit. Klein (2005) and others argue that disaster often results in large windfalls for the private sector and retrenchment of government services fomented by the crisis. In line with Klein’s argument, wildfires, wipe away old infrastructure, displace poor people and open up new ground for renewed accumulation. The urgency and devastation wrought by disasters presents a suite of opportunities to advance policies and practices that would meet resistance in more quiet times. According to Schuller and Maldonado (2016), there are two aspects of disaster capitalism. The first, (non)profiteering, usually receives the most widespread media coverage following a disaster and entails non-profit organizations and private companies receiving favored status for reconstruction efforts. In line

with the argument that capital accumulation thrives on disaster with regard to Hurricane Katrina Marxist political scientist Adolph Reed Jr. (2008), observes

Natural disasters can magnify existing patterns of inequality. The people who were swept aside or simply overlooked in this catastrophe were the same ones who were already swept aside in a model ... [that is] is predicated on their removal. Their presence is treated as an eyesore, a retardant of property values, proof by definition that the spaces they occupy are underutilized. ... Those who were the greatest victims of the disaster were invisible in preparation and response, just as they were the largely invisible, low wage props supporting the tourism industry's mythos ... They enter public discussion only as a problem to be rectified or contained, never as subjects of political action with their own voices and needs (p. 148).

While privatization of responses to disasters creates new markets, capital admits there is still a role for the state to play in the second dimension. Public institutions develop new policies governing natural disaster preparation and relief and serve as conduits for finance, delivering funding streams to private companies and non-profit agencies that perform the work, thus supplanting representational democracy with market-driven or consumer's democracy. Researchers (Issler et al., 2020) found significant foreclosures and mortgage delinquencies followed wildfires but that large wildfires actually contribute to a *decrease* in foreclosures possibly because a large amount of destruction (coordinated externalities) sweeps away older, less well-built homes that must be replaced by more expensive structures built in accordance with more updated codes, thus increasing property values. Balaban and Fu (2014) reported an increase in rent seeking behavior in California in which properties were deemed protectable by value. Balaban and Fu claim that centralization of firefighting is part of a strategy of opening up new land for development.

CHAPTER VII

TOWARDS A 21ST CENTURY PYROMETABOLISM

For thousands of years frequent surface and large infrequent stand-replacing fires shaped most of the U.S. The landscapes of western states were very directly shaped by lightning and human generated cultural fires. The grassland ranges of the western states would not exist if not for fire and fire was one of the main reasons that shade-intolerant shrubs became abundant. In a certain sense, whether we like it or not, those fires are returning to the western states in places where they historically occurred. There is much argument that wildfires today are “megafires” and that they are unprecedented. But they are only considered unprecedented because such a long time has lapsed since the extensive cultural fires set by Native people largely (but not completely) kept wildfire severity in check. And because the fire suppression aimed at protecting forests from the truly large and devastating industrial fires of the late 19th and 20th century was fairly effective at limiting the acreage of forest fires, containing spread.

As the ecological rift deepens, wildfires are likely to become a year-round occurrence in some parts of the U.S. West demonstrating that wildfires are as much a crisis of the economic system as they are a natural one. The megafires of today are a result of the wildfire paradox, a positive feedback loop of land use change and management geared toward production of exchange values, fuel buildup, wildfire and wild suppression that has left increased fuel loads and fairly uniform forest continuity (Arno and Brown 1991; Calkin et al. 2015; Ingalsbee 2017; Marks-Block 2021). This paradox must be seen as an accumulation of catastrophe that included violent dispossession, labor exploitation, and environmental destruction (Foster 2011).

In this dissertation, I asked “How has capitalism acted as a mediating force on wildfire suppression in the western United States?” I employed a historical materialist analysis of wildland fire suppression and management of the U.S. West. This project examines the major social, historical, and ecological developments in the last 150 years with regard to the changing nature of humans’ relation to

fire. This dissertation expands on the sociological literature that applies a Marxist lens to wildfire suppression (Hudson 2011). In line with Norgaard (2014, 2019), Vinyeta (2021), Marks-Block (2020; with Tripp 2021), I find that settler colonialism dispossession and subsequent war capitalism significantly disrupted and displaced Native people, introducing a different fire regime to the West. However, in agreement with Hudson (2011), I also found that conservation of timber values, supported by bourgeois science expanded understanding of forest ecosystems and formed the basis for a program dedicated to industrial fire suppression. Most of these findings are generally undisputed even among the current liberal approaches to wildfire, but beyond recognition of the embedded interests of the timber industry, they rarely mention capitalist accumulation as a primary driver.

Capitalist fire suppression enabled for the development of metrics for fire suppression while at the same time aiding and benefitting directly and indirectly the same entities that have contributed to rising CO₂ which drive climate change. Western forests are overgrown and prone to burn, because early fire science denied Indigenous traditional ecological knowledge and pursued fire exclusion to sustain lumber production and economic expansion (Kolden 2019).

Wildfire suppression and management has had a profound impact on the environment and communities through its introduction, professionalization, militarization, and its continuing role as a reason for deeper incorporation in the market system. This work addressed the ways historic mediation of wildland firefighting in the western United States by capitalism, firefighting's role in capital accumulation, and the ways in which suppression has impacted the environment and communities. I have done this by examining settler expropriation and transformation of land through the introduction of the capitalist mode of production with an emphasis on timber extraction which has left a legacy of high fuel loading.

I have traced how the emphasis on suppression to protect forests led to the professionalization of firefighting and labor exploitation is implicated in wildland firefighting by depending on populations made vulnerable by the crises of monopoly capitalism. I documented the influence of military Keynesianism and U.S. imperialism on fire suppression during the Cold War which brought together the

Forest Service, corporate giants in the chemical and aerospace industry, and the U.S. military. Finally, I revealed how monopoly finance capital has played a role in wildfire management has contributed to the financialization of nature through the finance, insurance, and real estate (FIRE) economy.

