

MUSHROOMS AND ENVIRONMENTAL JUSTICE:
COMMERCIAL WILD MUSHROOM HARVESTING IN THE
WILLAMETTE NATIONAL FOREST

by

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This research examines the extent to which Willamette National Forest's management of commercial wild mushrooms incorporates environmental justice principles. In Oregon, the edible, wild mushroom industry contributes to a significant portion of the economy, and thousands of commercial harvesters are out picking. Commercial mushroom harvesters are a diverse group of people who live on the fringes of society, are highly mobile, politically weak and largely understudied. The United States Forest Service land makes up the majority of the land that harvesters rely on to pick mushrooms. However, timber activities like clear cuts and logging destroy mushroom patches and the voices of harvesters are largely missing in public planning processes that impact decisions made by the Forest Service. The disenfranchisement of the commercial wild mushroom harvester community relates to themes of environmental justice. Environmental justice looks at the undue burden actions place on marginalized communities, and through this lens we can examine how the Forest Service can more justly and holistically manage United States lands. For my research, I interviewed harvesters and land managers, and reviewed the Willamette National

Forest's natural resource documents for how they manage for wild mushrooms. Themes that emerged include a minimal consideration of the mushrooms and the wild mushroom industry, restricting harvesters' access to the forest, and a predominant focus on managing for timber. All of this suggests an undue burden placed on harvesters because the Willamette National Forest is not managing for mushrooms. I conclude that the Willamette National Forest cannot manage the forest in an environmentally and socially just way if they do not consider the commercial wild mushroom industry and work to involve the harvesters in management decisions.

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Preface

The University of Oregon's Institutional Review Board for Human Subjects approved the Human Subjects Research protocol for this research in August 2017. To protect the identity of the mushroom harvesters because of the potentially sensitive information they shared, I use pseudonyms for all harvesters' names. Similarly, I do not include any specific place-names (cities, businesses, etc.) or photos that could identify harvesters in this study. However, I do use the real names of the land managers and the field experts I interviewed, because the information shared in these interviews was either published, open to the public, or both.

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Acronyms

Federal Policies

EO 12898 – Executive Order 12898

MUSY – Multiple-Use Sustained-Yield Act

NEPA – National Environmental Policy Act

NFMA – National Forest Management Act

National Environmental Policy Act (NEPA) Documents

EIS – Environmental impact statement(s)

EA – Environmental assessment(s)

RoD – Record of Decision(s)

FONSI – Findings of no significant impact(s)

Other

NTFPs – Nontimber forest products

SFPs – Special forest products

Willamette NF – Willamette National Forest

USFS – United States Department of Agriculture Forest Service

BLM – United States Department of the Interior Bureau of Land Management

INTRODUCTION

“Those few who do notice fungi love them with a breathless passion...how many times have foragers told me of the heat of ‘mushroom fever’, which drives them to dodge their other obligations to take up the wild thrill of the chase?”

(Tsing 2010: 192).

In Oregon’s temperate forests this wild chase happens under the boughs of the Douglas-firs, western red cedars and western hemlock as pickers search for another forest—the “mushroom forest.” The trees of this forest might poke above (or rest just below) the emerald moss and forest duff showing off (or hiding) their gills and ridges, caps and rings. Beneath the ground the mushrooms’ mycelium, i.e., fungal roots, come together in webs of threads, telling their stories under the forest floor.

The mycelium’s fruiting bodies, mushrooms, often remain hidden, hard to see and hard to find. Yet, there is a group of people who seek out the prized culinary mushrooms of the forest to sell. This group, commercial wild mushroom pickers, travel to forestlands in the Pacific Northwest and use their intimate knowledge of mushrooms and the forest to harvest. The commercial mushroom industry is one of the largest informal economies in the Pacific Northwest and thousands of harvesters are out picking (McLain and Jones 2001). Despite this, commercial harvesters are at times as elusive as the mushrooms they harvest, and like the mycelium beneath the earth have stories woven in complexity and largely untold. My study tries to unravel some of the harvesters’ stories in Oregon by looking at National Forest management policies and using the Willamette National Forest as a case study.

Significance of this Study

This study uses an environmental justice lens—the focus on the inequitable burdens that racial and ethnic minorities, and impoverished or marginalized communities face—to examine the social, political, cultural and environmental rights that commercial mushroom harvesters have in the management of Oregon’s forests. Environmental justice is a relevant lens to examine commercial mushroom harvesters because commercial harvesters have a high cultural, social and economic stake in the management of these lands as picking mushrooms is a way of life as well as a way to earn money (Jones and Lynch 2002; Arora 1999; Tsing 2015). The people out harvesting include Southeast Asian immigrants, Latinos, Native Americans, and Euroamericans—all part of the commercial mushroom industry which provides economic opportunities for rural and marginalized communities (Jones and Lynch 2002; McLain 2002; Arora 1999; Tsing 2015).

I research how the Willamette National Forest manages for the commercial mushroom industry because how different public land agencies and landowners manage the forests greatly affects the harvesters’ livelihoods. Through Executive Order 12898 (1994) the United States government mandated that federal agencies, like the Forest Service, make environmental justice part of their mission. Along with this, federal policies, e.g., the National Forest Management Act (NFMA), require that the Forest Service manage for forest products like mushrooms. However, to date, there has been little investment in managing these lands for mushrooms (and NTFPs in general), along with little research, inventory or basic monitoring by forest managers (Jones 2002; Jones and Lynch 2007; McLain 2002; Pilz and Molina 2001). The management

practices affecting commercial mushroom harvesters include timber activities like clear cuts and thinning that sometimes result in the loss of commercial harvesters' mushroom patches (Arora 1999; Jones 2002). Moreover, mushroom harvesters face chronic powerlessness in the management of these lands due to inadvertent exclusion from public involvement processes, and their lack of political power (McLain 2002).

The disenfranchisement of the commercial mushroom harvesting community relates to environmental justice themes, and illuminating these issues can help forest managers make educated management decisions to create more inclusive and just public spaces. Thus, for my research on the commercial mushroom industry in Oregon I use a document analysis and the stories of the commercial mushroom harvesters to illuminate not only the mycelial web of relationships that comes forth from examining wild mushrooms and their management, but also the environmental justice implications for how the Willamette National Forest (NF) manages for the commercial mushroom industry.

Study Site

Commercial mushroom harvesters in the Pacific Northwest United States rely on the large amount of suitable mushroom habitat that exists on publicly owned forests, which various federal agencies (e.g., the United States Forest Service, Bureau of Land Management, National Park Service and Fish and Wildlife Service) manage. The majority of suitable mushroom habitat in the Pacific Northwest is found in the forests of Oregon and Washington (Pilz and Molina 2001). In Oregon, the United States Forest Service's land makes up the majority of the land that harvesters pick on (McLain 2002; Pilz and Molina 2001). Therefore, the Willamette NF in Oregon is a highly relevant

case study to examine the Forest Service’s management of the commercial mushroom industry.

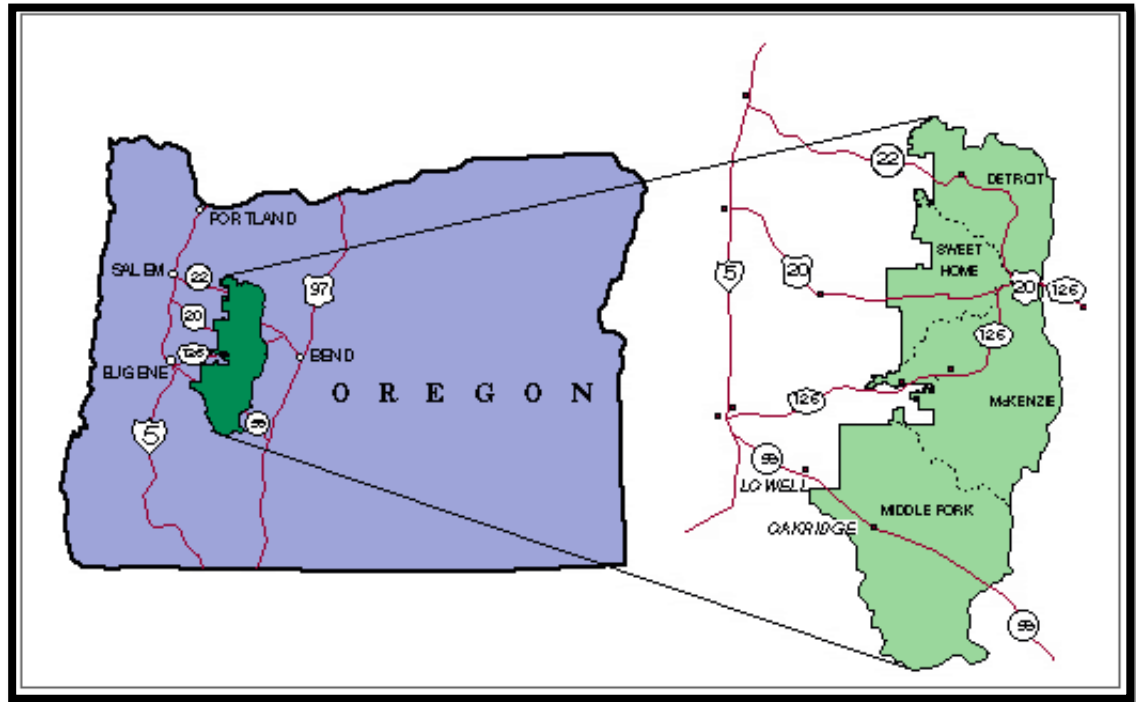


Figure 1: Willamette National Forest, Oregon, United States

Photo taken from Willamette National Forest’s official website,
<https://www.fs.usda.gov/main/willamette/maps-pubs>

Douglas-fir trees and an ever-present promise of rain characterize the Willamette National Forest. Other major tree species blanketing the Willamette NF include cedar, pine, hemlock and several species of fir (Rakestraw 1991: iv). These forested areas, along with the region’s temperature climate and high annual rainfall, makes the Willamette NF an ideal place to foster a wide array of the “fungal flowers” we know as mushrooms. Chanterelle mushrooms are the primary commercially valuable mushroom harvested on the Willamette NF, while morels and matsutake are more commonly picked in the Deschutes National Forest (east of the Cascades).

Carved by glaciers, the landscape of the Willamette NF includes “high mountains, narrow canyons, cascading streams and wooded slopes” and the Willamette, McKenzie and Santiam rivers all pass through (“About the Forest” 2018). The Forest contains over 1.5 million acres nestled along the western slopes of the Cascade Range in Western Oregon (“About the Forest” 2018). It borders Oregon’s Willamette Valley and can be easily accessed from the cities of Albany, Eugene and Salem.

The Willamette NF was originally part of the Cascade Range Forest Reserve, designated in 1893 by the United States government. The Forest Service has managed it since 1905 and it became a National Forest in 1933 (USDA-FS). After World War II, and into the 1970s, the Willamette National Forest was the top timber producer out of the 156 National Forests in the United States (Rakestraw 1991: iv). On the Willamette National Forest’s website, the Forest Service highlights the recreational activities available in the Forest such as hiking, boating, backpacking, and camping. Furthermore, the Forest hosts an array of other activities: timber production, ecological and forestry research (e.g. H.J. Andrews Experimental Forest) and people use the forest to gather forest products such as berries, floral greens, and wild mushrooms.

Thesis Structure Overview

The guiding question for this study is to what extent the Willamette National Forest incorporates principles of environmental justice into their policies and management decisions. For the first section of this paper, I give background on the Willamette National Forest, the commercial mushroom industry, and explain environmental justice as a theoretical framework. Next, I situate this study through reviewing the existing literature and describe my methods— interviews with

commercial harvesters, land managers and field experts as well as a text-analysis of the Willamette NF's natural resource management documents. In the results section, I sort the data from my interviews and from my text-analysis of the Willamette NF's documents into broad themes: harvester culture and management themes from the interviews, and commercial mushroom management themes from the Willamette NF documents. Lastly, I discuss the environmental justice implications of the results by juxtaposing them with the United States environmental justice guidelines. I conclude by reviewing the opportunities the Willamette NF has to improve their environmental justice framework and better incorporate environmental justice into their management of wild mushrooms.

BACKGROUND

Commercial Wild Mushroom Harvesting

Mushroom Ecology

In the Pacific Northwest there are currently a variety of wild mushroom species commercially harvested from forests. The most important of the commercially harvested mushrooms are the American matsutake (*Tricholoma magnivelare*), black morel (*Morchella agusticeps*), yellow morel (*Morchella esculenta*), Pacific golden chanterelle (*Cantharellus formosus*), hedgehog (*Hydnum repandum*), King bolete (*Boletus edulis*), Oregon white truffle (*Tuber oregonense*), and Oregon black truffle (*Leucangia carthusiana*) (Pilz and Molina 2001: 3). Some wild edible mushrooms such as morels are saprophytic: growing on decaying wood and organic matter as they decompose it. Other mushrooms, like the American matsutake, Pacific golden chanterelle, hedgehog, king bolete and truffles are mycorrhizal: living symbiotically with trees (or other vascular plants) exchanging nutrients and water (Pilz and Molina 2001: 2). While people can cultivate saprophytic mushrooms (e.g., oyster and shiitake mushrooms), morels are extremely difficult to cultivate, so people pick them in the wild (Pilz 2007). Similarly, people can only find mycorrhizal mushroom species in the wild, because of their complex relationship with vascular plants in the forest (Pilz 2001; Jones and Buttolph 2012). Therefore, people need to enter and interact with the forest if they wish to harvest and eventually consume these mushrooms.

Rise of Commercial Mushroom Harvesting

The large, commercial mushroom industry of today did not begin to emerge until about thirty years ago, and when it did, like a mushroom, it seemed to appear overnight and out of nowhere. There is little historical evidence of regular consumption of wild edible mushrooms by Native American tribes in the Pacific Northwest although some tribes hunted mushrooms for medicinal uses (Kuhnlein 2009). The widespread subsistence harvesting of wild edible mushrooms probably began with the migration of Euroamerican settler-colonizers into the western United States in the 1860s (Pilz and Molina 2001). About a hundred years later, in the 1980s and 1990s, the Pacific Northwest's commercial wild mushroom economy rapidly expanded due to rising demand for mushrooms in European and Japanese markets (Tsing 2015; McLain 2008).

