

IN DEFENSE OF PRESCRIBED FIRE AS HABITAT
MANAGEMENT IN THE WILLAMETTE VALLEY THROUGH THE
LENS OF AVIAN ECOLOGY

by

ZOE HILL SPARKS

A THESIS

Presented to the Department of Environmental Science
and the Robert D. Clark Honors College
in partial fulfillment of the requirements for the degree of
Bachelor of Science

MAY 2025

An Abstract of the Thesis of

Zoe Hill Sparks for the degree of Bachelor of Science
in the Department of Environmental Science to be taken May 2025

Title: In Defense of Prescribed Fire as Habitat Management in the Willamette Valley Through
the Lens of Avian Ecology

Approved: Peg Boulay, ELP Senior Instructor II
Primary Thesis Advisor

Suppression has been the primary form of fire management in the United States for decades, driven by a widespread fear of the destruction that fires can have on the world. While these fears are fair, fire is not an all-destroying, uncontrollable entity, and is instead a vital part of the natural cycle within many different ecosystems across the country. Within the Willamette Valley, it is especially important since the landscape was originally shaped by historical Kalapuyan burns before settlers forcibly removed the people and suppressed their traditions. In this thesis, I argue instead for controlled burns to be implemented into ecosystem management plans because of fire's many benefits to the natural world. Through the lens of avian ecology, I explore the history of fire laws in Oregon, the direct effects that fire has on Willamette Valley habitats, and the visible positive changes that follow controlled burns.

Acknowledgements

Firstly, I would like to thank my advisors: my primary advisor, Professor Peg Boulay, for supporting me through this project as well as through my experience as an Environmental Science undergraduate and for always being excited to talk about birds, and Professor Kristin Rahilly, my Honors College representative, who has been so excited about this project since day one and who provided excellent feedback and support through this whole process.

To my parents, thank you for instilling naturalist ideals into me from an early age. I feel so grateful that I can go on hikes with you and spend entirely too much time looking at birds.

To my partner, Bryan, thank you for everything from your companionship to your proof-reading skills to your willingness to listen to my stories anytime I go outside. Without you, I probably wouldn't have finished this, and your endless love and support mean the world.

And finally, to my dear friend, Ben, thank you for being an excellent birding companion and unofficial research partner for this project. You drove me to enough places around Eugene to look for birds and fire evidence that you should probably get some credit in here.

Table of Contents

1: Introduction	6
2: A Long History of Suppression	10
Prescribed Burns by Indigenous Tribes	10
The Weeks Act and Other Fire-related Laws	12
A Land Without Fire	15
3: After Fire	19
Post-burn Successional Stages	19
Site 1: Burn Unit #49, in the Pioneer Succession Phase	21
Site 2: Meadowlark Prairie, in the Intermediate Successional Phase	27
6: Conclusion	38
Bibliography	40

List of Figures

Figure 1: Oak-associated Habitat Decline in the Willamette Valley	17
Figure 2: Burnt thistle	24
Figures 3 and 4: Rose bushes (top) and the dark-eyed juncos underneath them (bottom)	26
Figure 5: Fender's blue butterfly Range	31
Figure 6: Meadowlark Prairie burned section	33
Figure 7: Meadowlark Prairie, January 2025	35

1: Introduction

Throughout southern and eastern Oregon, if you're driving in a rural or wild area, there's a good chance you're going to spot a fire danger sign. They're big and wooden with Smokey Bear usually plastered on them, an Uncle Sam-esque figure in jeans and a ranger hat proclaiming that "only YOU can prevent wildfires". Beside Smokey is the colorful dial with an arrow that's usually pushed to **HIGH** in the summertime and **LOW** in the winter. As we would drive past those signs when I was younger, I loved seeing the pretty colors and Smokey's little hat, and I believed his message wholeheartedly. No starting fires. Got it. I knew that fires were bad for the logging industry that my hometown had once relied on, and Smokey reaffirmed that sentiment: fire was not a good thing, and we want to never see that dial set to **EXTREME**.