I have analyzed these aspects of wildfire suppression and management employing an ecosocialist theoretical approach founded in a radical political economic orientation. This view has enabled me to explore the issues surrounding wildfire suppression and management bringing a different and more critical perspective than previous work on the subject. By combining historical information such as articles and reports dealing with specific fires as to the general techniques of fire suppression and also using interviews, and historians' accounts, with a socio-ecological point of references revealing the shortcomings of mainstream theoretical explanations such as those developed by other social sciences in the areas of planning, fire management, sociology, and media reports. These other accounts fail to emphasize historically specific and dialectical aspects of modern social relations between society and nature in the case of wildfire. Examining wildfire using a radical political economic perspective uncovers the contradictions, convergences, and consequences of wildfire suppression and management with capitalist accumulation.

Capital and technological intensity, including biological and terrestrial transformation, increasing industrialization, militarization, and expansion of fictitious capital markets oriented to buying and selling nature are all hallmarks of the capitalist economy. These general conditions are not limited to industrial forestry, but characterize the general progression of the rift in the metabolic relations between society and nonhuman nature. Interruptions in the natural human-fire cycle that created the western, fire-dependent landscape wrought by capitalist accumulation are somewhat different than the climate-change driven catastrophes we are seeing now such as hurricanes, tornadoes, and floods because those events are not conceived of as controllable. The capitalist mode of production has resulted in nature's desecration and dangerous imbalance bringing about global climate change accompanied by heat, drought, and wind events that are unprecedented in recorded history. The legacy of this metabolic rift coupled with the specific belief in the controllability of fire resulted in 150 years-worth of fuel build-up in forests and

expansion into areas that historically were only temporarily or not occupied by humans has created the wildfire paradox – the cause of wildfires and the need to fight them.

As I have recounted using the Caldor Fire as a case study in miniature, fire use and exclusion came about as the result of a transition from an Indigenous life mode that prominently featured fire for numerous human activities to a capitalist mode of production which simplified land management. Settler expansion into the territory of Native people's as a consequence of soil impoverishment, the discovery of gold, and U.S. imperial ambitions brought with them disruptions in the original human-fire metabolism. Settler colonial expropriation of land, through acts of genocide and the seizure of natural resources led to dispossession and dispersal of the Miwok people and other Native groups. The use of fire by indigenous groups was widespread and integral to social metabolic relations with the landscape and represents an example of human-nature coevolution. Settler colonial expropriation of land scaffolded the transition from indigenous fire for use values and settler fire for exchange values. Settlers enacted legislation to ban cultural burning and enslave indigenous people. As Native people were dispossessed, the practices that have led to devastating modern fires began to form. Contrary to commonly-held beliefs about capitalist transition, none of these processes was even or complete. Settlers learned directly from native people to use of fire but did so to transform the landscape for the purposes of European patterns of permanent animal and plant husbandry for mercantile and capitalist extraction.

As we have just seen with the devastating fires in Maui, the legacy of invasion by settlers has left a legacy of nonnative plants that can have devastating consequences (LaRosa et al. 2008). The settler economy featured livestock that compacted soils, polluted waters and severely limited the range of native plants that supported the Indigenous economies in the West while also eliminating plants upon which native ungulates depended. Fire exclusion further contributed to selection pressure enabling more invasive plants to thrive. Settlers introduced flammable weeds, such as *Bromus* or cheatgrass that are now part of the modern landscape increasing the risk of severe wildfires. The spread of these invasive weeds edges out native species that are less flammable and support various native species that ensure ecosystem integrity. Grasses such as cheatgrass and medusahead have become a problem in the Great

Basin and are a wildfire threat. Additionally, research shows these legacy weeds are migrating from rangelands to higher elevations as a part of climate change.

The transition from the hybrid mercantile mode of production to one of capitalist extraction also changed the landscape through deforestation as timber was harvested for mining and lumber production leaving denuded hillsides prone to erosion and fires. Timber firms placed an overwhelming emphasis on species important to the industry such as lodgepole and sugar pine as well as Douglas fir, replanting those trees while eliminating competitor species that industry considered weeds. This practice continued through the 20th century and, coupled with fire suppression, has contributed to dense, even-aged forests with species uniformity and a considerable amount of ladder fuels which significantly contributes to rapid, unpredictable wildfire behavior and spread.

Influenced by scientific forestry proposed by Frederic Clements's holistic ecosystem model fire, fire exclusion was prioritized to control the environment. The leaders of the Forest Service adopted scientific labor management as part of a utilitarian program of fire suppression aimed at taming the land for capital and taming workers for exploitation. I have documented how unevenly applied fire exclusion metamorphosed into full-blown fire suppression as the result of timber extraction, accelerated by mechanization that enabled capital interests to access remote forests, speed up processing times, and expand lumber markets. The late-19th century was a period marked by economic crises, damaged environments and the concentration of wealth among large regional monopolies which brought larger amounts of land under their control including forests while also increasing mechanization which displaced workers and left landscapes covered with waste slash which periodically led to devastating conflagrations, including the Big Blowup, a large complex fire that killed over 80 people prompted more land acquisition by the federal government and formalization of fire suppression as national program.

Professionalization of firefighting in the 20th century was significantly hampered by shortages of money and equipment, but especially labor. As the primary organization responsible for firefighting, the Forest Service struggled to recruit and train the labor force needed to achieve its ambitious 10 AM Policy of swift suppression. However, economic crises and war enabled the agency to obtain surplus

populations to carry out its conservation and fire work on public and private lands. Not only was the labor of the CCC composed of impoverished young urban men a major factor in containing fires in the 1930s, but it also served the purpose of labor habituation through physical training, hard work, and a military structure. It was at this time that selection of Robert Fechner, a former union executive brought the Army and unions closer together in a grand bargain that carried into the Second World War, ensuring ideological and material support for the war and the promise of economic prosperity in the post-war era. The stated goal of the CCC was to mold the men into disciplined workers in future employment (Schnaiberg 1980). Additionally, women, prisoners of war and other incarcerated people considerably contributed to capital accumulation at no or nominal cost to the government or corporate entities. During this time, fire suppression formulated much of its labor regime and ethics using surplus populations as firefighters on the line as a laboratory experiment in labor management and machinery applications to meet the productivity goals of full fire suppression.