This expansion of the industry brought other changes to the forestlands in the Pacific Northwest. Mushroom buying camps popped up on Forest Service land with the influx of mushroom pickers hurrying to the woods seeking out the new mushroom markets (Tsing 2015). Additionally, at this time, the timber industry was declining and the Forest Service started limiting access to logging roads and lands (Pilz and Molina 2001; Duncan 2000; VonHagen 1999; McLain 1998; Tsing 2015). The new harvester population in the woods along with the fewer harvesting areas increased competition between harvesters (Eric Jones, personal communication, April 4, 2018). Moreover, the Forest Service's minimal knowledge about the mushroom pickers, and the mushrooms in the forest, led to Forest Service action that increased conflict on the land (e.g., spreading fear of gun-toting harvesters and involving law enforcement agents) (ibid.) Despite these conflicts, the wild mushroom industry continued to grow and, even now,

researchers predict that it will continue to contribute a significant portion of the Pacific Northwest's regional economy (Rebecca McLain, personal communication, 2018).

The Mushroom Industry and other Nontimber Forest Products

Forest mushroom trade at a global scale is worth billions of US dollars annually, and even as early as 1992 economists estimated that the Pacific Northwest wild mushroom industry contributed \$41 million dollars to the region (Schlosser and Blatner 1995). Commercial wild mushrooms fall under the larger umbrella of nontimber forest products (NTFPs), which are products like moss, lichen, berries, boughs, floral greens and mushrooms. The NTFP industry is informal (not monitored by the government) and provides economic opportunities to those with the fewest options, such as recent immigrant groups and economically distressed communities (Duncan 2000; Jones and Lynch 2007; Von Hagen 1999). Mushroom pickers often pick other NTFPs to contribute to their household economies, because pickers usually cannot rely solely on mushrooms for their livelihoods and many pick in addition to other fulltime or part-time jobs (McLain 2005; Jones 2002). Thus, with proper timber and NTFP management practices there is the opportunity to increase the ecological, economic, cultural, and social value of the forest (Duncan 2000; Jones and Lynch 2007; Von Hagen 1999).

Wild Mushroom Pickers

The demographics of the people involved in mushroom picking has changed dramatically over the last century, and researchers like David Arora, Rebecca McLain, Eric Jones, and David Pilz characterize harvesters by their highly diverse backgrounds.

In the 1900s Euroamericans were the predominant pickers in the forests of the Pacific Northwest, but in the 1980s and 1990s a wave of Southeast Asian refugees and Latino immigrants came to the area and began picking (Hansis 2001: 142). Southeast Asians pickers began harvesting in the mid-1980s and Latino pickers first entered the business as reforestation workers and since the mid-1990s have taken a more prominent role in picking (Hansis 2001: 142). A wide range of ages and ethnic groups harvest: Latinos (mostly Mexican, Guatemalan, and Salvadoran), Southeast Asians (mainly Khmer, Lao, and Mien), Euroamericans, and Native Americans (McLain 2002 and 2008). Additionally, many harvesters are immigrants and/or undocumented (McLain 2002 and 2008; Arora 1999).

Despite this variability in demographics, a distinguishing characteristic of commercial mushroom harvesting is the corresponding mobile lifestyle of many harvesters (Arora 1999). To partake in the wild mushroom industry commercial harvesters must commute to local, state or regional forests, and, thus, rely on vehicles to visit their mushroom patches in the forests (McLain 2000; Jones 2002). Additionally, many participate in the ‘mushroom circuit’—a sort of seasonal round ranging from northern California to southern Alaska (Arora 1999). All of this results in an often mobile and transient lifestyle for harvesters as they follow the appearance of mushrooms in the Pacific Northwest’s forests from season to season.

In addition to commercial harvesters often mobile lifestyles, many harvesters share common reasons for picking including autonomy over their jobs and ability to be out in nature. From McLain, Arora and Jones’ research, commercial harvesters expressed a common view that the informal nature of the wild mushroom industry

allows them levels of freedom and independence not always available in other jobs. For example, some commercial harvesters may not have a bank account, and instead follow an independent lifestyle outside of the typical societal norms (Arora 1999; Duncan 1999; Brown 2000). Many commercial harvesters also pick due simply to a love of mushrooms and a love of being in the forest (Arora 1999; Love 1998; Jones 2002; McLain 2000; Pilz 2003; Tsing 2010). Yet, the highly mobile and independent lifestyles of many harvesters also leads to challenges for harvesters, land managers and researchers as pickers can be difficult to track down and, thereby, hard to include in public planning decisions.

Challenges Facing Commercial Harvesters and the Forest Service

Commercial mushroom harvesters rely on the forests of the Pacific Northwest for a significant portion of their livelihoods; yet, they face institutional challenges regarding mushroom harvesting on public lands. One challenge is the Forest Service's minimal management for commercial mushrooms. In addition to this, mushroom harvesters are (inadvertently) left out of public planning processes that affect the management of their forests (Arora 1999; McLain 2002).

The United States Forest Service also faces challenges regarding its capacity to manage its lands for commercial wild mushrooms. For example, the Forest Service lacks funding, administrative capacity and appropriate training to involve the highly mobile and politically weak mushroom harvesters in public planning processes (McLain 2002; Jones and Lynch 2008). Additionally, in comparison to timber harvesting's "straightforward" management through mechanized labor and thorough records and research, a disincentive for managing for commercial mushrooms is the increased levels

of complexity because of the manual labor and competing interests involved (Jones, personal communication, 2017).

Despite these challenges, Jones and Lynch's (2008) study show that opportunities exist for the Forest Service to manage for wild mushrooms (and other nontimber forest products). These opportunities include economic diversification, biological conservation, enhanced forest management and stewardship and increased public involvement in management processes (Jones and Lynch 2008). Thus, addressing these challenges and embracing opportunities for the integration of wild mushroom management can enhance the management of Forest Service lands, and the lives of commercial harvesters.

National Forests, Mushroom Pickers and Environmental Justice

A Foray into the National Forest System: Timber-intensive to Ecosystem Management

The story of the United States and its forestland has centered on cutting down the forests, first simply clearing the forests for other uses and then extracting timber from the forests, and since the 1970s has transitioned again into a more holistic management of the forest. As Euroamerican settler-colonizers expanded their communities into the western United States they displaced the Native Americans who had resided in the area for thousands of years and by 1910 had converted 256 million acres of United States original 1,023 million acres of forested land to mainly agriculture use (Limerick 1987; "U.S. Forest Resource Facts" 2014). Gifford Pinchot, the first chief forester in the United States, described this clearing of the United States forestland as "the greatest, swiftest, the most efficient, the most appalling wave of forest destruction

in human history” (Limerick 1987: 295). In response to the destruction of the forestland in the United States, the United States Congress, in 1891, authorized the President to set aside federal land in the western United States for forest reserves—later to become the United States’ national forest system. The government designated this land to be in public ownership and to be managed for the public’s interest (Hurt 1994: xvii).

Even in its earliest stages the United State’s National Forest System has had a mission to manage the forests for timber production. For example, the Organic Act of 1897 appropriated funds for National Forests and mandated management goals that included “securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States” (Organic Act, 1897). When the National Forest Service was officially founded in 1905, the agency established a mission to sustain healthy, diverse and productive forests and grasslands for present and future generations—productive forests alluding to timber production (Hirt 1994). Starting after World War II, timber on Oregon’s national forests was a major forest product (Hirt 1994; Pilz and Molina 2001). Yet, increased conservation and environmental concerns from the 1970s onwards led to substantial declines in timber harvest from Forest Service (and other federal) lands (Pilz and Molina 2001).

Although timber production has, and to some extent still does, dominate National Forest System policy, in 1993 the Forest Service adopted an ecosystem management approach. The switch to an ecosystem management approach by the Forest Service stemmed from increasing concerns in the 1950s, 1960s and 1970s about ecosystem functions, especially the diminishing habitat of species such as the northern

spotted owl (Castellano 1999). Ecosystem management has a goal to manage the long-term integrity of whole ecosystems taking into account economic, cultural, ecological and social factors as well as involvement of the public in decision-making processes (Pilz and Molina 2001). However, there is room for the Forest Service to more fully embrace these tenets as commercial mushroom and other NTFP harvesters have still commonly been excluded from public participation processes and Oregon's national forests are still managed chiefly for timber (Jones 2002; McLain 2002; Pilz and Molina 2001; Duncan 2000; Von Hagen 1999).

Nontimber Forest Products and the National Forests

The United States Forest Service's central focus on managing its public forestland for timber has led to an absence of consideration of other forest products such as mushrooms, berries, floral greens and mosses, and the economic, ecological and cultural services they can provide. The Forest Service literature uses the term special forest products (SFPs) for nontimber forest products (NTFPs). And although the Forest Service mainly manages for timber, they do have a mandate from various federal statutes to include SFPs in their forest planning documents and involve the public in decision-making processes. These mandates come from the 1897 Organic Act, 1960 Multiple-Use Sustained-Yield Act (MUSY); 1970 National Environmental Policy Act (NEPA), and 1976 National Forest Management Act (NFMA) (Antypas 2002: 357).

Wild mushroom harvesters have the right to access mushrooms on Forest Service land and contribute to the management of the Forests through these above acts. Both the Organic Act and MUSY have mandates regarding the public's ability to access nontimber forest products and have the Forest Service manage for these products

(Antypas 2002; 357). NEPA and NFMA build upon these earlier mandates of managing for multiple resources and also require the public to be involved in the Forest Service's decision-making processes (Antypas 2002; 357). Additionally, NEPA requires that government agencies conduct environmental assessments (EA) and environmental impact statements (EIS) to give proper consideration to the environment and potential affected communities before taking any action that might affect the environment (Antypas 2002: 357). Although required to manage for NTFPs, McLain and Jones' 2005 research found that in Region 6 (Oregon and Washington) of the United States' National Forest system, three quarters of reporting forests included NTFPs in forest plans and environmental assessments but less than thirty-five percent in environmental impact statements—which would be the documents most likely to address the impacts of management practices on NTFPs. Moreover, inclusion of NTFPs in these documents was found to be minor or oblique (McLain 2005).

Environmental Justice and the Forest Service

A few federal policies promote federal agencies incorporation of environmental justice. Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority and Low-Income Populations”, mandates that federal agencies, including the Forest Service, make environmental justice part of their mission. The Executive Order directed federal agencies “to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations” while also providing these communities access to public information and public participation (Executive Order 12898, 1994). After this executive order, the National Environmental Policy Act (NEPA), signed into law by

President Nixon in 1970, created a complementary document that required federal agencies to consider environmental justice in their mitigation measures and actions (Environmental Protection Agency, n.d.). This is important because NEPA requires federal agencies to conduct environmental assessments (EA) and environmental impact statements (EIS), before taking any action. In summary, through these procedural documents the Forest Service must consider environmental justice.

Human Rights and Commercial Wild Mushroom Harvesters

Environmental justice frames the ecological, economic, social and political rights that harvesters have, which mirror human rights issues laid out by the United Nations Human Rights Council. The Council defines human rights as inherent to all beings, and asserts states' obligation to respect, protect and fulfill human rights (United Nations Human Rights Council, n.d.). Connecting commercial mushroom harvesters' rights to international human rights situates their rights into a larger, global framework, and adds another layer in which to understand their stories.

One of the core international human rights instruments that relates to the rights of commercial harvesters is the International Covenant on Economic, Social and Cultural Rights. This covenant affirms the right of everyone to enjoy just and favorable work conditions, to partake in cultural life and to participate equally in political and public affairs (United Nations Human Rights Council, n.d.). The Council highlights the right to equal participation in political and public affairs, because of this right's key role in empowering people and eliminating marginalization and discrimination (United Nations Human Rights Council, n.d.).

Two other international human rights issues that are particularly relevant to commercial mushroom harvesters are the right to food and the right to land. Regarding the right to food, everyone has a right to regular, permanent and unrestricted access to food corresponding to the cultural traditions of the people to which the consumer belongs (United Nations Human Rights Council, n.d.). Commercial mushroom picking for harvesters ties into their food security as it provides sustenance and an economic means to obtain food. Most importantly though, is the cultural food security this activity provides as the picking of mushrooms is inextricably linked to harvesters' cultural and social structures (Tsing 2015; Jones 2002; McLain 2000). To sustain this way of life, harvesters rely on forestland managed by the state. The United Nations Human Rights Council recognizes land as a source of livelihood for many people and its centrality to economic rights and connection to people's identities (United Nations Human Rights Council, n.d.). Therefore, although mushroom harvesters do not own the land on which they pick, the management of this land is mandated to be for the public's interest, which must include those who derive a (partial) livelihood from it.

THEORETICAL FRAMEWORK

The Environmental Justice Movement

Overview of the Movement

I use an environmental justice framework to guide my study. The current environmental justice movement in the United States is a fast growing social movement and started in the 1960s as a response to the resource exploitation of modern, industrial capitalism (Nixon 2013; Carter 2016; Tesh and Williams 1996). It opened up the field of justice to include people's responsibility to nature, and began to link environmental harm to community harm (Tesh and Williams 1996; Capek 1993; Peña 2003). As a movement, environmental justice originally, and even today, focuses primarily on the "unequal burden of industrial waste, pollutants and inadequate housing conditions in urban environments for people of color and people living in poverty" (Pulido 2016: 1; Pellow 2005; Faber 2008). Scholars have also drawn connections between the environmental justice movement and a variety of other movements including civil rights, indigenous people and community-based movements for social and economic justice (Pellow 2005; Nixon 2013; Peña 1992).

In 1991 the First National People of Color Summit was held in Washington D.C. This "watershed event" for the environmental justice movement produced a document outlining seventeen principles of environmental justice (See Appendix A: First National People of Color Summit Principles of Environmental Justice) (Peña 2003). After this summit, a central achievement from a policy perspective for the environmental justice movement was the Executive Order 12898 of 1994 issued by President Clinton (Pulido

2016). The EO directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, and also to provide these communities access to public information and public participation (“Summary of EO 12898”, n.d.). In response to the EO 12898, the White House Council on Environmental Quality issued an environmental justice guidance document for federal agencies to adhere to when following the NEPA procedure (See Appendix B: Environmental Justice Guidance under the National Environmental Policy Act). Reminder: this is relevant to the Forest Service because they have to follow the NEPA procedure, conducting environmental assessments, before they take any federal action.

However, environmental justice scholars have critiqued the success of the movement despite these steps forward (Pulido 2016; Pellow 2005; Carter 2016; Peña 2003). Critics argue that the United States government’s adoption of environmental justice focuses on environmental equity (e.g. equitable distribution of harm), and falls short of embracing the principles of environmental justice of the 1991 Summit (e.g. cessation of environmental harm) (Peña 2003; Energy Justice Network, n.d.). Another critique comes from Pulido’s (2016) work, which states that the environmental justice movement has been ineffective, to an extent, due to its reliance on the state. Pulido then calls for a radicalization of the environmental justice movement that should see the state as an adversary and ought to directly challenge it (Pulido 2016). This radicalization is in part what this research tries to embody—challenging the United States National Forest System’s implementation and definition of environmental justice.