Then, as I grew older, we would still drive past those signs, and they would be set to **EXTREME** in the summer, framed by densely-packed Ponderosa pine forests and gray-orange smokey skies. Gone were the summers of my childhood with clear blue skies; instead, we waited for warnings about dangerous air quality and advisements to stay inside in front of the air purifier so my younger sibling's asthma wouldn't get triggered. Those fire danger signs were a great way to gauge how crispy the grass will be when you walk through it and whether or not you'll be able to start a fire in the pit at a campground, sure, but they were now also a warning about the potential for a terrible story on the news later that night. The front page of the newspaper would have articles about a new wildfire every other day, and they were always named after the location they were working on burning down. Had other people not been following Smokey's instructions all this time? Why were the fires getting worse?

Smokey's message, it turns out, isn't all that effective in the real world, because fire isn't a thing that should be prevented. Fire is an integral part of ecosystems across the world,

including each habitat that's protected by a fire danger sign in southern Oregon. Burns clear brush, kill invasive species, and break down detritus that's building up in an ecosystem. Despite Smokey's instructions, they can't be prevented at all, by me or you or anyone else on the planet. Lightning wouldn't be such an effective fire starter if fires weren't supposed to happen!

Dozens of species have evolved to utilize those periodic burns as part of their lifecycles:

lodgepole pines (*Pinus contorta*), for example have serotinous cones that require exposure to high heat to open and release seeds (Anderson 2003), and Venus flytraps (*Dionaea muscipula*) require fire to remove competitive undergrowth and shrubbery, and the flytraps thrive most in the early successional stages following a burn (Schulze et al. 2001). The pines and flytraps, though very different species of plants that require very different resources to survive and that are found in habitats on opposite sides of the country from each other, both rely on the natural cycle of fire to survive, and the removal of fire is detrimental to the survival of these species and many others. Even if an organism doesn't directly need fire to survive, many species in frequent fire systems have evolved to be fire-resistant and can't compete with fast-growing fire-sensitive competitors if periodic burns are removed from the habitat.

Despite all of these positive effects that fire has on many different species, suppression has been the primary form of fire management in the United States since white colonialists set foot in North America. Many of the opinions surrounding this practice have been driven by fear of the destruction that fire causes, but it's been proven over and over that suppression isn't the best way to manage fire (Kreider et al. 2024). Smokey doesn't seem to really have nature's best interest at heart, and it's high time to change our opinions about what fire means and how it affects the world. As an alternative thought process and national practice, I will be arguing for a

Commented [PB1]: Since you are using lowercase for species' common names, don't capitalize lodgepole (but do capitalize Venus because it is a proper noun).

method of management that also works as a tool for habitat restoration and stewardship: controlled burns.

Controlled burns, also known as ecological or prescribed burns, are deliberate fires set by humans for the express purpose of ecological control and management. They've been used for thousands of years, both as a cultural and ecological practice, and have proved to be effective in maintaining the natural cycle without the significant disruption of human life (Cohen 2010). Deliberate choices and careful planning go into a controlled burn, unlike the wildfires that are in the news: while wildfire season, for example, happens in the summer when the landscape is driest and most susceptible to fire starting via lightning or human error, controlled burns are normally carried out in the late summer and early fall when temperatures cool, moisture returns, and the land isn't at its driest point. Burns are only carried out if weather conditions and wind direction allow a safe environment that won't let fire escape its confines (hot winds are especially effective at moving burning material away from a fire), and they're monitored constantly by the people who set them, whether that's a federal organization like the Bureau of Land Management or a local restoration nonprofit. Most importantly, though, controlled burns are backed by decades of research into how fire affects ecosystems in positive ways. Species like the Venus flytrap and lodgepole pine are present all across the country, and reintroducing fire in a safe, controlled manner is a viable and important method for restoring their threatened populations.

For my argument, I'll be using two things that are very important to me: birds and the Willamette Valley. I am a birder first and foremost, so I always love learning about birds, but avian ecology is also an effective lens for observing natural processes. Birds are indicator species within their habitat, directly reflecting the health and functionality of their niche ecosystem

(Forest and Rangeland Ecosystem Science Center 2022). They're highly affected by any events that change their habitat, whether that be fire or something else. They're also diverse and abundant throughout the world, as well as colorful, vocal, and diurnal, so it's easy to observe them. As for the Willamette Valley, although it differs quite a bit from southern Oregon, fire is and always has been an integral part of the natural cycle. An array of unique habitats throughout the valley, including marshes, wetlands, prairies, wet prairies, riparian ecosystems, oak woodlands, and conifer forests, have all evolved to allow fire to periodically come through. Through decades of intense fire suppression and human impacts, however, many of these delicate habitats are suffering. An estimated 67% of Willamette Valley wetlands have been reduced or converted since settlers colonized the area starting in the mid-1800s (Taft and Haig 2003), oak habitat is continuously declining, and the ecosystems that must support a wide array of migratory and local birds are no longer able to provide that support as effectively.