The USFS, as part of an effort to maintain domestic profitability and ensure American world dominance, deepened the metabolic rift through experimentation and cooperation with the military and private capital in the of aerospace and chemical weapons industries as part of an economic policy aimed at maintaining production, absorbing economic surplus, Additionally, the agency helped to direct a campaign of ecocide against the Vietnamese people in coordination with the U.S. military and defense contractors as part of the Cold War anti-communist international agenda. Additionally, increased capital accumulation through deregulation of utility companies and timber and construction conglomerates to increase their reach into new markets including real estate through speculation and cost-cutting measures. The expansion of new housing into rural and marginal areas of extraction such as coalfields and formerly logged forests has been a hallmark of the Anthropocene, placing communities in the path of wildfires. All of these activities taken together have greatly contributed to global climate change as well as worsening wildfire severity.

Social Science's Proposed Solutions

Liberal Social Science

The majority of social scientists, policy makers, and economists have documented some of the same features of the current wildfire regime that I have. The general trend of this research applies Parsonian assumptions about rational action that recognizes inequality but calls for discrete changes that do not fundamentally transform the system. While many of these studies are well-meaning and generally recognize differences among communities, their inability to contemplate how historical, economic, and ecological forces have gradually sculpted communities so that their cultures appear self-evident leaves the tyrannies of the market and government untouched. Mills objected to this harmony of interests between social scientists and the powerful. In response to Talcott Parsons C. Wright Mills took exception to the evacuation of power relations and engagement with historical development, stating that it accommodated the powerful and pathologized nonconformity among average people:

It is, for example, difficult to imagine a more futile endeavor than analyzing American society ... with no mention of the changing nature, meaning and forms of success characteristic of modern capitalism, or of the changing structure of capitalism itself; or, analyzing United States stratification in terms of 'the dominant value system' without taking into account the known statistics of life-chances based on levels of property and income (p. 43).

These reforms are very much in line with reflexive modernization theory which aims to make technical adjustments while leaving capital untouched. These include standardizing development with wildfire risk ratings, withholding federal payments to rural counties that do not create fire plans, denying loans and insurance to those who build in the WUI, instituting fire risk mapping, and forcing local communities to pay firefighting costs. These measures leverage already-existing inequality hurting people who cannot afford to upgrade their homes, pay higher taxes, or move away while at the same time creating markets for high priced insurance, concierge fire suppression, and result in rise of property values that benefit already wealthy residents (Auer 2021; Auer and Hexamer 2022).

In contrast to liberal sociology, those who advance the radical settler colonial studies framework argue that the root of catastrophic wildfires can be found in dispossession of Native people and the prevention and criminalization of cultural burning. SCS and indigenist scholars rightly demand wider respect for Indigenous Traditional Ecological Knowledge (TEK), a return of cultural burning, and most importantly of all, the return of Indigenous land (Alder and Goode 2014; Marks-Block 2020, with Tripp 2021; Minor and Boyce 2018; Middleton Manning and Reed 2019; Norgaard 2019; Vinyeta 2021; Martinez et al. 2023). Many SCS scholars ground their criticisms in terms of sovereignty and argue that “primitive accumulation” is an all-encompassing and ongoing form of expropriation by the state. Their failure to examine capitalist accumulation in any historicized depth ignores the catastrophic effects of the FIRE economy’s ability to create new products and markets that provide speculative outlets to the financial sector without ostensibly threatening Indigenous sovereignty. Hudson (2011) contends that a focus on the “bully state” embodied by the USFS assumes a level of autonomy the agency does not possess. Correspondingly, I have shown that capital has a parasitic relationship to public money and relies on the state to make or take away laws that distribute surplus while also administering accumulation without fundamentally changing economic relations.

The SCS theoretical project centers the state as the main while explicitly eliminating any consideration of class dynamics. This is a denial of the historically specific and asymmetrical accumulation regimes, stagnations, and crises generated by capitalism that touch not only working class non-Indigenous people but also working-class Indigenous people and tribal governments. For instance, borrowing from post-humanist anthropologist, Anna Tsing’s concept of “pericapitalist space,”⁹⁹ Marks-Block (2020) describes Indigenous exploitation

⁹⁹ According to Marks-Block pericapitalist space is “where individuals are engaged in capitalist and non-capitalist forms of subsistence (p. 22). From my understanding this is a description of Marx’s “hidden abode of production,” in which social reproduction of labor power and of capital are realized.

Although fire management provides Tribal members with a source of income and moves Tribes toward their longer-term objectives of increasing cultural burning, these institutionalized management activities also detract from cultural and subsistence practices. Many Tribal members lament that their wage work reduces their time to gather and hunt traditional foods and materials. Fire management generates a dialectic between the bureaucratic and managerial procedures necessary to increase fire on the landscape, and the livelihoods that cultural burning intends to support (p. 22).

It is unclear how this is a description of anything but classic Marxian exploitation. The superimposition of settler colonialism onto capitalist expropriation and exploitation is a distinct weakness SCS scholarship, because it is unable to apprehend historical changes in capital accumulation regimes. Moreover, the transmutation of alliance of capital and the state to simply the predator state with regard to wildfire management betrays a stunning disregard for millions of exploited Non-Native people. A recent example is an article (Martinez et al. 2023) demanding the return of Indigenous fire sovereignty which downplays the “wildfire crisis (p. 143)” arguing that “Too often, appeals to ‘crisis’ function to dehistoricize the very power relations that produce disasters and re-entrench violent structures by defaulting to liberal logics of reform (p. 143).” The authors make the obligatory reference to capitalism’s “norms of private property and capital accumulation” even referencing the low wages, demoralization, danger, and dirt of wildland firefighting before declaring that environmental concerns devolve to “state technocrats (p. 143)” who ignore locally-specific Indigenous cultural burn practices. They convincingly condemn a “TEK rush” in which “settlers respond to large-scale environmental change by rushing into Indigenous communities” in an “impulse to extract Indigenous knowledge solely to ‘save [one’s] own skin’ ([Povinelli 2021:103] qtd in Martinez et al. 2023: 151) in reaction to environmental crisis (pp. 151).” The authors conclude

It is not enough to simply learn from Indigenous people and apply their knowledge. This tactic is settler colonialism at work and directly supports settler futurities of erasure, appropriation, and replacement (p. 152).