The Environmental Justice Movement and Natural Resource Management

For my study, I examine environmental justice in the natural resource management field. Environmental justice scholars Pulido (1996) and Peña (1992, 2003) expanded the field of environmental justice to include inequalities and conflicts over the management of natural resources (and not only disproportionate exposure to risks and harms). In recent years McLain and McDonald have also added to the literature connecting environmental justice to the political rights of NTFP harvesters in natural resource management decisions (McLain and McDonald 2000; McLain 2002). As McLain (2002) explains, not all harvesters are people of color or poor, but, a commonality for commercial mushroom harvesters is their “position of chronic powerlessness” in Forest Service planning processes (McLain 2002: 376). Thus, using political rights as an avenue into environmental justice promotes harvesters’ meaningful participation in decisions that affect both their environment and livelihoods.

Environmental Justice Principles

In my analysis of my interviews with harvesters and how the Willamette National Forest incorporates environmental justice within their planning and procedural documents, I use the environmental justice directions and principles laid out by Executive Order 12898 and the NEPA document. Executive Order 12898 directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, and also provide these communities access to public information and public participation (Executive Order 12898, 1994). Two of the themes in this direction are relevant to commercial mushroom harvesters:

- 1) Addressing the environmental affects of federal action on minority and low-income populations, and
- 2) Providing these communities access to public information and public participation.

NEPA's environmental justice document includes three principles relevant to managing the forest for commercial mushroom harvesters:

- 1) Recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action;
- 2) Develop effective public participation strategies; and
- 3) Assure meaningful community representation in the process, beginning at the earliest possible time ("Environmental Justice and NEPA", n.d.)

Additionally, I use six of the environmental justice principles from the First National People of Color Environmental Leadership Summit to add another layer of analysis to these results and provide direction for how the Forest Service might improve their understanding and implementation of environmental justice. This is because these principles represent a more transformative approach regarding justice issues, calling for an abolishment of harm, versus the United States government model of environmental equity, calling simply for "fair treatment and meaningful involvement" (Energy Justice Network, n.d.).

I've chosen six of the First National People of Color Summit principles, because they directly relate to the environmental justice concerns of commercial wild mushroom harvesters:

- 1) Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction;

- 2) Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias;
- 3) Environmental Justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things;
- 4) Environmental Justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples;
- 5) Environmental Justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation;
- 6) Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and provide fair access for all to the full range of resources (United Church of Christ, 1992).

LITERATURE REVIEW

“Through the eyes of a fungus we may tune our sense of the world’s relations differently” (Choy 2009: 384)

The goals of this literature review are to categorize the previous literature on the Pacific Northwest’s commercial mushrooms industry, examine the gaps in the literature and situate this study’s place in the scholarship. For this literature review, I focus on studies from Oregon and Washington about the commercial mushroom industry and include a few critical studies from the larger scholarship on NTFPs to provide additional background and context. The wide geographic range of studies I use from the Pacific Northwest illuminate the different experiences of harvesters and ways that the National Forest System manages for mushrooms. These topics and themes directly relate and are a lens to view commercial mushroom harvesting on the Willamette NF, although most do not explicitly include the Willamette NF.

I’ve placed the literature into larger categories (ecology, economic, social, etc.) although I recognize some of the scholarship’s ideas and themes overlap across these categories. As I review the literature I pull out themes relevant to environmental justice such as power struggles, relationships with nature and the involvement of stakeholders in public land agencies’ decision-making processes. The majority of material I reviewed came from academic journals, dissertations and books.

The Pacific Northwest's Commercial Mushroom Industry

Ecology Lens

One way the literature has examined commercial wild mushroom harvesting in the Pacific Northwest is through studies on mushroom ecology and biology. Studies conducted in the Pacific Northwest, since the late 1990s, surveyed and examined the biological productivity of some of the region's commercial mushrooms (Norvell 1995; Liegel 1998; Luoma 2006; Pilz 2001; Pilz 2003; Trappe 2004; Bergemann 2000; Greene 2010). Additionally, in 1999 the Pacific Northwest Research Station came out with a handbook for the fungal species in the Pacific Northwest to help facilitate the Forest Service's compilation of various fungi's ecology and distribution (Castellano 1999). Despite the work completed by researchers and the Forest Service, mushroom ecology is still largely unknown and there is a need for long-term studies (Pilz and Molina 2001; Pilz 2003). A better understanding of mushroom ecology would help land managers manage for mushrooms, and, potentially, timber as well.

The sustainability of harvesting commercial mushrooms was a topic that drew different conclusions from different researchers. Many reports about concerns for overharvest were based on perceptions of other stakeholders (i.e. amateur harvesters) who believed the influx of commercial harvesters into the woods was unsustainable for mushrooms' productivity (Molina 1993; McLain 1998). Molina's 1993 Forest Service report on the biology, ecology, and social aspects of commercial mushroom harvesting cited the destruction of the forest due to overharvest based on widespread perceptions held by stakeholders, but not from any research or scientific studies. Additionally, Norvell (1995) and Money (2005), both wrote articles expressing concern that the

commercial harvest of mushrooms was compromising mushroom productivity. And Luoma's 2006 study proposed that harvesting did not hinder future mushrooms as long as harvesters picked carefully and did not substantially disturb an area by raking. Raking an area refers to some harvesters use of rakes to try and remove forest duff to reveal the mushrooms (primarily matsutake mushrooms) underneath.

In 1998 Love, et. al., conducted a study propelled by these concerns about overharvesting chanterelles, and concluded that these perceptions were largely overblown and more studies were needed. In various case studies on wild mushroom productivity and harvesting practices following Love, et. al's, (1998) research, commercial picking was shown to not have any negative consequences on mushrooms subsequent productivity (Pilz 2003; Luoma 2006; Hansis 2001; Jones & Buttolph 2012). For example, an article by Jones & Buttolph (2012) states that there is no scientific evidence to show that you can overharvest mushrooms and they cite a 10 year study by the Oregon Mycological Society. Despite inconclusive evidence of mushroom harvesting's ecological risks and the growing body of literature arguing against the negative consequences of picking, the Forest Service continues to exclude commercial mushroom pickers from national forests in the Pacific Northwest over fears of overharvesting (McLain 2002). The lack of a consensus on the effects of mushroom harvesting shows how pertinent researching mushroom ecology and biology is; when land managers understand the ecology of the forest they can better manage for mushrooms and for biodiversity.

Economic Lens

The literature on the wild mushroom industry and value in the Pacific Northwest is scarce and outdated (Schlosser and Blatner 1995; Alexander, Pilz, et. al., 2002; Alexander 2010). Schlosser and Blatner's (1995) study on the size of the region's industry are the most current estimates. Even fifteen years later economic valuation methods are in their infancy and metrics for wild mushroom harvesting are hard to obtain (Alexander 2010).

Regarding the assessment of the value of wild mushrooms, a few studies in different Pacific Northwest forests examine the potential economic value of managing mushrooms and timber simultaneously (1999 Pilz; Duncan 2000; USDA 2001; Alexander, Pilz, et. al., 2002; Pilz 2006). The studies highlighted the opportunity for the increased economic value of co-managing for timber and mushrooms. They also cited the difficulties of assessing the values of timber and mushrooms co-management, because mushroom productivity and markets are variable while timber metrics are more straightforward and easy to obtain.

However, one recent addition to scholarship on the mushroom industry is Tsing's ethnographic research on the commodity chain of the matsutake mushroom—from the forests of Oregon and Canada to markets in Japan and China. Tsing's research looks at how the matsutake mushroom thrives in forests destroyed by activities (i.e., logging) and the larger implications of this for people finding opportunities in this “capitalist ruination”.

The commercial, wild mushroom industry provides important economic opportunities to people with low incomes and rural communities (Alexander, Pilz, et. al.,

2002; McLain 2005). Timber industry economic metrics are well-documented, yet, the wild mushroom industry is not. However, as the timber industry continues to decline, wild mushrooms are an alternative to enhance not only the forest's economic value, but also biodiversity (Jones and Lynch 2007).

Social and Cultural Lens

The diversity and variability of mushrooms and their markets reflect the literature's data on the people and culture of wild mushroom harvesting in the Pacific Northwest. McLain, Jones, and Tsing all conduct ethnographic research incorporated under larger frameworks such as political ecology or an economic lens. Other people-centric research includes Arora (1999), Love (1998) and Hansis's (2001) studies on the demographics of Pacific Northwest's commercial harvesters. These studies depict the high ethnic variability as well as the evolving demographic trends of the pickers. However, harvesters' ethnic variability is still largely underresearched (Jones 2002).

Inextricably tied to the people who are harvesting is the way that they are harvesting. In Liegel, Jones, McLain and Love's research the stewardship practices—promotion of mushroom productivity and sustainability—of harvesters is a central theme. Jones' (2002) research shows how land managers' increased regulations, e.g., restricting access to picking areas in some cases, undermines the stewardship practices of harvesters by cutting them off from their traditional harvesting grounds. And, Tsing's (2010) ethnographic work illuminates the ways that harvesters' connections with mushrooms promotes the preservation of forest areas.

A love of mushrooms, and other key cultural values, also came up in the work of the above researchers: respect for nature, independence, and inclination to stay on the

fringe of society. Additionally, some of the norms of picker culture include: keeping mushroom patches secret and driving as a distinguished characteristic of mushroom picking. Due to the secrecy, migrant and under-the-radar lifestyles of many of the pickers there have not been large-scale studies on people who are harvesting.

Management Lens

Since the 1990s, the Forest Service's Pacific Northwest Research Station started to look at the management of commercial mushroom harvesting. An overview report on commercial mushrooms in the Pacific Northwest came out in 1993 and comprehensive reports on what is known about the American matsutake, chanterelle and morel species history, ecology, management, and socioeconomic aspects came out in the late 1990s and early 2000s (Molina 1993; Hosford 1997; Pilz 2003; Pilz 2007). All of these reports are meant to provide information to help facilitate the Forest Service's mushroom management strategies, yet recognized the large gaps in the literature on mushrooms.

Along with the theme of limited information available on commercial mushrooms is the Forest Service's extensive management for timber in Oregon and Washington, which has negative repercussions on harvesters' livelihoods. For example, harvesters lose their mushroom patches when the forest service clear cuts an area, which creates additional obstacles for harvesters because now they need to spend time and money searching for new patches (Molina 1993; Arora 1999). Moreover, managing solely for timber limits the biodiversity of the forest and mushroom productivity (Molina 1993; Castellano 1999; Pilz 2006; Tsing 2015).

Another subgroup of the literature on management examines the knowledge base the management comes from and the importance of collaboration. For example,

Tsing's (2008) article examines the difference in the scientific legacies of Japan and the Pacific Northwest and how that shapes forest management. Choy's (2009) article brings together the research of ethnographers in a collaborative effort, and Jones (2002) research cites the opportunity for land managers to include harvester knowledge to create better management policies—harvester knowledge being undervalued and left out of policy decisions. But it must be recognized that this knowledge can be hard to come by and be included in formal procedures due to the transient and alternative lifestyles of many pickers.

Policy Lens

There is a growing body of literature on how the Forest Service policies in the Pacific Northwest impact commercial wild mushroom harvesting. Examples of this in the scholarship include McLain's (2002 & 2008) and Arora's (2008) studies on the Forest Service's increased regulation since the late 20th century which demonstrate negative impacts on commercial mushroom culture and livelihoods. McLain's (2008) research shows how the extension of nation-state control on the east side of Oregon's Cascade range changed the harvesters' living space into a working space and does little to manage for mushrooms or forest biodiversity.

A couple of studies in the early 2000s provide analysis on the policies affecting nontimber forest product management (Antypas 2002; McLain 2005). Antypas' 2002 article reviewed the major federal laws, policies and regulations relevant to NTFPs and McLain's 2005 research examined the inclusion of NTFPs in the United States Forest Service's Forest Plans for Oregon and Washington's National Forests; NTFPs inclusion

in these documents were minor or oblique and that due to lack of funding and training barriers the Forest lacked the capacity to manage for NTFPs (McLain 2005).

Richard Hansis (1998), Jones (2002) and McLain (2000) all use political ecology frameworks—understanding natural resource use through cultural, economic and political structures and relationships—for their studies examining mushroom harvesting in the Pacific Northwest.

Wild Mushrooms: A Case of Environmental Justice

Themes of environmental justice including power imbalances and undue burdens on populations are evident within different scholarship: exclusion of harvester knowledge and participation in making policy decisions that affect them (Jones 2002; McLain 2001; McLain 2002); negative impacts of management policies on harvester livelihoods, e.g., timber harvesting and increased forest regulations (Molina 1993; Castellano 1999; Pilz 2006; McLain 2008); primary income or economic buffer (Antypas 2002); people of color involved and impacted by federal agencies actions (Antypas 2002; Love 1998; Hansis 2001).

McLain's (2002) case study in Central Oregon applies this environmental justice lens as a guiding framework, which no other study in the Pacific Northwest's commercial mushroom literature does. In her 2002 study, McLain analyzes wild mushroom pickers' exclusion from Forest Service land and, albeit unintentionally, from Forest Service public planning processes. McLain concludes that the harvesters experience unjustified burdens because of the Forest Service's management for "resource protection" and their powerlessness to participate in these planning processes.

Gaps in the Literature

In the past 10 years, minimal literature on the commercial, wild mushroom industry in the Pacific Northwest has come out. Exceptions include Anna Tsing and The Matsutake Worlds Research Group's continuing work on the matsutake mushroom industry. There are still large gaps in the known social aspects, biology, ecology and value of the region's mushrooms and markets, and thus, researchers should continue to study all of these areas. Along with this, the effects of a changing climate on the commercial mushrooms of the forest should be brought into the conversation with the biological, ecological and social studies—as no studies mentioned this in the literature; probably due to the lack of information on wild mushroom ecology to start with.

One promising area for research regarding mushroom productivity and value is the continued research into the co-management of timber and mushrooms and how the forest's land managers can further manage for biodiversity. As the literature is now becoming outdated, more research on the changes in harvester demographics and culture, along with how they use the forest resources, would also be valuable to help forest managers make informed decisions.