Already, controlled burning is being reintroduced across the valley in a variety of ecosystems, and in the coming pages, I will share the history of fire suppression, the effects of fire on a given ecosystem, and the long list of positive outcomes of fire when it occurs. I'll do this through a combination of personal field observations, creative writing, and literature review to create a palatable, accessible way to share a passion that I already possess and that I believe others will benefit from. Smokey Bear's slogan may be popular, but the diversity and beauty of birds throughout the Willamette Valley that are supported by fire are much more worthwhile to pay attention to.

2: A Long History of Suppression

Prescribed Burns by Indigenous Tribes

Before white colonialists settled in the United States, Indigenous tribes across the continent acted as the caretakers of the land. They utilized ecological management practices long before those practices were recognized as scientifically beneficial to the environment, and this was often to assist the tribe in the long term through the pruning of the environment to their benefit. In the Willamette Valley, the Kalapuya people led this management, acting as stewards of the land while supporting themselves from their ecological efforts. Historically, the valley was dominated by oak savannah and wet prairies with the occasional conifer stand, mostly consisting of Ponderosa pine (*Pinus ponderosa*) and incense cedar (*Calocedrus decurrens*), interspersed. It's been observed that the valley would have much more conifer coverage and much less oak savannah presence if the Kalapuya had not been using fire consistently for more than 6,000 years before white settlers came in (Allen 2003). Controlled burns were well-thought-out by the Kalapuya: long before it was scientifically backed, fires were usually only used in the late summer and early fall because control is easiest during that time of the year (Grand 2024), and many people would be a part of the burn process to make sure it was carried out effectively.

Burns were utilized for a variety of reasons by the Kalapuya, most of which were related to gathering food or supporting the landscape so that increased production from food-bearing plants was possible. Robert Boyd's 1999 essay "Strategies of Indian Burning in the Willamette Valley" details multiple food sources that the Kalapuya gathered through prescribed burns. Ungulate species, including the black-tailed (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus leucurus*) and Roosevelt's elk (*Cervus canadensis roosevelti*) were prevalent in the Kalapuyan diet (the latter two species are now limited in the Willamette Valley due to significant

habitat loss and over-hunting). Systematically burning open areas to restrict grazing areas led to an easier hunt, and collaborative communal drives with other tribes were held yearly in the fall to bring in enough venison to sustain tribes throughout the winter. Other species also became more available through open habitat burns: grasshoppers were easy to collect after they'd perished in the fire, and the seeds of tarweed (*Madia* spp.), which were used to make meal, were easier to collect once the tar-like substance the plant produces to protect itself was burned away. Many plants that are vital for both the prairie ecosystem and the Kalapuya, including camas (*Cammasia quamash*), wild onion, lupines, and bracken fern (*Pteridium aquilinum*), are fire-resistant, growing back quickly and healthier before the burn. In the forested areas, most of which were dominated by Oregon white oak (*Quercus garryana*), burns cleared underbrush without harming the fire-resistant oaks, which in turn stimulated acorn production for the Kalapuya (Grand 2024). While these fires were helping the Kalapuya collect a variety of food across the land, they were also affecting the ecosystem that shaped the Willamette Valley's ecology into what it has been for thousands of years.

Despite the Kalapuya's benefits to the valley, they were still removed from it in the mid-1800s and forced to live on reservations in other parts of the state. At the same time this displacement was occurring, implicitly racist regulations across multiple states outlawed many aspects of Indigenous cultures, including their languages, cultural practices, religions, and any type of intentional burns, even if it were for ecological benefit. In California in 1850, for example, the Act of Government and Protection for Indians was enacted in the first session of the California State Legislature, and included a section denoting "If any person or persons shall set the prairie on fire, or refuse to use proper exertions to extinguish the fire when the prairies are burning, such person or persons shall be subject to fine or punishment, as a Court may adjudge

proper” (California State Legislature, 1850). With a growing fear of fire and anything related to Indigenous culture among white settlers, prescribed burn practices by the Kalapuya, as well as hundreds of other tribes, were halted, both by social pushes by the pioneers and, eventually, by federal laws.