Despite the weaknesses of the SCS theoretical perspective, its revolutionary insistence on protecting the integrity of Indigenous land and technologies is indisputable. Additionally, the demand for the return of Indigenous land and the freedom to engage in cultural burning should be the mission of every ecosocialist, because it accords with a long and deeply-held Marxist belief in human freedom, self-

determination, and the ability of communities to provide for themselves according to their needs and cultures.

Relatedly, the ecosocialist value in all human and nonhuman life is encapsulated in Ruth Wilson Gilmore's statement: Where life is precious, life is precious.

Ecosocialism: Saving (All of) Our Skins

This examination complicates the commonly accepted narratives now being aired in academia and the media, raising questions concerning potential solutions involving changing the current wildfire regime given the clear hand of capitalism and its environmental failures not just with regard to the fire regime in the western U.S. but also the world given the far-reaching consequences of global climate change. Would the elimination of militarized wildfire suppression solve the ecological and social problems associated with it? Would introduction of Indigenous cultural burns and prescribed burning stop catastrophic fires? Would the elimination of capitalism itself change the current fire regime? Given that this dissertation is an indictment of capitalist social metabolic relations with regard to wildland fire, the expected answer should be a resounding “Yes!” But many of the big ecological problems we currently face are the results of numerous contradictory and, in some cases, unpredictable social and ecological developments. The foregoing evidence points to historic changes that are occurring as the result of capitalist accumulation and have left permanent and semi-permanent changes to landscapes, groups of people, and climatic conditions that cannot easily be undone. Solving the wildfire paradox must include an understanding that the evolution of capitalist social relations has depended on unending growth, imperialism, and war, deepening inequality, periodic crises, an entrenched oligarchy, and also depends local elites who partner with nongovernmental organizations and private capital furthering regimes of accumulation (Foster 2023).

In her book *A World to Build*, Chilean sociologist Marta Harnecker asks, “Why talk about socialism?” Why mention a word so freighted with negative connotations since the collapse of the Soviet Union and the rise of the neoliberal Third Way? The answer is because there is no other theory or plan of action that can be applied to environmental problems so comprehensively. Marx and Engels described capitalism’s creative destruction: dispossession, robbery, exploitation, and its cynical use of science to extract every last bit of surplus value from nonhuman nature and human labor. “The moral of the tale,” Marx stated, “is that the bourgeois system runs counter (1991 [1894])” to a sustainable social metabolic relation with nature because the system does not recognize natural limits.

In order to heal the rift between humans and nature, Marx argued that the collective labor of associated producers, or people closest to material activities, would bring about a more rational and sustainable social metabolic order. Magdoff and Foster’s (2011) ecosocialist elementary triangle of ecology complements to Venezuela’s President Hugo Chávez elementary triangle of Bolivarian socialism: social ownership, social production by the associated producers, and satisfaction of community needs. This triangle of ecology entails,

- (1) social use, not ownership, of nature;
- (2) rational regulation by the associated producers of the metabolism between human beings and nature; and
- (3) the satisfaction of communal needs—of present and future generations.

These suggestions adapt Magdoff and Foster’s suggestions as a possible way out of the wildfire paradox.

Satisfaction of Communal Needs for Present and Future Generations

Writing for *Undark*, former wildland firefighter Emily Shepherd links climate change, militarism, and austerity

Every time somebody thanks me for my service, it reminds me that this wildfire crisis was preventable. Half a century was squandered in the response to climate change. While Congress funded wars, the U.S. Forest Service couldn’t afford to both fight wildfires and manage fuels to reduce wildfire severity, so wildfires became more severe (2021).¹⁰⁰

¹⁰⁰ <https://undark.org/2021/09/23/the-hero-myth-of-wildland-firefighting/>

Shepherd addresses a rarely-examined aspect of wildland fire - capital's addiction to crisis as evident in the U.S. wars and proxy wars for economic and political supremacy. Those wars and their stimulation of the economy brought us the innovations that fueled The Great Acceleration that have now become a baked-in feature of modern life. This dissertation cannot address all aspects of the exacerbating factors of wildfire spread and severity associated with climate change. Sweeney (2020) argues that the duty of socialists is to unreservedly support militant social movements opposed to fossil fuel extraction and to embrace, with significant modifications, the role of the state as part of the solution for dealing with climate change. I extend Hudson's (2011) convincing argument that problematizing the state to the exclusion of capital, ignores the powerful role of the FIRE economy in undermining Indigenous sovereignty, further weakening environmental progress and protections, and deepening social inequality.¹⁰¹ The FIRE economy cannot solve the climate crisis or devastating wildfires, because so-called green alternatives such as carbon offsets and insurance schemes that protect utilities from being held accountable for starting wildfires is about making more money not protecting the environment or satisfying social needs.

End Carbon Markets

An ecosocialist program to tackle climate change and ease, as best we can, the severity and impacts of wildfire must take control of finance. A critical component of dealing with wildfire is recognizing that climate change will significantly exacerbate the paradox by adding unpredictable weather conditions. As I have shown wildfire is both a sign of climate-related environmental instability as well as a threat to human and nonhuman health. Research by the Union of Concerned Scientists (UCS

¹⁰¹ As of today (21 September 2023), *Bloomberg Billionaire Index* reported that the top 9 U.S. billionaires had more liquid assets (\$134 bn) than the U.S. Treasury's operating cash which stood at \$4,962 bn. Nike's Phil Knight and his family were at an ignoble 33rd place with \$37.4 bn as of September 21, 2023. Billionaires: <https://www.bloomberg.com/billionaires/> and U.S. Treasury: <https://www.fiscal.treasury.gov/reports-statements/financial-report/where-we-are-now.html#:~:text=As%20of%20September%2030%2C%202022,%241.2%20trillion%20in%20net%20PP%26E>.