Contribution of this Study

Building off of McLain's 2002 work in Central Oregon, my study uses an environmental justice lens to add to the conversations within the existing literature. This research uses the Willamette NF as a case study to examine environmental justice themes. I do this by interviewing stakeholders and completing a text-analysis of Willamette NF natural resource management documents. This research comes out fifteen years after McLain's study, and so, will add data on the evolution of

environmental justice issues in the field. Through an environmental justice lens we can examine issues and solutions for the sustainable and just management of people and the environment. And, by studying the social aspects of wild mushroom management, such as power imbalances, class and ethnic divisions, and ideological struggle, we can see how they mirror large-scale environmental justice issues (McLain 2002).

RESEARCH DESIGN AND METHODS

Research Question

This research examines to what extent does Willamette National Forest's management of commercial, wild mushrooms incorporate environmental justice principles. To answer this I explored three questions: 1) How does the Willamette National Forest manage for commercial, wild mushrooms?; 2) What are the mushroom harvesters' experiences harvesting on Willamette National Forest land?; and 3) What would/does environmentally just management of Willamette National Forest land look like?

Description of Study

Study Population

I interviewed three separate populations: commercial mushroom harvesters, Willamette National Forest land managers, and experts in related fields of study. I interviewed fourteen participants total: nine harvesters, two land managers and three field experts.

Selection criteria

In my selection of commercial mushroom harvesters for this study, I define commercial harvesters as people who harvest and sell their wild mushrooms to distributors, mushroom buyers, restaurants, etc. Additionally, I include mushroom business owners in this category, because all of the business owners I met had experience picking mushrooms. All harvesters I interviewed picked in Oregon on Forest Service land.

For the Willamette National Forest land managers, I interviewed land managers with a background in management policies concerning wild mushrooms. One Forest Service employee was the SFP program manager for the Willamette NF and another was the timber stand improvement and SFP coordinator for the Willamette NF's Detroit Ranger District.

In regards to field experts, I interviewed researchers who had done extensive research on different topics relating to the commercial wild mushroom industry in the Pacific Northwest. This research included economic, ethnographic and political research that addressed a variety of topics regarding the commercial wild mushroom industry. Researchers had conducted doctoral theses and/or published, peer-reviewed academic work in this field.

Recruitment

I recruited study participants using adaptive and opportunistic methods. For the commercial mushroom harvesters I obtained contact information through an expert's connections, talking to a harvester selling on the roadside, and by visiting a mushroom business. I gained subsequent contact information of harvesters by using snowball sampling—acquiring contact information of harvesters from interviews with other harvesters and business owners. Through online searches and visiting farmers' markets, mushroom festivals, and mushroom business in Oregon, I reached out to and recruited wild mushroom business owners.

To recruit land managers from the Willamette National Forest I reached out to land managers whose jobs involved managing nontimber forest products. To do this I contacted the Willamette National Forest office to receive the contact information of

land managers I should talk to. To recruit field experts I connected with experts using the recommendations of my thesis advisors. Finally, I reached out to potential participants by phone/email/in-person to gauge their interest in participating. If they agreed to participate I either interviewed them directly, or scheduled a later time to conduct an interview with them.

Research Methods

For this research I used three distinct methods: interviews with different stakeholder populations, participant observation and a text analysis of Willamette National Forest's natural resource management documents.

Interviews

I used semi-structured interviews, informal interviews and participant observation in this study. The majority of my interviews were semi-structured interviews (See Appendix C: Semi-structured Interview Template) where I asked open-ended questions and followed a general script (Bernard 2011). I conducted fourteen interviews via email, phone and in-person: nine with wild mushroom harvesters, two with Willamette NF land managers, and three with field experts. I transcribed the nine in-person/phone interviews.

Following Bernard's (2011) methods, I began my interviews with a grand tour question, which is a broad question that encourages participants to give descriptive answers. I then dove into details, asking follow-up questions based on the answers. Semi-structured interviews allow both the participants and interviewer flexibility to follow leads within the participants' answers while also providing structure and

allowing for comparable qualitative data between participants (Bernard 2011).

Moreover, it allowed the research to more easily follow the story that the stakeholders told. The informal interviews included email correspondence with two of the experts and one day at the farm of one of the business owners.

Participant Observation

When visiting the two commercial wild mushroom businesses in Oregon I used participation observation—observing activities and recording my observations while sharing in the activities—to collect data (Bernard 2011). I toured and collected data at one commercial wild mushroom business site for two hours in the fall. Additionally, in January, I spent one day volunteering and gathering data at a commercial wild mushroom business’s farm in Oregon.

Text Analysis of Willamette National Forest Documents

I analyzed fifty-six natural resource management documents from the Willamette NF to understand how the Forest manages for commercial mushrooms and to explore how they incorporate principles of environmental justice into their management practices:

Willamette National Forest Document List
1969 Harvesting Report
1974 Planning Area Guide
1990 Willamette NF Land and Resource Management Plan & Final Environmental Impact Statement (FEIS)
1993 Northwest Forest Plan
1993 Amendment 23 to the Willamette NF Land and Resource Management Plan
1997 Robinson-Scott Landscape Management Plan FEIS
1998 Young’n Timber Sales FEIS
1994-2015 Watershed Analyses
1999-2015 Monitoring and Evaluation Reports

The National Environmental Policy Act (NEPA) of 1970 guides how the Forest Service makes planning documents. NEPA requires federal agencies to conduct an environmental assessment (EA) to assess the impact on the environment or people before they take any action (EPA 1970). If the United States Forest Service deem significant impact they complete a finding of no significant impact (FONSI) (EPA 1970). If there is potential for the action to significantly impact the environment or people, agencies must then conduct an environmental impact statement (EIS) to list action alternatives—although they are not required to choose the action with the least environmental impact (EPA 1970). Additionally, in light of Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, federal agencies must consider environmental justice in their missions and when creating NEPA documents (“Environmental Justice and NEPA”, n.d.). In 1997 the Council on Environmental Quality issued an environmental justice guidance document outlining how federal agencies can incorporate environmental justice in their NEPA documents (Environmental Protection Agency, n.d.).

Below are descriptions of the Willamette National Forest’s natural resource management documents I analyzed:

Forest Plans

National Forests develop their management actions from the guidelines laid out in forest plans. I examined the following three plans: First, the Planning Area Guide established in 1974, jointly managed the Willamette, Gifford Pinchot, Mt. Hood, and Siuslaw National Forests. Second, the Forest Service created Willamette NF’s current

plan in 1990, which managers use as the foundation for the integrated management of the Forest's resources. This plan is a dynamic document and has been amended and revised over the years (USDA-FS "Planning"). Third, the Northwest Forest Plan's creation in 1993 provided an overarching framework and comprehensive management plan for the federal forestland within the range of the northern spotted owl (Pacific Northwest-United States). This plan updated and amended the Willamette NF's 1990 land and resource management plan. I also examined the 1993 amendment to the Willamette NF's land and resource management plan, the Special Forest Products Management Plan. This amendment created a joint mushroom permit plan between the Willamette NF and three adjacent national forests: Deschutes, Fremont-Winema, and Umpqua National Forest.

Environmental Impact Statements

I also analyzed the Willamette National Forest Land and Resource Management Plan's Final EIS as well as two EISs for proposed timber projects: the Robinson-Scott Landscape Management Plan (1997) and the Young'n Timber Sales (1998). I chose the two EISs for proposed timber projects, because they were the only EISs (other than the Forest Plan) accessible on the Willamette National Forest website.

Watershed Analyses

The Northwest Forest plan requires that the forests in the Pacific Northwest conduct watershed analyses to provide site-specific information and a basis for restoration and monitoring programs. These analyses are not decision-making documents, but they inform decisions for future projects. I examined all thirty-four of

the Willamette NF's watershed analyses to see to what extent they included mushrooms and the commercial mushroom industry.

Reports

I analyzed 15 of the Willamette NF's monitoring and evaluation reports, which began in 1990 with the adoption of the Willamette National Forest's Land and Resource Management Plan. I looked through the reports from 1999-2015 as this period was available on the Willamette NF's website. The purpose of these reports is to provide information to make sure the forest follows their management promises and evaluate if there is a need for change within the forest plan.

Finally, I reviewed a 1969 harvesting report about the special forest products harvested in Oregon and Washington to give context on commercial mushrooms historical place in the Forest Service's literature.

Data Analysis

Grounded theory is an inductive methodology—drawing theories based on data and observations (Bernard 2011). Using grounded theory for data analysis allows the analyst to become “more and more grounded in the data”, understanding “more and more deeply how whatever you're studying really works” as the research progresses (Bernard 2011: 463). The analyst uses an iterative process—running notes about potential hypotheses and new directions for research as they go through the research process (Bernard 2011). For my data analysis I followed these grounded theory guidelines drawing from Bernard's (2011) text-analysis and coding methods and from Ryan and Bernard's (2003) theme sorting methods.

Text Analysis of Willamette National Forest Documents

The environmental justice principles outlined by Executive Order 12898, as well as NEPA's environmental justice guidance document, guided my analysis of the Willamette National Forest's management of commercial wild mushrooms within their planning documents. While conversations with experts and a priori knowledge from reading the literature directed my analysis of the documents.

Within each of these documents I used computerized keyword searches to find statements/sections that included, or were relevant to, wild mushroom management (Ryan 2003). Keywords used to search each document included: "fungi," "mushroom," "harvest," "truffle," "special forest product," "forest product," "harvester," "commercial," "commercial harvest," "chanterelle," "morel," and "matsutake." Additionally, after going through the table of contents and reviewing the documents I did a line-by-line analysis of sections that had the potential to be relevant to commercial wild mushroom management.

When looking for themes within the documents I applied scrutiny techniques outlined by Ryan and Bernard (2003) looking for: repetition, similarities and differences across the documents, missing data, and environment justice themes. I compared the environmental justice themes between the various management documents and analyzed the development of the commercial mushroom management over time. And, using these environmental justice themes, I analyzed to what extent the documents incorporated environmental justice principles.

Interviews

To analyze my interviews I used line-by-line analysis to code all of the interviews for environmental justice themes; I started with general themes from reading the literature and added themes and subthemes as I went (Bernard 2011: 464). I used the same scrutiny techniques outlined by Ryan and Bernard (2003) to identify themes from the interviews and also looked for indigenous themes (themes that characterize the experience of informants).

Following Bernard's 2011 text-analysis methods to code and analyze my interviews, I transcribed my interviews and identified the potential analytical categories that arose.

Limitations of the Study

Language barriers impacted the quality of two of my phone interviews with harvesters. For one phone interview with a harvester the son translated my questions and his father's answers. And for another phone interview with a harvester I had to adapt some of my questions so the harvester would understand. I still include both of these interviews in my data analysis because they did respond to my questions, and although they did not provide as in-depth responses, they do provide insight into the harvesters' experiences.

A second limitation of this study is my interviews with the Willamette NF land managers. I conducted an email interview with Willamette NF's Special Forest Products Program Manager/Timber Program Manager, who shared his answers with the other three land managers I planned on interviewing. Anderson agreed with all of Lahey's responses and Crowder added onto Lahey's answers. I received Nimer's responses too

late to include in this paper. Being able to see Lahey's responses might have influenced the responses of the land managers. I still included these answers because they provided a land manager's perspective to my questions.

Lastly, a third limitation of this study is the amount of interviews I conducted with land managers and harvesters. Interviews with harvesters were especially difficult to complete in part due to the political climate, inherent difficulty in tracking down a population who live on the fringes of society, and short time frame of this research. Thus, I was unable to interview a more representative sample of commercial wild mushroom harvesters. Yet, the interviews I did conduct provide insights into land management, as well as harvester culture and issues, yet, primarily work to complement and strengthen my text-analysis of the Willamette National Forest documents.

RESULTS

This results section presents the major themes that came up in my interviews and the Willamette NF natural resource management documents. The first section provides an overview of commercial wild mushroom harvesting in Oregon looking at harvester culture and stewardship practices themes from my interviews. The second section brings in voices of the land managers and field experts, along with the harvesters, to examine themes related to management of the forests. Lastly, in the third section I examine how the Willamette NF incorporates mushrooms and the commercial mushroom industry in its natural resource management documents. The documents follow a chronological order to see how the Willamette NF's management for mushrooms has or has not changed over time.

Due to the different biomes in Oregon, from the high deserts in eastern Oregon to the temperate forests and coastal environments west of the Cascades, the types of mushrooms picked in these regions vary. Chanterelle mushrooms are the primary commercially valuable mushroom harvested on the Willamette NF, while morels and matsutake are more commonly picked in the Deschutes National Forest (east of the Cascades). Even though some harvesters I interviewed talked about experiences picking mushrooms on different National Forests, this data still adds to a better understanding of harvester culture and provides lessons for how the Willamette NF can manage their forests.

For the Love of Mushrooms: Harvester Culture and Stewardship Practices

The below table gives an outline of the data and themes that emerged from interviews with harvesters:

Harvesters' Regional Origins	Involvement in Mushroom Industry	Sense of Place	Stewardship Practices
Laos (1); United States (5); Central America (2); and Canada (1)	Mushroom business owners (3); mushroom buyer (2); commercial harvester/side income (4)	<p>Miguel likes everything about picking and loves the forest: "you find a good patch and [can] be there by yourself relaxing. No matter the weather".</p> <p>I have to understand its life cycle, how it grows, where, when. I think it helps make me feel part of nature instead of above or outside of it (Louis).</p>	<p>Martha compared the management of mushrooms to that of tending a garden</p> <p>Eliza believes that "[successful management of mushrooms] has nothing to do with managing the mushrooms, but has to do with managing the forest".</p> <p>Harvesters mentioned not raking and covering the ground after picking.</p> <p>Belief that picking spreads the mushroom spores and promotes growth (Eliza, Martha)</p>

Figure 2: Overview of Harvester Culture and Related Themes from Interviews

Data collected from interviews with commercial wild mushroom harvesters, land managers and field experts (2017-2018).

I expand on each of these themes in the following paragraphs.

Demographics

The harvesters I interviewed came from the United States, Laos, Central America, and Canada. Harvesters either identified with their respective regions when I talked with them, or, in a couple of cases, the business owner who put me in contact with the harvesters informed me of their country of origin. According to three harvesters, the majority of harvesters are Latinos and Southeast Asian and "white guys are the minority" (Peter). Louis added that Southeast Asian refugees used to be the

majority, but “now Latino pickers, especially young Guatemalans, are the new majority. It will be 80% Latino pickers before too long.” I interviewed two female harvesters and seven male harvesters.

A Day in the Life of a Harvester

The day in the life of a harvester varies from harvester to harvester and even from season to season. As Peter put it there are “no typical seasons” for mushrooms; “mushrooms can have cycles. There are good years and bad years.” Peter only picks during the fall and winter seasons to supplement his income. Another picker, Eliza, who relies on wild mushrooms for a substantial amount of her income, hunts for wild mushrooms year round. To get a better idea of what an actual day out picking might look like for other commercial harvesters, Louis’ provided a detailed overview of his typical day:

Depending on the season and the mushrooms harvested, sometimes I hike all day and pick, have lunch in the woods and pick till my baskets are full or it’s time to come back. Other times I pick closer to the road for like an hour and come back to the car, dump the mushrooms and drive to another spot and do that all day. Then I drive to a buyer station, sometimes shop around for the best price, sometimes not. Sometimes I have to wait in line to sell my mushrooms. I chat with the buyer and other pickers, trying to glean information. Then I get gas, food, water and go cook dinner. In the rainy season I often have to go to the laundromat to dry my clothes, unless I pick from home or I have a motel room, which is rare. Then I look at maps and try to figure out where to go the next day (Louis).

As exemplified above, the level of involvement of harvesters in the mushroom industry is variable. The commercial harvesters I interviewed ranged from business owners whose livelihoods depended entirely on wild mushroom harvesting to those who

harvested mushrooms as a side, supplemental activity. The commonality is that they all go out to the forest to pick and sell their mushrooms.

Sense of Place

The harvesters I interviewed shared stories about where they picked and their love for picking in these places, which suggests a deep sense of place and connection to their mushroom patches. Some harvesters have been going to the same spots for years: Peter has around twenty or so spots he visits every season. And for Louis, part of the draw of harvesting is developing a relationship with mushrooms and the forest:

I'm also developing a relationship with a wild resource, which transforms the way I think. Instead of trying to control a resource by watering it, fertilizing it, etc, I have to understand its life cycle, how it grows, where, when. I think it helps make me feel part of nature instead of above or outside of it. I also like the fact that it is a resource owned in common with the rest of the public and that it can (in theory) be managed communally.

Miguel's comments also reflected this sentiment as he expressed that people, including harvesters, need to take care of the forest; he likes everything about picking and loves the forest: "you find a good patch and [can] be there by yourself relaxing. No matter the weather". Thus, the harvesters' stories of continuing to return to the same patches and appreciation of the forest indicate their investment in the forest and their mushroom patches, as well as their connection to these places.

Local Ecological Knowledge and Stewardship

Harvesters not only professed a sentiment for taking care of the forest, but many harvesters I interviewed actively managed for the continued productivity of their mushroom patches. Eliza's believes that "[successful management of mushrooms] has

nothing to do with managing the mushrooms, but has to do with managing the forest”. Martha added to this by comparing the management of mushrooms to that of tending a garden. She believes that the landowners should log the forest, albeit responsibly, to take out the diseased trees and other “weeds”. She also likened mushrooms to tomato plants: when you pick tomatoes from a tomato plant you’ll get more tomatoes (Martha). Management techniques harvesters use include covering the ground where they picked mushrooms and not raking for mushrooms (Martha; Louis). Additionally, many of the harvesters believed that picking mushrooms promoted mushroom growth because it “proliferated” mushroom spores (Eliza).

Harvesters also prized the knowledge they gained from being out in the woods: Keo told me that many pickers come to him for advice because he has a lot of experience. Additionally, Martha stated that “I can tell you anything you need to know about commercial mushrooms: where to pick them, how to pick them, how to manage for them.”

Mushroom pickers I interviewed are actively managing and thinking about how to best manage their mushroom patches and the forest, so that they can continue harvesting. Harvesters carry out stewardship practices on a small scale, in the next section I look at how large-scale forest management decisions impact mushroom harvesters.

The Fungi in the Forest: Managing for the Commercial Mushroom Industry

Management themes that appeared from interviews with harvesters are outlined in the table below:

Compliance with Mushroom Permit System	Access to Forestland	Economic Opportunities	Timber Management
The Willamette NF is creating an online permit system	The Forest Service is closing up logging roads (Kieran, Louis)	Kieran lamented the Forest Service's focus on timber and not mushrooms, because he believes that mushrooms are better for the local economy and provide environmental services.	"Right now there are a lot of places logging everywhere" and pickers losing patches because of this (Miguel).
Land managers brought up harvesters' lack of compliance with regulations as a challenge	Harvesters cannot pick in wilderness areas (Louis)	Forest Service could let pickers pick an area before they log (Louis)	Because of extensive logging practices, Eliza believes that she and other harvesters are "one of the last generations of wild mushrooms harvesters"
Compliance challenges for harvesters: variable rules; withholding of permits (Kieran, Peter, Louis)	No-pick areas based off of one study, Luoma et.al., (2006); although lack other data (Louis)	Timber is of high value short term, mushrooms and other NTFPs are high value long-term (Jones)	According to Martha "logging changes everything [for harvesting mushrooms]", because depending on if it's a clear cut of heavy thinning you might not get mushrooms in an area for 20 years

Figure 3: Overview of Management Themes from Interviews

Data collected from interviews with commercial wild mushroom harvesters, land managers and field experts (2017-2018).

These next sections examine the management themes in more detail.

The Mushroom Permit System

The Forest Service manages their mushrooms through a mushroom permit system, and both harvesters and land managers brought up various challenges and opportunities they saw within the this system. Lahey, the Special Forest Product Manager/Timber Program Manager for the Willamette NF, says that in the past few years he has tried make the permit process easier on customers and simpler to understand:

I think people generally want to do the right thing, but sometimes our regulations intimidate people and make it hard for them to be in compliance. I think making permits easier to access to understand is an important step we can take in many of our programs, including mushrooms.

An example of this is Lahey's work on creating an online permit system. Kieran, a harvester and business owner, brought up that acquiring permits was hard for people who work because they have to drive out to the stations to get them. So, an online permit system has potential to create fewer barriers for commercial harvesters' acquisition of permits.

A few harvesters expanded on the reasons why complying with the permit system is challenging for them. Challenges for Peter, Louis and Kieran included the different prices and regulations that the Forest Service, Bureau of Land Management (BLM) and private forests have.

However, the majority of the harvesters I interviewed stated that they rely on getting permits from the Forest Service or BLM land because private forest permits are more difficult to obtain. Keo told me that it was easy for him to get permits from the Forest Service. Louis added that on "National Forest land [he] can buy a permit directly for a smaller fee and sell [his] mushrooms to who [he] want[s]."

Despite the easier acquisition of Forest Service permits over private permits, the Forest Service's regulations can still be a barrier to harvesters' access of mushroom patches. For example, harvesters face the choice of whether to pick illegally or not when the Forest Service opens up the season for only a short period or time or does not sell permits for an area:

For burn morels, often the Forest service decides to not sell permits at all. Then I can decide to pick illegally and risk getting a ticket or getting my mushrooms confiscated. It creates a lot of stress in this job that is normally very peaceful... It is sometimes very nerve wracking to risk losing a whole day of work. It is extremely frustrating when I know and studies have shown that burn morel commercial harvest is totally sustainable (Louis).

Regarding Louis' comment that states harvesting burn morels as "totally sustainable", I found Pilz and other's (2007) comprehensive report on the ecology and management of the morel mushroom. This report showed that forest disturbance (e.g., fires, logging, insect-diseased trees) can increase morel production in an area, and morel productivity does not seem to be contingent on the amount picked by harvesters. However, the study also stated that researchers still need to conduct studies on morel biology to better understand what "sustainable" harvesting of morels would look like. I did not find any other studies regarding morel mushrooms productivity as it relates to commercial harvesting.

Another challenge for land managers and harvesters are the Forest Service's rules regarding matsutake mushroom harvest. Crowder, one of the Willamette NF's district land managers explains one of the challenges of managing for mushrooms to be:

Everyone following the rules, such as on the east side with the great desire for Matsutake they have problems with folks disrupting the soils extensively. They put limits on the types of tools allowed.

However, some of these rules negatively affect harvesters:

Also, we cannot use a harvesting stick longer than 18 inches because it could then be used to rake. Matsutake picking involves checking every single bump that we see to see if it's a matsutake. Which means having to bend over a lot, unless we use a longer stick. It again creates a lot of stress when I come back to my car with a stick that is longer than 18 inches and risk getting a ticket. They should give tickets for raking, not because they think that if you have a long stick it means you have raked (Louis).

Although the Willamette NF is taking steps to manage for mushrooms and address the concerns of harvesters, the testimonies of harvesters and land managers suggest that there is a communication gap between the two groups. For example, some harvesters do

not understand why the Forest Service is making certain management decisions and have a hard time complying with them.

Access to Forestland

Harvesters told stories about the physical and legal barriers they face when they try to pick, and how this negatively impacts their livelihoods. Louis and Kieran shared that pickers keep finding the roads to their mushroom patches on private timberland gated and inaccessible to their vehicles. Field expert, McLain, brought up that the Forest Service is starting to close-up old logging roads, which although important to protect these areas, does severely limit harvesters' access to their patches.

Roughly half of the Willamette NF land is available for commercial harvesting, while the other land is designated for free-use permits, or is a no-pick area (e.g., wilderness area). The darkest areas on the Willamette National Forest's "Mushroom Harvest Map" shows areas that the harvesters can pick mushrooms commercially (See Appendix D: Willamette National Forest Mushroom Harvest Map for enlarged versions of these maps). Despite the Forest Service's designation of about half of the land to harvesters to pick commercially on, other barriers can restrict access to these lands. These barriers include limited road access because of closure of logging roads and road designation for "special use" only or seasonal openings. The Willamette National Forest Motor Vehicle Use Maps (MVUM) show the roads that vehicles can access. The special designation roads (roads only vehicles with special designation can access) in the Willamette National Forest were concentrated in one site below the Jefferson Wilderness area (on the map this area is outlined in red). I could not find a map of the

closed logging roads, but do want to take note that these exist and also impede harvesters access to the designated commercial picking areas.

Limiting harvester access to areas also occurs because of legal decisions: sometimes well informed and sometimes not. Louis shares his experience with one of the federal policies that affects the Forest Service's management of the land—the 1964 Wilderness Act:

Another thing is that we cannot pick in Wilderness areas, since according to the 1964 Wilderness Act there cannot be any commercial activity in these areas. The problem is that the Act was written before there was any commercial mushroom harvest, which is done on foot with a bucket and a knife. It is very low impact compared to logging and other commercial activity that were intended in the act.

For Louis, this Act did not take into consideration the low-impact of mushroom harvesting and he believes that the Forest Service districts should reconsider implementing this law in some instances.

In addition to the laws restricting access, the Forest Service also designates certain areas for commercial harvesting and others for recreational harvesting. Louis believes the Forest Service's division of these areas is not based off of informed decisions:

The problem is that the way they divide those areas is totally random and not based on best potential. So if the best ground ends up being in a personal zone it's hard to resist going there. I understand the need to have mushrooms for recreational pickers but I'm not sure it's the best way to do it.

This, along with other no-pick zones, sometimes leads to illegal picking of areas, which can result in steep fines for harvesters, and even a loss of driver's licenses in some cases—which is essential for pickers mobile lifestyles (Louis).

Another example of restricting access to forest areas is the Forest Service's designation of no-pick areas, which Louis says is based on a Luoma, et. al., (2006) study on mushroom harvest techniques:

But the study didn't really base their raking technique on that of the pickers, and the Forest Service does not have any data on how much raking is actually taking place. And so one year we may have to hide and maybe get a ticket for picking in a closed area, supposedly to protect it from damage from raking, but then the next year the same area gets logged.

Crowder states that a challenge for the Forest Service is having harvesters follow the rules and that the desire for matsutake in some areas leads to extensive disruption of the soil. Regardless of who is right, these examples show the communication gap between the harvesters and the land managers and the tangible consequences these policies have on the harvesters' livelihoods. Louis believes that the Forest Service needs to sit down and talk with commercial and recreational pickers to help them make more informed decisions.

Economic Opportunities

The harvesters I interviewed stated that they made, or could make, a substantial amount of their income from harvesting mushrooms. Harvesters sold their mushrooms to restaurants, wholesalers, local stores, farmers' markets, and on the roadside. One business owner I talked with sold mushrooms internationally as well as domestically, while another business owner only sold their mushrooms within the Pacific Northwest region.

Two field experts I interviewed, McLain and Alexander, both brought up how they've seen the edible wild mushroom industry in the Pacific Northwest grow over the years:

I've watched it change, in that the industry has become a lot better at finding domestic markets for both fresh and preserved (dried etc.) products...Just look at Costco, or Safeway, where you can find wild edible fungi like chanterelles in neatly shrink-wrapped packages, or open bins...even 10 years ago that was not something you'd be likely to find in the produce section (Alexander, email interview, 2018).

McLain believes that the industry is stable and probably expanding as more people eat wild mushrooms domestically and as international markets open up.

Harvesters also talked about the opportunities they saw for the Forest Service to expand their knowledge and recognize the economic value of mushrooms for the public:

When the Forest Service decide to let loggers go harvest burnt trees before we can harvest the mushrooms it means we don't get the chance to pick those mushrooms. I wonder if they could wait for the morel season to be done before letting the loggers go in. It seems like it would create a bit more revenue for them and more work for different communities (Louis).

Similarly, Kieran lamented the Forest Service's focus on timber and not mushrooms, because he believes that mushrooms are better for the local economy and provide environmental services. Field expert, Jones, adds that although timber is of high value short term, mushrooms and other NTFPs are high value long-term.

Timber Management

Some harvesters brought up concerns over resources with how the Forest Service manages the available land. From a conversation with McLain, the Forest Service has made a shift from managing for timber to other forest products because they are currently not able to cut as much timber. This has resulted in more biodiversity,

although it was not a conscious effort by the Forest Service to do so (McLain, phone interview, 2018).

Kieran believes that the Forest Service’s “focus and priority is to serve the timber industry and commercial harvesting of mushrooms is a nuisance.” Other harvesters brought up experiences of how timber harvesting has a large effect on their mushroom patches and livelihoods. According to Martha “logging changes everything [for harvesting mushrooms],” because depending on if it’s a clear cut or heavy thinning you might not get mushrooms in an area for 20 years. Moreover, Miguel added that “right now there are a lot of places logging everywhere” and he is losing patches because of this. Lastly, Eliza, cited logging and clear cuts as the biggest reason for the mushroom decline on forestland. Because of these extensive logging practices, Eliza believes that she and other harvesters are “one of the last generations of wild mushrooms harvesters.”

The above harvesters’ stories imply that the Forest Service’s logging practices undermine the wellbeing of the commercial harvesters mushroom patches and, thus, their livelihoods.