2023) links 88 gas, oil, and coal companies to worsening wildfire activity as the result of their activities. At the federal level UCS recommends that the U.S. Securities and Exchange Commission be charged with stringent corporate climate disclosure process, prosecuting companies that pollute and/or engage in disinformation campaigns, and urging companies to do better. This is not enough, because companies are able to pass costs onto society rather than reforming and they can even create “green” products to make up for dented reputations and fines. That is why the first step to climate resilience should be to eliminate participation by capital in climate talks at every level: global, state, and local. Rather than accommodating polluters, the negotiations need to be carried out with the populations of communities, their representatives and climate scientists.

This dissertation recognizes that there is already a carbon rush, a disastrous trade in carbon offsets such as REDD+ that Indigenous people in the Global South have valiantly resisted and California’s cap and trade program that many North American tribal governments have unfortunately embraced. The carbon rush, TEK, and wildfires are connected as tribes take advantage of upfront payments to maintain traditional ecocultural resource management and cultural burn practices (Middleton Manning and Reed 2018; Bernton 2023). But this has occurred despite pushback within Native communities, acknowledgement from the National Indian Carbon Coalition that offsets don’t always pay, and condemnation by the Indigenous Environmental Network (Pember 2021). Yurok social justice activist and active opponent of Green Diamond’s aerial pesticide spraying campaign, Aawok¹⁰² Jene McCovey remarked, “I think we did a good thing by saving the trees, but I’m not happy with it ... It’s not viable. It allows polluters to pollute (qtd in Kormann 2018).” While rural landowners, including Indigenous tribes benefit from an infusion of cash, they are deeply implicated in exploitation; after all someone has to hump the saws, carry the drip torches, and wield the pulaskis. Cultural burns for such projects, while meaningful, *are* proletarianization because they are a form of unequal exchange, forcing

¹⁰² Yurok term of respect and solemnity similar to “rest in peace” for an elder who has passed on.

tribes to set aside large areas of their land for the benefit of corporate polluters who, through their unchecked emissions, are influencing wildfire severity at the front end.

We know that climate change has contributed to variability in temperature, wind, and moisture patterns that increase wildfire severity. Some social scientists have explored the co-benefits of “ecosystem services” as an alternative source of revenue to extractive industries in rural areas and a wildfire mitigation strategy (Charnley et al. 2018). These practices have been held out as a way for rural communities and tribes to realize long-term financial security while enhancing carbon absorption and protecting landscapes from fire. Research has shown that carbon markets are ecologically unsustainable (Anderegg et al. 2020; Badgley et al. 2021; Coffield et al. 2022; Wang et al. 2022; Haya et al. 2023; Herbert et al. 2023).

As I have shown with the trade in carbon credits, large corporate polluters like Microsoft use state-run agencies for wildfire management on the neglected lands of large timber concerns and even on reservations as a way to profit twice: once from production and once from banking on nature. The federal government must place a cap on all emissions produced by companies regardless of industry, product, or location who sell or produce goods in the U.S. to below 50% by 2030 with progressive reductions to 0% by 2040. Additionally, the U.S. must meet its obligation to pay the \$2bn it owes the U.N. Climate Fund and devote 5% of U.S. GDP to climate aid (Foster et al. 2010).

Forests hold promise for helping to slow climate change (Anderegg et al. 2020) but in order to stop emissions from forests and restore fire to the western landscape, regional and forest type) carbon-dense Pacific Northwest vs low-carbon Southwest, for instance) differences need to be accounted for. For example, researchers recommend preserving the old growth forests of the northwest away from the WUI while engaging in thinning small-diameter trees and burning undergrowth in drier forests closer to the WUI. The best strategy for preserving the carbon-absorbing properties of trees is to scale back logging, lengthen harvest rotations, reforest with a mix of adapted species (Bartowitz et al. 2022). Additionally, with regard to the wood products industry, long term wood products, reduction of logging and mill waste and regenerative forestry projects can enhance carbon storage of forests (Bartowitz et al. 2022).

Nationalize Utilities

We must begin with a shift from private ownership to publicly owned electricity companies through nationalization. Electric utilities and other energy suppliers are generally considered natural monopolies, as the siting of the infrastructure and the delivery of the service usually precludes competition enabling a company like PG&E to extort rent (or rates), extract subsidies, create disasters, and buy its way out of penalties because there is no alternative service. Many electric companies already have some aspect of public ownership by a government; they should be completely de-linked from capital. Additionally, after affirming public ownership, the electricity sector must undergo a shift in mission and be made to serve the public – that is they must be demarketized.

In the example of PG&E, we saw that commodification and the need to keep expanding and turn a profit has led to disasters that the company foresaw and did nothing to alleviate and preferred to take out extra insurance to protect itself from lawsuits to protect its profits. Between 2017 and the time of this writing the energy monopoly was responsible for starting 30 wildfires, killing 100 people, and destroying 23,000 structures.¹⁰³ Additionally, it shielded itself from liability by hiring out the line maintenance that started devastating wildfires and managed to avoid collapse by raising rates (McGee and Greiner 2020). Democratizing utilities by making them public, along with strict provisions for long-term planning and assurance that excess savings should go to maintain infrastructure, would benefit poor and rural communities with lower rates, more control over shutoffs during fire season, and fewer ignitions. This is not a very radical idea. An example of this model is the Tennessee Valley Authority, which is wholly-owned by the federal government.¹⁰⁴

¹⁰³ <https://www.nbcnews.com/news/us-news/pge-face-manslaughter-trial-deadly-california-fire-rcna68753#>

¹⁰⁴ I am aware that the TVA caused considerable disruption environmentally with the endangerment of the snail darter and also socially with the relocation of people. My argument here centers on control of existing infrastructure in order to avoid the mistakes of the TVA.

Nationalize Insurance

PG&E had access insurance and reinsurance to insulate itself from lawsuits for murder, fraud, and other crimes associated with the neglect of its infrastructure which caused loss of lives and property while average people are either defaulting or can no longer afford property insurance. At present the federal government provides insurance to owners, renters, and businesses that cannot get commercial insurance through the National Flood Insurance Program (NFIP). Rather than selling insurance to those who cannot really afford it, the government should make insurance free for all disasters.