Is the Forest Only Trees?: Willamette National Forest Management Documents

	Mushroom Management Themes	Exemplary Quotes, etc.,
1969 Harvesting Report	No mentions of mushrooms	
1974 Planning Area Guide	Focus on timber management; no management objectives for mushrooms/ industry	"Most of the commercial forest land will be intensively managed for timber" (20).
1990 Willamette NF Plan and FEIS	Brief mentions of fungi; no mention of commercial industry; focus on timber	The Environmental Consequences of Alternatives chapter states the Forest's potential to impact jobs in proximal counties (IV-119). The proceeding paragraph goes into details about timber jobs and the timber industry.
1993 NW Forest Plan	Focus on timber; sets guidelines for fungi survey and manage	Vision for the Pacific Northwest involves producing timber products while protecting and managing impact species. "The 'survey and manage' standard and guideline will provide benefits to amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods" (Northwest Forest Plan 1993: C-4).
1993 Amendment 23	Creates mushroom permit system	The permits delineates the costs, regulations and no-pick areas for mushroom picking.
1997 Robinson-Scott Landscape Management Plan	No mentions of mushrooms or commercial mushroom industry	
1998 Young'n Timber Sales	Minimal mention of fungi: do not take into account social, cultural, or economic factors for the mushroom industry	"All of these measures contribute to conservation of mycorrhizal relationships in the soil and retention of the food web" (IV-31).
1994-2014 Watershed Analyses	Do not consistently take into account the social, cultural, or economic factors of the commercial mushroom industry; 3 out of 34 mention the commercial mushroom industry; 9 out of 34 include sections/statement for the Survey and Manage of fungi	The Upper North Santiam and Detroit Tributaries analyses include mushrooms as a potential economic product
1999-2015 Monitoring and Evaluation Reports	Includes descriptions of the mushroom permit system plan; do not consistently take into account the social, cultural, or economic factors of the mushroom industry	"This 'survey and manage' provision provides benefits to amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods in 1999 (32); 2006 (23); 2007(); 2011(34) Short description of the Willamette National Forest Amendment 23: Special Forest Products Management Plan is included in the reports from 1999-2011 and 2014-2015:

Figure 4: Overview of Mushroom Management Themes in the Willamette NF Documents

Data collected from text-analysis of Willamette NF natural resource management documents.

The following paragraphs expand on these themes found in each of the Willamette NF's natural resource management documents.

1969 Harvesting Report

The purpose of this harvesting report was to identify and summarize the values and volumes of the special forest products that are harvested from Oregon and Washington's forests (Harvesting Report 1969). This report included special forest products such as Christmas trees, floral greenery, split cedar, small roundwood, drugs, seed cones, fuels, foods, and native landscaping plants (1). However, the report did not include the values or volumes of wild edible mushrooms. Although the report came out before the boom in the commercial mushroom industry, people were still out picking mushrooms commercially as well as for subsistence and recreational purposes (Pilz and Molina 2001).

1974 Planning Area Guide

From 1974 to 1990 the Willamette, Gifford Pinchot, Mt. Hood and Siuslaw Forest were all managed under the same planning area guide. The guide's management direction focuses on timber: "most of the commercial forest land will be intensively managed for timber" (Planning Area Guide 1974: 20). There was no explicit management objective for mushrooms in this document. One listed direction for the state and private forestry was to "promote a small wood and miscellaneous forest products program that will generate opportunities for growth of rural communities" (Planning Area Guide 1974: 30). However, it appears that the Willamette NF did not create such a program for mushrooms until the 1990s.

1990 Willamette National Forest Land and Resource Management Plan & FEIS

In 1990 the Willamette NF published its own land and resource management plan. The Final Environmental Impact Statement (FEIS) preceding the final plan briefly mentions fungi in various sections. For example, in the “Fire” section of the FEIS it states that “fires influence many segments of the physical and biological forest environment including plant species and communities; insects, parasites, and fungi” (Willamette NF-FEIS 1990: III-55). In the “Soil” section in the same chapter there is another brief mention of fungi: “large woody material (whole downed, rotting trees) supports the life cycle of symbiotic soil fungi which attach to conifer roots” (Willamette NF-FEIS 1990: III-12). The FEIS does state the potential the Willamette NF has to affect jobs in proximal area, yet does not address the commercial mushroom industry or other NTFPs, but goes on to discuss timber supply and demand in the area (Willamette NF-FEIS 1990: IV-119).

The Willamette NF land and resource management plan that was approved in 1990 is the basis for the integrated management of all the Forest’s resources and specifies monitoring and evaluation requirements for the forest. There are no explicit monitoring questions for fungi/mushrooms or special forest product management in the 1990 plan. However, there is one monitoring question that has the potential to encompass commercial wild mushroom management: "is biological diversity being maintained or enhanced on the Forest" (Willamette NF Plan 1990: V-58-60).

1993 Northwest Forest Plan

The creation of the Northwest Forest Plan in 1993 amended the Willamette NF’s land and resource management plan and provided a guiding framework for the

management of the Willamette NF. The Northwest Forest Plan manifested due to increasing concerns in the 1970s and 1980s about ecosystem functions and the diminishing habitat of the northern spotted owl, as well as other species, due to extensive logging of old-growth forests (Castellano 1999). Research and debates by 10 agencies and over 600 specialists ensued on how the forests should best be managed (Oregon Wild, n.d.). The specialists crafted the Northwest Forest Plan out of this research, which was highly controversial due to its call for strongly decreased timber yields (Oregon Wild, n.d.). From this plan the Forest Service land and resource management changed from intensive timber management to that of an ecosystem management philosophy—a more holistic approach that takes into account economic, ecological, social and cultural factors as well as the long-term integrity of the ecosystem (Pilz and Molina 2001). Yet, according to the United States Forest Service’s Regional Ecosystem Office, the Northwest Forest Plan’s overall vision for the Pacific Northwest is one “that would produce timber products while protecting and managing impacted species” (Northwest Forest Plan 1993). Similar to the previous natural resource documents, the Northwest Forest Plan still has goals on incorporating timber harvesting in its management of the lands—although to a significantly smaller extent.

In line with the new ecosystem management philosophy, the Northwest Forest Plan’s survey and manage guidelines include fungi, which is the first time fungi were included in the Willamette NF’s monitoring and management decisions (Northwest Forest Plan 1993: 11). This guideline states that “the ‘survey and manage’ standard and guideline will provide benefits to amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods” (Northwest Forest Plan 1993: C-4). The

survey and manage guidelines require that the Willamette NF conducts surveys of and manages for fungi in the forest.

1993 Amendment 23: Special Forest Products Management Plan

In 1993 the Willamette NF completed an environmental assessment (EA) for their Special Forest Products Management plan, which had a finding of no significant impact (FONSI). This was the first management system put in place for commercial, wild mushrooms. This plan addresses sustainability, economic development opportunities, and monitoring for NTFPs. Additionally it lays out guidelines for the commercial mushroom joint permit system with the Willamette NF, Deschutes NF, Fremont-Winema NF and Umpqua NF. Since this plan's adoption, the Willamette NF has been managing for mushrooms through the regulations laid out by the permit system.

The mushroom permits lay out regulations for commercial harvesters including specifications for quantity, permit costs, and identification of no-picking areas. For example, in the Willamette NF's 2017 and 2018 permits commercial picking is not allowed in "Crater Lake National Park, Newberry National Volcanic Monument, H.J. Andrews Experimental Forest, Davis Late Successional Reserve, Research Natural Areas, Wilderness Areas, Developed Recreation Areas and other designated non-harvest areas." And the Willamette and Umpqua NF have two additional regulations: "1) at least one-third of the mushroom caps on the collection area (of the same species as being collected) should be left intact to release spores (FW-337); and 2) no harvest of truffles is allowed."

1997 Robinson-Scott Landscape Management Plan & FEIS

The Robinson-Scott Landscape management plan's purpose was to manage the project area on a landscape level providing health and diversity and timber products. In the plan's FEIS the only time fungi are mentioned is in the section heading "Proposed, Threatened, Endangered, Sensitive, and Other Plant, Fungi, and Animal Species of Concern" (Robinson-Scott 1997: 85). Yet, the plan does not mention fungi anywhere within this section or elsewhere in the document.

1998 Young'n Timber Sales EIS

In 1998, the Young'n Timber Sales proposed a plan to regeneration harvest and commercially thin 790 acres of the forest. In the plan's FEIS the only acknowledgement of fungi comes from one of the listed effects common to all action alternatives:

"in areas proposed for harvest, measures such as partial or full log suspension...duff and litter retention, and large wood retention...all of these measure contribute to conservation of mycorrhizal relationships in the soil and retention of the food web" (IV-31).

Similar to the Robinson-Scott Landscape Management Plan FEIS, this FEIS does not mention impacts of actions on the commercial mushroom industry or commercial harvesters. Timber harvesting can potentially affect mushroom productivity, but even if not, mushrooms are still part of the environment and are minimally, if at all, considered in the above two EIS.

1994-2014 Watershed Analysis Documents

The Northwest Forest Plan requires that the Willamette NF conduct watershed analyses, which should take into account all species that riparian reserves benefit.

Watershed analyses are not decision documents, but the information in these analyses

inform the Willamette NF's planning decisions So, for a more holistic management of the forest they should recognize mushrooms' place in the ecosystem. Of the thirty-four watershed analyses spanning 20 years (1994-2014) only three explicitly mentioned commercial wild mushrooms. The Upper North Santiam and Detroit Tributaries analyses include mushrooms as a potential economic product, and the Middle Santiam analysis simply states that edible mushrooms are a major special forest product (Upper North Santiam 1995: 41; Detroit 1997:4; Middle Santiam 1996: 4).

Additionally, nine of the thirty-four analyses state variations of the Northwest Forest Plan's guideline regarding fungi: "surveys and management for numerous species of wildlife, fungi, lichens, bryophytes and vascular plants (ROD Table C-3)". Of the other watershed analyses seven do not include fungi anywhere in the document and the others have oblique mentions of fungi. For example, in Fall Creek's 1995 watershed analysis the terrestrial domain section includes a sentence with fungi: "there is an abundance of habitat for the old-growth and riparian associated survey and manage bryophytes, fungi and vascular plants" (11). Although many of these documents mention fungi, and even commercial mushrooms, they do not provide an in-depth analysis of the current ecological conditions of fungi in these watersheds.

1999-2015 Monitoring and Evaluation Reports

The Willamette NF's monitoring and evaluation reports are supposed to provide information so the Forest Plan can evolve to the needs of the forest. I analyzed fifteen monitoring and evaluation reports spanning from 1999-2015. In all of these reports, the Willamette NF Plan has a monitoring question regarding managing for biological diversity: "is biological diversity being maintained or enhanced on the forest?" Yet,

there is no separate monitoring question for mushrooms. And even under the monitoring question for biological diversity, these reports did not include any information about mushrooms. Additionally, these reports have a section with the monitoring questions regarding the Willamette's NF's "Resources and Services to People." However, none of the reports I examined have any questions regarding the commercial mushroom industry or commercial harvesters.

When mushrooms are included, the reports use variations of the same phrase and information. The majority of the reports cited the same guidelines, updates and amendments regarding wild mushroom management. In four of the documents (1999, 2006, 2007, and 2011) they cut and paste a phrase from the Northwest forest plan's guidelines: "this 'survey and manage' provision provides benefits to amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods". And except for the 2012-2013 report, all other reports included a short description of the Willamette National Forest's Amendment 23 and of the 1994 Forest Plan update. The 1994 Forest Plan Update clarifies "that the exclusion of commercial SFP collection applies only to the large, mapped Late-Successional Reserves and not to all of the owl activity centers that are now 100-acres LSRs." There are no further amendments or updates for wild mushrooms included in these reports.

Summary

The Willamette NF's natural resource documents have made steps forward in addressing mushrooms in the forest since 1974. For example, the Northwest Forest Plan has a survey and manage guideline that includes fungi and the Willamette NF's Amendment 23 creates a Special Forest Products Management Plan. However, within

many of the documents (e.g., Willamette NF Plan, watershed analyses, monitoring and evaluation reports, and environmental impact statements) the inclusion of mushrooms and the commercial mushroom industry was minor, if at all. The Forest Service's ecosystem management philosophy requires that ecological, social, economic and cultural factors are taken into account in the Forest Service's land management. Yet, when mushrooms are mentioned in these documents, it tends to be in regards to their ecological role/part of biodiversity, and not their economic role as a forest resource.

Thus, from analyzing these documents emerged one large theme: minimal consideration of the mushrooms and the commercial mushroom industry. Subthemes included a primary focus of the documents (e.g., Willamette NF Plan, the Northwest Forest Plan and environmental impact statements) to manage for timber, and a restriction of access to the forestland for harvesters as evidenced in the mushroom permits and Forest Update 4. In this following section I use these themes to discuss the implications for environmental justice.

DISCUSSION

In this section I analyze and discuss how environmental justice relates to commercial mushroom harvesters and how the Willamette NF incorporates principles of environmental justice into its land management policies and decisions. To guide this discussion I use the environmental justice principles outlined by Executive Order 12898, as well as NEPA's environmental justice guidance document. There are two principles in Executive Order 12898 and NEPA's environmental justice document relevant to managing the forest for commercial mushroom harvesters:

- 1) Involving communities in public participation processes, and
- 2) Recognizing the social, occupational and economic factors that may amplify environmental effects of a federal action.

After discussing my data under these principles, I bring in the First National People of Color Summit's principles of environmental justice to illuminate how the United States National Forest System can incorporate a more transformative and holistic environmental justice approach.

Before I discuss my data under principles of environmental justice, I would like to recognize that the National Forest agency faces challenges managing for commercial wild mushrooms. These challenges arise due to a lack of funding and administrative capacity, as well as the difficulties of managing a highly mobile and diverse group of people (McLain 2002). However, working to incorporate and manage for environmental justice would help provide opportunities for low-income and politically weak communities.

The United States' Environmental Justice Principles

Involvement in the Public Participation Process

While both Executive Order 12898 and NEPA's environmental justice document include instructions to involve the public in public participation processes, neither include guidelines on how this is to be achieved. Executive Order 12898 directs federal agencies to provide low-income and minority populations with access to public information and participation, and NEPA requires the federal agencies "assure meaningful community representation" in decision-making processes (Executive Order 12898, 1994; "Environmental Justice and NEPA", n.d.). However, the themes emerging from harvesters' testimonies and within the Willamette NF natural resource documents suggest the lack of wild mushroom harvesters' public participation in Forest Service land decisions. In most cases, the natural resource management documents do not include mushrooms in their consideration of the affected areas and forest areas in general (e.g., EISs, Watershed Analyses, and Monitoring and Evaluation Reports).

The challenges faced by harvesters in complying with the mushroom permit system suggests how their voices might be missing from steps in the decision-making process. Kieran, Peter and Louis all cited the difficulties in complying with the different permits and regulations for each National Forest and public land agency or private land owner. Furthermore, the other regulations that negatively impact harvesters further implies the gap between managers' understanding of commercial harvesters on the land, and thus the lack of harvester participation in the making of these decisions. Louis' experience with these regulations expands on this point:

Also, we cannot use a harvesting stick longer than 18 inches because it could then be used to rake. Matsutake picking involves checking every single bump that we see to see if it's a matsutake. Which means having to bend over a lot, unless we use a longer stick. It again creates a lot of stress when I come back to my car with a stick that is longer than 18 inches and risk getting a ticket. They should give tickets for raking, not because they think that if you have a long stick it means you have raked. Other National Forests do not have these regulations, which is also frustrating. Why is one practice acceptable in one place but not the other?

Here is an opportunity for the Forest Service to listen to and work with harvesters so that they can make informed decisions regarding regulations as well as the mushroom permit system. Moreover, one of the First National People of Color Summit's principle of environmental justice might be used to add on to and expand the Forest Service's public participation guidelines:

Environmental Justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation (United Church of Christ, 1992).

For example, this principle, if adopted in practice by the Forest Service, would require mushroom harvesters to be treated as equal partners in the decision-making processes, not only that they have "access" to public participation as in Executive Orders 12898's directions.

Challenges that the harvesters experience as a result of land management decisions implies harvesters' need to be a part of the decision-making processes. This is especially important if the Forest Service is to properly address their concerns and have them participate as genuine partners in managing the land for mushrooms.

Economic, Social and Environmental Factors

Executive Order 12898 directs federal agencies to address the disproportionately high environmental effects of their actions on minority and low-income populations, and NEPA requires that federal agencies “recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action” (“Environmental Justice and NEPA”, n.d.). The economic factors and environmental effects of federal actions are pertinent to commercial wild mushroom harvesters since some rely solely or to some extent on National Forest land for their livelihoods. And according to the literature, thousands of people are out commercially harvesting mushrooms in the Pacific Northwest and on Forest Service land (McLain and Jones 2001). Yet, the Willamette NF natural resource management documents minimally consider the wild mushroom industry and the economic opportunities it provides to harvesters and communities. An example of this is in the FEIS for the Willamette NF’s land and resource management plan in 1990, which had multiple sections for managing timber but no sections on the economic opportunities for wild mushrooms (or other NTFPs). Additionally, the Willamette NF’s monitoring and evaluation reports from 1999-2015 do not include any monitoring questions for the commercial mushroom industry.

The harvesters I interviewed rely on harvesting either as a significant—if not primary—source of income. Peter makes a substantial amount of his income from selling wild mushrooms, and both Kieran and Eliza depend on selling wild mushrooms for their businesses. Both researchers and harvesters mentioned opportunities they saw for the Forest Service to manage the land for mushrooms—increasing its economic

value along with enhancing employment possibilities for local communities. For example, Kieran sees managing for mushrooms as better for the local economy and as a way to provide environmental services. Louis also saw opportunities when the Forest Service decided to log an area:

When the Forest Service decide to let loggers go harvest burnt trees before we can harvest the mushrooms it means we don't get the chance to pick those mushrooms. I wonder if they could wait for the morel season to be done before letting the loggers go in. It seems like it would create a bit more revenue for them and more work for different communities.

Thus, many harvesters rely on the forests for their economic self-determination, yet the absence of the Willamette NF's consideration of the wild mushroom industry in natural resource management documents suggests that more could be done to amplify the economic opportunities for pickers, as well as for the forests.

The First National People of Color Summit's principle regarding social, economic and environmental rights adds another layer to the Forest Service's principles by also including the right to self-determination:

Environmental Justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples (United Church of Christ, 1992).

This principle clearly delineates the rights harvesters' should have and could provide another lens for the Forest Service to follow when making management decisions. In practice it might mean that the Forest Service considers mushroom harvesters as a distinct social, economic and cultural group with specific needs that should be considered in the administration of forestlands.

Radicalizing Environmental Justice in the National Forests

Although the United States government requires that federal agencies incorporate principles of environmental justice into their missions and decisions, these principles fall short of taking a comprehensive approach to environmental justice issues. Executive Order 12898 and NEPA's environmental justice guidance document do not take into account an ethical, balanced and responsible use of land, respect and justice in public policy, fair access to resources, and freedom from ecological destruction—all of which the First National People of Color Summit principles address. Thus, I turn to four principles from the First National People of Color Summit because they take a more comprehensive and radical approach to addressing environmental justice issues. This is an approach from which the National Forest System and communities could benefit when striving for just management practices.

Principle One: Ethical, Balanced and Responsible Use of Land

Environmental Justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things (United Church of Christ, 1992)

Harvesters partake in a responsible use of land and a renewable resource (i.e. mushrooms) through the active management of their mushroom patches. For the harvesters, picking mushrooms is a way to help more mushrooms grow: Eliza stated that “the more you harvest mushrooms the more you proliferate the spores” and Martha believes you should “keep harvesting to keep mushrooms growing.” Peter and Martha have been harvesting for twenty and thirty years, respectively, and cited that there is no difference for a mushroom patch's productivity whether you cut the mushrooms' stems or pull the whole mushroom out of the ground. Martha also shared a story of carefully

harvesting “beautiful, large chanterelles” that grew under moss at one mushroom patch for over twenty years. Additionally, for Eliza, successful management for mushrooms: “has nothing to do with managing the mushrooms, but has to do with managing the forest.” A clear case supporting a holistic approach in forest management practices.

Harvesters’ love of the forest and investment in their mushroom patches also speaks to their responsible use of the land. Miguel’s statement exemplifies this: “I like everything [about mushroom picking]. I love the forest”. Other harvesters’ expressed this attachment to the forest in different ways. For example, Peter goes to the same mushroom patches every year and for Louis picking can be a transformative experience:

I'm also developing a relationship with a wild resource, which transforms the way I think. Instead of trying to control a resource by watering it, fertilizing it, etc, I have to understand its life cycle, how it grows, where, when. I think it helps make me feel part of nature instead of above or outside of it. I also like the fact that it is a resource owned in common with the rest of the public and that it can (in theory) be managed communally (Louis).

These stories suggest harvesters’ investment in the land and the variety of ways they are managing their mushroom patches. Thus, including the harvesters’ experiences managing for their mushroom patches is an important knowledge base for the Forest Service to include and collaborate with when making management decisions.

Principle Two: Respect and Justice in Public Policy

Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias (United Church of Christ, 1992)

Harvesters’ perception was that the Forest Service did not see managing for wild mushrooms as a priority and in some cases singled out pickers. This suggests that wild mushroom harvesters might experience (or at least feel) discrimination from the Forest

Service based on their occupation. Kieran and Louis brought up some of these allegations. According to Kieran, the “Forest Service considers pickers to be a big headache” and their “focus and priority is to serve the timber industry and commercial harvesting of mushrooms is a nuisance.” Louis also explained ways he believed the Forest Service avoided managing for commercial mushroom harvesters and how they target some groups of harvesters:

When the Forest Service decides to close an area because they don't want or can't manage it, sometimes they'll turn a blind eye on the pickers that decide to pick anyway. Except that it's easier for the white pickers to pass as locals or campers. When Asian or Latino pickers show up in a small rural town, they are targeted as pickers right away.

Louis told another story about harvesters potentially experiencing discrimination from the Forest Service:

One National Forest area next to Crater National Park is closed to picking not because it's wilderness or anything, only because apparently pickers used to park there to access the park. So now they outlawed this huge area. Which means now pickers parked in the next legal area to access that one. One picker got caught three times one year and got three \$500 tickets and loss his driver's license, which is essential to pick mushrooms. So then he might have had to drive without a permit and risk getting more tickets.

Only a couple of harvesters brought up cases where they believed the Forest Service might be discriminating against pickers and picker ethnic groups. I use the above examples not to demonize the Forest Service, but to show the divide between managers and harvesters, and to provoke the question of how the Forest Service might incorporate more inclusive policies and measures so harvesters do not feel targeted and marginalized.

Principle Three: Fair Access to Resources

Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and provided fair access for all to the full range of resources (United Church of Christ, 1992)

Restricted access to forest resources was a recurrent theme that emerged from the harvesters' testimonies and within the Willamette NF's natural resource management documents. The Willamette NF management plan for mushrooms restricts access to the different forest areas: wilderness areas, research areas, habitat conservation areas, designated non-harvest areas, etc. Louis does not completely agree with the closing up of wilderness areas to harvesting, because he believes that commercial mushroom harvesting is a "low impact activity compared to logging and other commercial activity that were intended in the act." As the harvesters I talked with pointed out, these restrictions have very real effects on harvesters' livelihoods: limiting access to their mushroom patches and, at times, forcing them to pick illegally and risk getting fined. Louis cites a concern for the sustainable picking when the Forest Service opens up limited areas for more harvesting:

When I don't have access to a burn and I don't want to pick illegally I have to go pick in a legal burn, along with all the other pickers who decide to do the same. What happens is that there is too many pickers in that area and the mushrooms are being harvested too young, before they can mature, and each picker picks less mushrooms. So it's bad for our livelihood and for the environment.

Additionally, Louis states the problems he sees with how the Forest Service divides up commercial and recreational harvesting areas:

The same thing happens if they open some areas for commercial pickers and others for recreational. The problem is that the way they divide those areas is totally random and not based on best potential. So if the best

ground ends up being in a personal zone it's hard to resist going there. I understand the need to have mushrooms for recreational pickers but I'm not sure it's the best way to do it. It's also very hard to enforce. I think the Forest Service needs to sit down with commercial and recreational pickers to try to figure that out (Louis).

Once again this shows the lack of communication between harvesters and the managers.

Moreover, the exclusion of pickers from certain places may not sufficiently take into account the stake that harvesters have in the forest and, thus, fair access of the forest for those harvesters.

Principle Four: Freedom from Ecological Destruction

Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction (United Church of Christ, 1992)

Although the National Forests were set up to provide the nation with timber, the Forest Service has shifted to an ecosystem management approach that takes into account more holistic ecological management goals. However, the continued timber production activities on the forest as well as a lack of recognition of mushrooms in management documents results in the Forest Service falling short of these goals. For example, the harvesters' testimonies of the Willamette NF's timber activities illuminated how these activities sometimes result in the destruction of harvesters' mushroom patches. The Willamette NF natural resource management documents showed minimal consideration of mushrooms and the role of mushrooms as an economic resource. Moreover, the Willamette NF land and resource management plan and the Northwest Forest Plan incorporate overall visions and/or monitoring questions for managing timber, yet not for wild mushrooms.

This timber-centric management has, at times, serious repercussions on the harvesters' livelihoods. Martha supports logging when it allows timber and mushrooms to be grown together, yet she adds, "logging changes everything" for harvesting mushrooms. She notes that if the Forest Service clear cuts or thins an area "you don't get mushrooms for twenty years." Additionally, Miguel stated concerns about losing patches and having to take time to find a new patch because of "a lot of places logging everywhere". He explained, "this is a big problem for pickers...I don't want to lose my [mushroom] patch". Logging is a major concern for Eliza, also:

The biggest problem with the mushroom decline is destruction of the forest. The BLM [United States Department of the Interior Bureau of Land Management] obliterates the land [through logging] causing landslides.

Eliza continued, adding that from the continued logging by land agencies "I just see like the forest declining, thinning out". Because of this decline in the forest Eliza also believes mushroom hunting is consequently dying out.

These stories indicate that the timber activities occurring on Forest Service land do not always promote 'ecological unity and interdependence of all species', but instead destroy harvesters' mushroom patches and disrupt their livelihoods. If the Forest Service were to address the harvesters' concerns as well as re-evaluate the timber activities occurring on the forest there is potential for them to increase the ecological wellbeing of not only wild mushrooms, but also the forest.

Summary

The United State's principles of environmental justice (through EO 12898 and NEPA) provide a baseline to evaluate forest management practices, however they do not fully address commercial wild mushroom harvesters rights. Thus, to incorporate a

more holistic and transformative environmental justice approach the Forest Service could use the principles of environmental justice outlined by the First National People of Color Summit. Environmental justice themes that emerged from this discussion included a marginalization of the commercial mushroom harvesters community through harvesters' lack of participation in management decisions, lack of acknowledgement of mushrooms as an economic resources, restricted access to forestland, and destruction of the forestland that harvesters rely on.

CONCLUSION

“Behind all things seen lies something vaster; everything is but a path, a portal or a window opening on something other than itself”

–Antoine Saint-Exupéry, *Wind, Sand and Stars*

The world of Oregon’s commercial mushroom industry is vast, like the mushrooms’ mycelium underground. However, through analyzing the Willamette NF documents and interviews from an environmental justice lens this research opened a small window into this world.

My conversations with harvesters introduced me to the diversity within commercial mushroom harvesters’ worlds as each harvester came from a different region, background, and involved themselves in the industry in distinct ways. But despite these differences, a commonality between the harvesters was exemplified through their high environmental, cultural and economic stake in forest management, which emerged through the communal themes of sense of place, stewardship practices and economic dependence on the wild mushrooms of the forest.

The United States government requires that public land agencies like the Forest Service involve the public in decision-making processes and make environmental justice part of their mission. However, my conversations with harvesters and analysis of the Willamette NF’s natural resource management documents suggest that the Willamette NF, and other national forests in the Pacific Northwest, fall short of both these mandates. The Forest Service has its own barriers trying to manage for commercial mushroom harvesters due to limited funding and lack of administrative capacity. Yet, commercial wild mushroom harvesters have the right to have their voices

heard in management decisions and their economic, social and political rights be addressed. This is especially important for harvesters as many are politically powerless and rely on commercial mushroom harvesting as a source of income, and social and cultural wellbeing (McLain 2002; Tsing 2015).

Themes that surfaced from the Willamette NF's natural resource management documents and testimonies of harvesters indicate that the Willamette NF (and other public land agencies in the Pacific Northwest) are not incorporating principles of environmental justice in their forest management practices. According to the principles of environmental justice from EO 12898 and NEPA's environmental justice guidance document, harvesters have a right to participate in public participation processes and have the economic, social, and ecological effects of federal actions on their livelihoods addressed. Moreover, the 1991 First National People of Color Summit, expands these rights to include: fair access to resources; freedom of their environment from ecological destruction; and a rights to harvest for economic, cultural, political and environmental self-determination. However, the themes within the Willamette NF's documents include a minimal consideration of the mushrooms and the wild mushroom industry, restriction of harvesters' access to the forest, and a focus on managing for timber. Moreover, from the harvesters' testimonies, themes of the undue burden that these management practices placed on harvesters surfaced: their absence in decision-making processes, restricted access to mushroom patches, and destruction of mushroom patches because of logging. Moreover, there is a concern that future generations might not be able to continue to harvest mushrooms due to public land agencies timber-centric management

practices. Thus, the Willamette NF, among other land agencies in the Pacific Northwest, could be doing more to justly manage the forest as a whole, diverse ecological entity.