According to the National Oceanic and Atmospheric Administration data showing that to date there have been 24 confirmed weather/climate-related disasters with costs exceeding \$1bn each.¹⁰⁵ Nationalizing insurance with guaranteed funding will spread out risk and Nationalizing not just insurance but the companies themselves will disengage them from the capitalist market and transition their workforces in local areas to perform the same jobs accountable to local residents and state governments. There is already an example of this in California where there is a clear need to help people recover from destructive wildfires, and where also people are not renewing their policies. In order to do this, the federal government would allocate roughly 5% of GDP yearly to cover damage from natural disasters.

Universal Coverage of Firewise

Despite all the Generally, when fire managers approach the topic of wildfire mitigation, preparedness, and resilience, they treat the local people as “stakeholders” and call for coordination among agencies. A lot of so-called coordination relies on experts employed to perform the tasks needed to deal with wildfire without considering or asking people in those communities what skills they possess that to

¹⁰⁵ <https://www.ncei.noaa.gov/access/billions/>

achieve that goal and providing them sufficient funding and technical assistance to do so. Some fire managers have advocated for holding federal grant money back from communities compensated for the nontaxable federal lands they occupy, called “payment in lieu of taxes” if they don’t perform comprehensive wildfire planning and forcing local communities to pay for wildfire protection.

Punishing rural counties by consigning them to deeper poverty is the type of bankrupt logic that caused the wildfire paradox in the first place. In rural areas the loss of extractive industry jobs such as mining and timber, and the combination of rising housing prices and stagnant wages, has seen rising small town populations and caused rural residents to become dependent on the service industry and carceral facilities. Rural areas are also often afflicted by lopsided economics with more wealthy people moving to rural areas for the scenery and to take advantage of cheap land prices while earlier residents living in older housing struggle to recover from the loss of jobs and services that have been withdrawn because of shrinking available monies.

One of the reforms put forward by liberal fire managers and supported by social scientist with scores of studies aimed at deciphering cultural antipathy toward hardening their homes against wildfire is enrollment of homeowners in the Firewise program. Firewise assists individuals and Community Wildfire Protection Planning organizations to mitigate wildfire risks. It functions in conjunction with the National Cohesive Wildland Fire Management Strategy (NCWFMS), a plan to mitigate wildfire risk and damage. Firewise is already in place but is administered unjustly in a top-down manner whereby communities and individuals have to apply for grants to carry out wildfire mitigation.

A truly just approach to “fire adapted” communities would be to review the objectives of the NCWFMS and find out what people in the community can do to achieve them from the bottom up with substantial help from state and federal government. The cost of mitigating risks around existing homes is not prohibitive and local people can be trained, paid a living wage, and provided with the tools to perform assessments of homes in rural communities and on reservations. This type of work could extend not only to mitigating wildfire risk but also making homes more comfortable, energy efficient and accessible.

Social Use Not Capitalist Ownership of Nature

In the spirit of the Weeks Act, with significant modifications, all forest and grasslands held by private timber companies must be nationalized and actively managed using prescribed fire and thinning methods that promote ecosystem health, carbon absorption, and community well-being and safety. A common fixture of capitalist accumulation is the transformation of formerly abandoned areas of industrial extraction and even burned over communities to build new, expensive developments. The major cause of devastating wildfires that take lives and destroys homes occurs on private property (Downing et al. 2022). Our infrastructures such as powerlines, cars, homes, and our activities that use combustibles and machinery are problematic in landscapes starved of fire.

Wildfire Growth Boundary

The wildland urban interface is a contested designation and may become obsolete in the face of wind-dominated wildfires like the Marshall and Camp fires (Keeley and Syphard 2019; Abatzoglou et al. 2021), because fuels are drier and winds are more unpredictable because of climate change. So, what do we do to protect people? We need to eliminate suicide subdivisions and stop building into areas prone to burning. A commonly-discussed solution in the wildland firefighter community has been the complete elimination of encroachment into the WUI.

As I discussed in my chapter of FIRE, between 1990 and 2010, 43% of new housing was built in areas prone to burn because of housing prices and land speculation by companies like Kaufman and Broad (Radeloff et al. 2017). An average of 3,000 structures per year were destroyed in wildfires between 2002 and 2016, and more than 60,000 communities are at risk for fires originating in the WUI. Yet, according to the U.S. Fire Administration, encroachment into the WUI continues at a rate of 2 million acres per year.¹⁰⁶

¹⁰⁶ <https://www.usfa.fema.gov/wui/what-is-the-wui.html>

At present we have, in some states, urban growth boundaries (UGBs) that separate human development from greenspaces and agricultural lands and limit the spread of cities and towns encouraging building density rather than sprawl. UGBs are important because they protect watersheds, forests, and other areas from encroachment from buildings and infrastructure and they *can* contribute to human health, employment stability and satisfaction, and decent neighborhoods. Additionally, the Flood Disaster Protection Act of 1973 prohibits federal government loans and construction in areas affected by flood. This legislation could be amended to make it for wildfire making it illegal to site any new development in the WUI. A federal wildfire growth boundary (WGB) would do essentially the same thing but it would stop development in the WUI with denial of loans, permits, or any type of planning that would extend into the WUI.

While UGBs are usually negotiated on a 20 to 30-year basis, the WGB would permanent and be evaluated every 1-2 years only for the purpose of evaluating wildfire risk and making necessary thinning and other changes such as prescribed burning. Research has shown that housing arrangement and location were the most important factors in property loss and that land use patterns that favor habitation in the WUI contribute to loss. They found that places where houses were more likely to burn in the WUI were also in areas that fires were more likely to start. While there are cases of cities burning in wildfires that originated from outside their boundaries, most losses occur in areas with low density. This is because scattered housing is difficult access and defend. While that may seem to contradict my earlier claims, researchers argue that “housing clusters with fewer roads” like the Caldor and Camp fires as well as high density housing that “contributes to structure-to-structure fire spread” is also a problem, like in the case of the Marshall fires (Syphard et al. 2018). Permanent federal legislation and funding as well as a “wildfire czar” need to be established to implement this program. Unlike simple planning department designs, local WGB bodies will be composed of elected and fully funded residents and in consultation with state fire ecologists and local tribes.