Opportunities for the Willamette National Forest

The Willamette NF's improved management of mushrooms could result in increased economic and ecological services within the forest. The commercial mushroom industry provides economic opportunities to people, as well as the Forest Service if they manage for mushrooms. Moreover, managing for mushrooms in tandem with, or in lieu of, timber products can improve the biodiversity within the National Forests along with the corresponding ecological, economic and cultural services (Jones and Lynch 2007; Pilz 1998; Duncan 2000).

Including the voices of harvesters in decision-making processes opens up opportunities for management of mushrooms. Many of the harvesters I interviewed actively managed their mushroom patches and many had decades of experience picking from the same patches. When managers do not consider wild mushrooms in analyses and planning documents or include harvesters in decision-making processes, they are leaving out a portion of the public who relies on the forest and their knowledge of a forest resource. Moreover, harvesters are a highly diverse group, which is all the more reason to conduct more research and improve policies to better understand the ecological benefits and impacts of mushroom harvesting.

One way the Forest Service can enhance the involvement of harvesters in decision-making processes is by implementing a participatory management approach. Participatory managements uses "context-specific collaboration among stakeholder groups" to develop action plans and takes into account ecological and social dynamics

(Barron 2012: 1007). Ultimately, the Willamette NF cannot make informed or environmentally just management decisions if they do not take into account the experiences, knowledge and voices of the commercial mushroom harvesters.

APPENDICES

Appendix A: First National People of Color Summit Principles of Environmental Justice

Principles of Environmental Justice

Delegates to the First National People of Color Environmental Leadership Summit held on October 24-27, 1991, in Washington DC, drafted and adopted 17 principles of Environmental Justice. Since then, The Principles have served as a defining document for the growing grassroots movement for environmental justice.

PREAMBLE

WE, THE PEOPLE OF COLOR, gathered together at this multinational People of Color Environmental Leadership Summit, to begin to build a national and international movement of all peoples of color to fight the destruction and taking of our lands and communities, do hereby re-establish our spiritual interdependence to the sacredness of our Mother Earth; to respect and celebrate each of our cultures, languages and beliefs about the natural world and our roles in healing ourselves; to ensure environmental justice; to promote economic alternatives which would contribute to the development of environmentally safe livelihoods; and, to secure our political, economic and cultural liberation that has been denied for over 500 years of colonization and oppression, resulting in the poisoning of our communities and land and the genocide of our peoples, do affirm and adopt these Principles of Environmental Justice:

- 1) Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.
- 2) Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.
- 3) Environmental Justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.
- 4) Environmental Justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right to clean air, land, water, and food.
- 5) Environmental Justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples.
- 6) Environmental Justice demands the cessation of the production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production.
- 7) Environmental Justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation.
- 8) Environmental Justice affirms the right of all workers to a safe and healthy work environment without being forced to choose between an unsafe livelihood and

unemployment. It also affirms the right of those who work at home to be free from environmental hazards.

9) Environmental Justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.

10) Environmental Justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration On Human Rights, and the United Nations Convention on Genocide.

11) Environmental Justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.

12) Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and provided fair access for all to the full range of resources.

13) Environmental Justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.

14) Environmental Justice opposes the destructive operations of multi-national corporations.

15) Environmental Justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms.

16) Environmental Justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives.

17) Environmental Justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible; and make the conscious decision to challenge and reprioritize our lifestyles to ensure the health of the natural world for present and future generations.

The Proceedings to the First National People of Color Environmental Leadership Summit are available from the United Church of Christ Commission for Racial Justice, 475 Riverside Dr. Suite 1950, New York, NY 10115.

Appendix B: Environmental Justice Guidance under the National Environmental Policy Act

In light of Executive Order 12898, the White House Council on Environmental Quality (CEQ) issued Environmental Justice; Guidance Under the National Environmental Policy Act (December, 1997) . This guidance includes six principles for environmental justice analyses to determine any disproportionately high and adverse human health or environmental effects to low-income, minority, and tribal populations.

The principles are:

- 1) Consider the composition of the affected area to determine whether low-income, minority or tribal populations are present and whether there may be disproportionately high and adverse human health or environmental effects on these populations
- 2) Consider relevant public health and industry data concerning the potential for multiple exposures or cumulative exposure to human health or environmental hazards in the affected population, as well as historical patterns of exposure to environmental hazards
- 3) Recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action
- 4) Develop effective public participation strategies
- 5) Assure meaningful community representation in the process, beginning at the earliest possible time
- 6) Seek tribal representation in the process

Appendix C: Semi-structured Interview Questions Template

When interviewing study participants I used grand tour questions, and then ask follow-up questions based on their answers. Grand tour questions for the different study groups are outlined below:

A. Commercial Mushroom Business Owners

1. How long have you been in the commercial mushroom business?
2. Can you walk me through what a typical season is like for the mushroom business?
 - a. If they don't mention where they get their mushrooms (land ownership) prompt them:
 - i. So, where do the mushroom harvesters selling to you harvest the mushrooms – on private lands? Public? Both?
 - ii. Is harvesting the same from both public and private lands? If not, can you describe the differences? And how does this affect your business?
 - b. If they don't mention permits/policies, prompt them:
 - i. So, what types of permits are needed, if any? How does that all work? How do these policies affect you?

B. Commercial Mushroom Pickers

1. How long have you been commercially harvesting mushrooms?
2. Can you walk me through a typical day of harvesting from start to finish? What's a season like?
 - a. If they don't mention where (land ownership) prompt them:
 - i. So, where do you harvest – on private lands? Public? Both?
 - ii. Is the typical day harvesting the same on public and private lands? If not, can you describe the difference?
 - b. If they don't mention permits/policies, prompt them:
 - i. So, what types of permits are needed, if any? How does that all work? How do these policies affect you?

C. Willamette National Forest Officials

1. How long have you been a land manager?
2. How do you manage for mushrooms on Willamette National Forest land?
 - a. What are or are there any future management plans for mushrooms on Willamette National Forest lands?
3. What are your experiences with commercial mushroom harvesting on Willamette National Forest land?
4. What types of challenges exist for commercial mushroom harvesting management on National Forest lands?

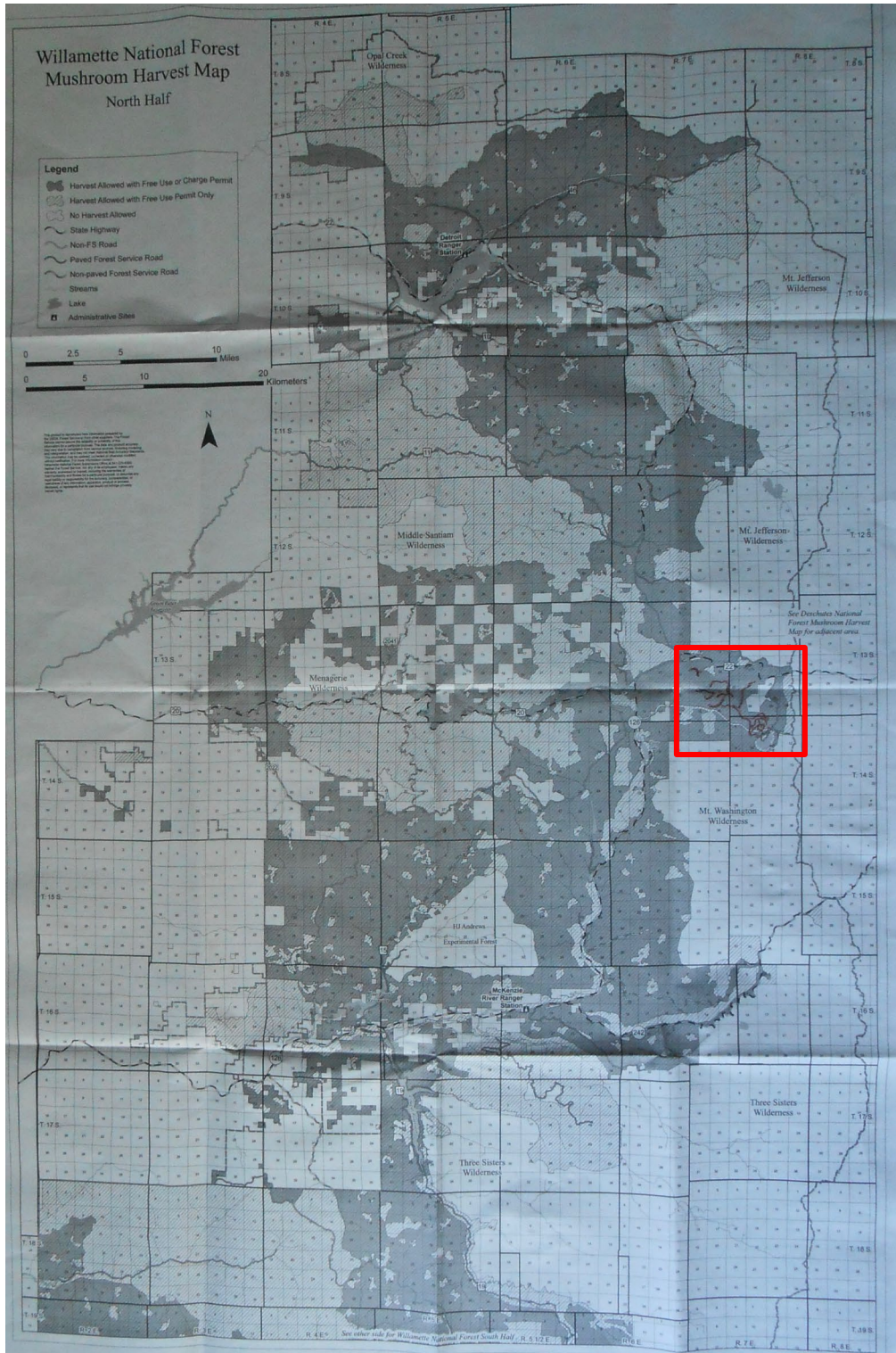
D. Experts on Wild Mushroom Harvesting in the Pacific Northwest

1. What types of challenges exist for commercial mushroom pickers on National Forest lands?

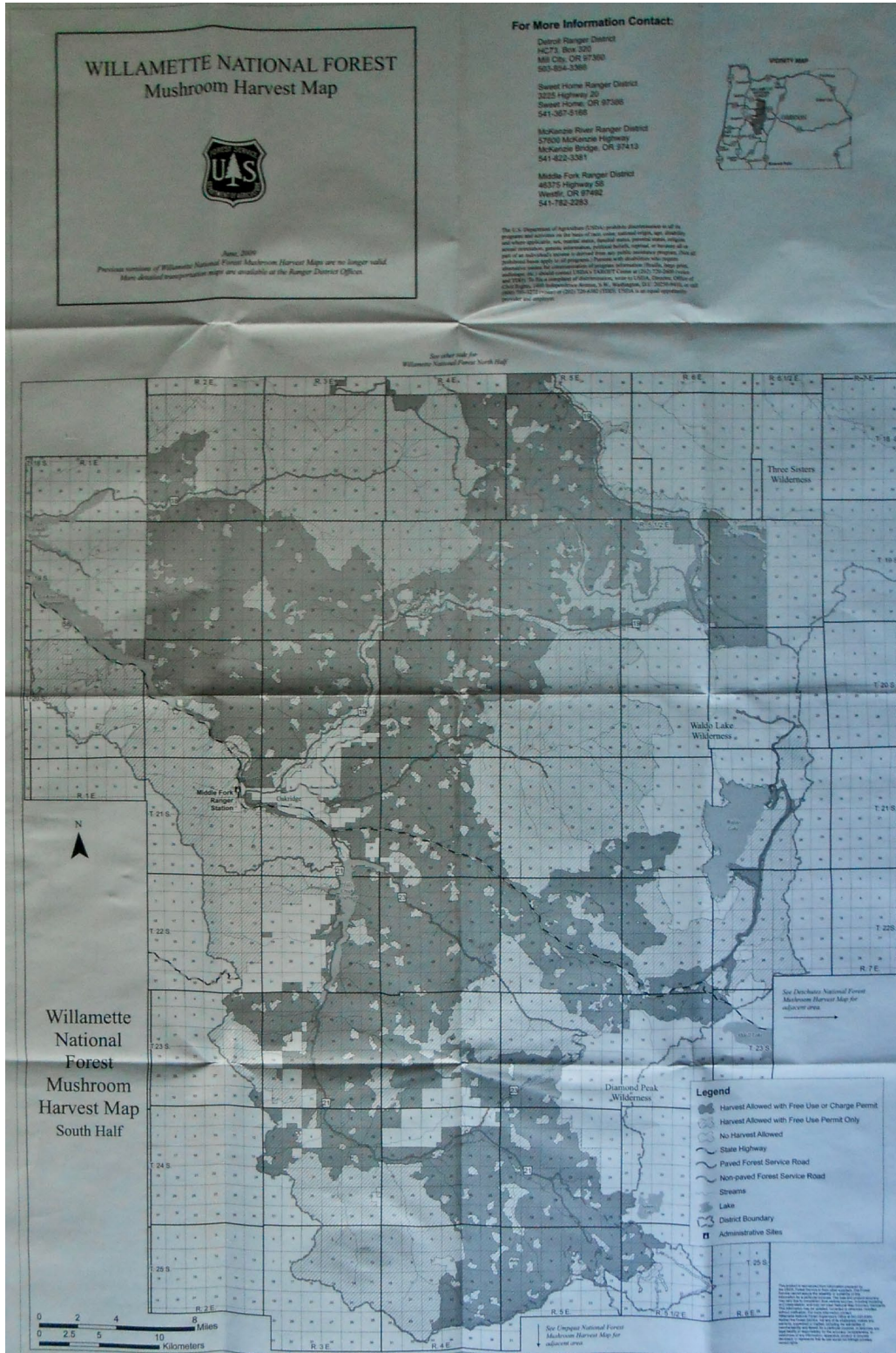
2. What types of challenges exist for commercial mushroom harvesting management on National Forest lands?

Appendix D: Willamette National Forest Mushroom Harvest Map

North Half of the Willamette NF Mushroom Harvest Map:



South Half of the Willamette NF Mushroom Harvest Map:



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