Land Back

Setting aside forests and grasslands under federal conservation was pursued by displacing, killing, and confining Native people, private companies such as timber and mining corporations used federal laws to gain access to millions of acres forests. In response to massive fires and the Progressive drive to direct capitalist accumulation, the Weeks Act of 1911 nationalized nearly millions of acres of land, placing them under the jurisdiction of the Forest Service. Following years of land-fraud and outright theft, one of the stated goals of the Weeks Act was to protect against wildfire and support rural communities.

Yet, past nationalization of forests and grasslands dispossessed Indigenous communities of their lands, and legislation against intentional burning criminalized Indigenous fire management. So, it is understandable that many tribes, in the face of intransigence from the federal government, have turned to monopoly finance capital in order to ensure economic security for their communities. Projects advanced by companies like Microsoft, British Petroleum, and Green Diamond Resource Company, and PG&E as opportunities for tribes to buy back land and engage in traditional activities such as cultural burning strengthen corporate profitability and widen the metabolic rift. This is so because small local changes cannot counteract the worldwide harm of global capital. Additionally, within the capitalist framework of private property agreements such as carbon offsets, tribes are required to sign a limited waiver of sovereign immunity, opening them up to potentially devastating legal challenges. Giant monopolies engage in financial transactions and increased production that enable environmental degradation far from their bases of operation. However, through transactions, Green Diamond Resource Company, Weyerhaeuser, Sierra Pacific and other timber companies are able to green and redwash their activities by entering the carbon market, financializing their risks, issuing statements of engagement and offering grants to tribes rather than giving back the land they stole with the help of the federal government.

Safeguarding and extending treaty-protected collective Native land tenure of homelands is important, because cultural attachment and use of the land satisfies community obligations and ensures that tribes have a say over how to use their lands. The U.S. Supreme Court has set precedent for claims

by tribes to obtain their stolen land. The same process can be used to redistribute newly nationalized land stolen by the state and corporate entities. Beyond that, the U.S. and state constitutions must be amended to not only recognize but guarantee Indigenous land tenure by adopting language and protections similar to Article 119 of Venezuela's Constitution which agrees to "to demarcate and guarantee the right to collective ownership" of Indigenous land ensuring that it is "inalienable, not subject to the law of limitations or distraint, and nontransferable (University of Minnesota 2023)."

Rational Regulation of Social Metabolism with Nature

Despite the many flaws of utilitarian conservation during the Progressive era, the stated commitment of the USFS to providing for public lands for the greatest good is an important goal, one that must be completely delinked from profit. USFS forester Raphael Zon and promoter of forest research stations elaborated on the motto by stating "the conservation of natural resources did not mean merely their physical protection, but their relationship to the welfare of all the people depending upon them (qtd in Jameson 2017, 32)"

Obviously, local communities in the U.S. are not as dependent on forest resources as they once were. Eliminating fuel loads, engaging in prescribed burning, and producing locally made wood and fiber products will entail thousands of dedicated and trained people. However, many towns in wildfire corridors were the sites of extractive timber company land and operations, so training local communities to run small mills and other forest-related activities including using prescribed burning is entirely workable. The federal government would be responsible for purchasing and distributing forest products to guard against profit-seeking activities and no third parties such as the Nature Conservancy or other NGOs would be permitted to operate in newly nationalized forests. Additionally, the federal government will set a minimum salary for work on all forests and grasslands for woods-workers as well as firefighters with free full health benefits, guaranteed vacation time, and upgrades to rural housing.

Decriminalization of Prescribed and Cultural Burns

The USFS and state governments, etc. initially prevented cultural burning through theft of land, criminalization, and aggressive fire suppression and so it is right to criticize them as the original perpetrators of the wildfire paradox, as these policies have enabled a massive fuel buildup. The Forest Service has previously employed social scientists for the purpose of ensuring conformity in their employees and treating the public as scientifically illiterate, as we saw with the case of John P. Shea (1939, 1940) who pigeonholed rural people who set fires. By purporting to remain objective while at the same time adhering to economic orthodoxy, fire science has shown a failure recognize important and culturally-specific fire practices (Vinyeta 2021). Additionally, there is a reciprocal relationship between fire scientists and corporate entities, and the military significantly accelerated the use of aerial bombardment with chemicals that continues today. In these cases, social and natural scientists and policymakers position themselves as translators to the powerful seeking pliability and compliance.

However, a new movement to clear the way for returning fire to pyrophilic landscapes has begun to take shape such as Senate Bill 332 in California recently introduced that added legal protections Indigenous people and non-Indigenous U.S. citizens that burn landscapes to mitigate wildfire risks. In order to be held accountable for the firefighting costs of an out-of-control fire, there must be evidence of gross negligence. This important framework removes the possibility of burdensome legal problems for groups pursuing cultural burns or other prescribed fires that have the potential to lessen fire danger. Decriminalizing burning also means that adequate firefighter support can be available and mobilized in the event burns don't go as planned for swift suppression.

Citizen Fire Science

It is not enough for fire science to be “decolonized” – it must also be *socialized* involving multiple strands of knowledge derived from material and spiritual practices, rediscovery, and discovery.

A good start would be revamping the orientation of the Forest Service to act, not as a guardian, but as a facilitator of conversations and concerns regarding fire as an integral component of forest and community health. It could act as a supporter of knowledge-sharing, trainings, building upgrades, library programs and school curricula, and a conduit of federal funding. There are numerous networks and organizations already established in frontline communities that could have guaranteed funding to develop community wildfire protection plans and carry out “citizen science” at every level of the community with guaranteed funding, training, and opportunities for teaching others. There are already projects in existence, for instance the Environmental Protection Agency’s Smoke Sense that puts monitoring equipment in the hands of local people and provides real-time air quality information.

This transition would entail asking communities what they need and what organizations are already in place to fulfill those needs by fully and permanently funding organizations to enable local people to educate and train themselves for productive and conservative use of forest products. companionship, involvement, and care of older residents, and wildfire mitigation. As a repository for much of the information on wildfire and forest health through its extensive database, *Treearch*,¹⁰⁷ as well as other scientific work, the USFS could also engage with citizen science programs in communities.

Fire ecologists and managers should tap into community networks and provide training and resources to enable people to gain knowledge and experience. With such a program, communities could identify members who have the knowledge to train others in these types of activities. An example of just one simple citizen science project would be teaching people how to “spin the weather,” for relative humidity, temperature, and wind direction and speed by hand and to provide automated wifi-connected weather information which helps to assess fuel conditions so that community burning projects are safe and firefighters can assist in the case of slop-overs, etc.

¹⁰⁷ <https://www.fs.usda.gov/research/treearch>

Welcoming Fire as a Relative Not a Servant

Marx argued that humans fully realize themselves through their rational metabolic interaction with nature. A radical and just approach comes from Native foresters and natural and social scientists who propose returning Indigenous fire to the land and revitalizing Indigenous cultural values and material practices such as cultural burning of the land. Fire's transformation from valued relative who enriches and enlightens humanity to feared enemy that must be fought is a clear example of the metabolic rift. Additionally, the call by 20th century light burning advocates for enlisting fire as a servant of capitalist extraction before it could become a commodity-destroying master advanced the cynical logic of capital.

Bourgeois science is preoccupied with the generation of statistical models, categorization, and other measures in order to prescribe actions. It is important to shift the focus from acreage burned to impacts. Western landscapes are pyrophilic and therefore need fire to remain healthy. Wildfire science has perfected these types of assessments. Thus, fire managers have called for comprehensive fire mapping and reporting to the federal government in order to keep track of where wildfires could occur, prioritize structure safety, ensure quick and effective access by firefighters, and to develop safety zones and evacuation paths for residents. There is no reason to dispense with wildfire science, because it is limited.

However, for many Indigenous peoples who use fire in everyday life, being on and burning the land is part of a process of rebuilding and renewing Indigenous social structures disrupted by fragmentation, criminalization, and dispossession. Many Indigenous groups across the world and in the western U.S. have used fire to preserve ecosystems, fulfill spiritual obligations and maintain economies and traditions and still possess some of that knowledge. In the current context the use of Indigenous fire is also important to tribes to protect homelands from wildfires that threaten property and valuable ecocultural resources. Research shows the fuel treatments that mimic Native fire regimes, or are actual cultural burns, reduce the likelihood of unpredictable late season catastrophic wildfires (Ericksen and Hankins 2014; Wynecoop et al. 2019; Morishima and Mason 2017; Long, Lake, and Goode 2021). With respect to the privacy of traditional knowledge of family groups and tribes, non-Indigenous fire scientists

and Indigenous fire practitioners can strategize the best ways to use fire that reduces hazardous fuel loads in accordance with both tribal and non-tribal community and cultural values (Lake 2021; Lake et al. 2017)

As Washoe Tribal Council member and wildland firefighter Helen Fillmore observes, “Fire without any other tending or gathering or hunting won’t solve the health crisis of our overgrown forests. But ensuring that Indigenous people have proper access is a huge first step in beginning the process of mending the broken pieces of our ecosystems.” Fillmore’s work on the Mayala Wata restoration project to rehabilitate the 8-square mile Meeks Meadow, a small part of her tribe’s territory, reintroduces cultural burning in the Sierra Nevada. The project is a cooperative venture with the USFS that could be extended throughout the U.S. West (Botel 2021; USFS Lake Tahoe 2022).

Stealing the Fire Back

As I have shown here there are a number of things that can be done to return fire to western forests, help rural communities mitigate wildfire risks while providing meaningful work and better housing, pursue culturally appropriate and democratically-informed science, and repatriate and restore Indigenous land. These reforms employ the administrative capacities of the state backed by the energy and creativity of rural communities. Development of more just and balanced material relations can only come through our exertion and endurance in the “living political school (Luxemburg 1905, p. 130).”

In the wake of the Camp Fire, Mechoopda member and founder of the Chico Traditional Ecological Stewardship Program (CTESP), Ali Meders-Knight, a TEK teacher, has overseen the planting by volunteers of c’ipa/willow and l’yli/redbud in the watershed near Paradise, California. Through CTESP, Meders-Knight and agro-forester and others work with volunteers on a Mechoopda-administered plot in Chico, California cultivating native plants for restoration work in Butte County including the Camp Fire Restoration Project. Meders-Knight’s experience from weaving baskets inspires her long-term vision of promoting healthy, resilient landscapes tended by a large workforce of knowledgeable local

residents. The collective work of these associated producers would clear brush, set prescribed fires, and cut timber for local production and use not for sale, restoring native species and enhancing water quality. Meders-Knight observes, “Each tribe around here has a fire story, and there’s always a bird or animal that takes the fire back, because fire is power... That’s us. We are helping the community steal the fire back. ... This crisis brought us together.”

The logic and dynamics of capital accumulation foment increasing crises. With climate change, we confront a global crisis that demands bringing the financial center under the control of average people to slow emissions. We can begin to undue the catastrophic ecological conditions that give rise to devastating wildfires by taking steps within the present economic and national system that break with the logic of unending growth at all costs and begin the process of developing a truly environmentally sustainable and socially beneficial metabolic order whereby

the associated producers, govern the human metabolism with nature in a rational way, bringing it¹⁰⁸ under their collective control instead of being dominated by it as a blind power; accomplishing it with the least expenditure of energy and in conditions most worthy and appropriate for their human nature (Marx 1991 [1894], p. 959).

We cannot break the logic and machinery of capital by “play[ing] the schoolmaster (Luxemburg 1905, p. 148)” but through “adroit adaptability to the given situation (p. 148)” recognizing that numerous economic, political, and cultural acts build critical momentum toward a radical reorganization of society. A balanced approach to fire will be anti-capitalist, embrace radical reforms, and reclaim state power (Sweeney 2020). We have a clear choice: descend into fiery ecocide and social barbarism or steal the fire back employing the accumulated knowledge and militant energy of workers and Indigenous peoples to bring about an ecosocialist revolution.

¹⁰⁸ Their metabolism, not nature. Marx advocates breaking free of the capitalist mode of production whose dominance over social relations drives environmentally destructive practices.

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