The Weeks Act and Other Fire-related Laws

As white settlers moved across the United States and established permanent towns, homesteads, and agricultural fields, their opinions on fire were wholly negative since it could destroy the permanency they’d worked so hard for. While the landscape still desperately needed fire, especially as traditional Indigenous fire practices were halted, this uncontrollable threat to the settlers’ new lives was greater than the maintenance of the natural world. Farmers and ranchers occasionally used small fires to clear growth and improve land conditions for livestock grazing, but mostly, fires were put out before they could get very big. A lack of knowledge about how fire functioned within an ecosystem also pushed these ideas: beliefs about fire being destructive to soil, ruining habitats completely, or causing plants to grow back unhealthier than before were spread widely amongst settlers (Johnson and Hale 2002).

The major catalyst for establishing real laws surrounding fire management, however, was via the U.S. Forest Service. In the late nineteenth and early twentieth centuries, multiple large and devastating fires happened across the United States, including the Great Fire of 1910, which burned three million acres of forest land across Montana and Idaho and killed 86 people (Donahue 2024). The U.S. Forest Service, only five years old at the time, did not have the resources to fight the Great Fire before it destroyed so much, and utilized this incident as evidence that fire suppression was necessary in the United States. After all, if there’s a Forest Service to protect the forests, why would we let those forests burn down? This, combined with

increasing anti-fire sentiment from the timber industry, led to one of the first federal laws related to fire suppression to be passed: in 1911, President Howard Taft signed the Weeks Act. The act allowed the federal government to purchase private land for the purpose of conservation, called for national fire protection efforts (Forest History Society 2011), and urged the states to come up with individual fire plans rather than the government leading in the establishment of regulations for dealing with fires (Southard 2011). \$200,000 in funds were also designated to be given to states with forest protection agencies: up to \$10,000 could be given for fire patrolman salaries as long as the state matched the amount (Forest History Society 2011). The state-specific laws following this act reflected that state's individual biomes, economy, and general attitude towards forest management and fire presence; Oregon's timber industry was the primary driver behind most fire-related ordinances at the time, and a state forester position was created for "a practical forester familiar with western conditions and experienced in organization for the prevention of forest fires" (Oregon Forest Fire Laws, 1911-1919).

While the Weeks Act headed the establishment and expansion of federally protected national forests across 25 states (Forest History Society 2011), the fire-related sections of the act were not especially effective in creating the pro-fire suppression ideals that the Forest Service was pushing for, mostly because of a lack of incentive for the states (Forest History Society 2019). In December 1923, Oregon Senator Charles E. McNary introduced a bill to amend the Weeks Act and expand upon it; in January 1924, New York representative John D. Clarke introduced a bill to the House of a similar nature to McNary's. President Calvin Coolidge signed the Clarke-McNary Act in June 1924, which both changed the language in the Weeks Act about lands that the government could protect and increased the funds towards fire suppression action in the states to \$200,000 to increase collaboration between federal, state, and private forestry

sectors via financial incentive (Forest History Society 2019). It worked, convincing timber companies to protect forests during logging and states to suppress fire as much as possible.

While many people would argue that fire was necessary in the United States, including Aldo Leopold in his 1939 book “A Sand County Almanac” and a variety of ecologists and scientists throughout the years, the Forest Service and the US government persisted with their suppression narrative. Funds available through the Clarke-McNary Act were withheld from states that tolerated controlled burning (Johnson and Hale 2002). The Forest Service coined the “10:00 AM rule”, which declared that all wildfires should be put out by 10:00 AM the day they’re discovered (van Wagtenonk 2007). Campaigns for anti-fire propaganda were carried out, sponsored by the American Forestry Association and focusing on ideas like fire being dangerous for wildlife and the American way of life. By far the most effective (and longest-running) symbol from the Wildfire Prevention Campaign was Smokey Bear, created in 1944 by the Forest Service, Wartime Advertising Council, and the National Association of State Foresters. With tensions caused by WWII running high, the need to protect US soil was critical, and Smokey was an ideal symbol to do so. It proved effective, continuing on despite opinions slowly shifting away from “only fire suppression can save the forests”.

Although many laws surrounding fire suppression have been amended or changed (in 2003, the sections about fire suppression funds were struck from the Clarke-McNary Act) and controlled burns have been slowly reintroduced into U.S. ecology since the 1970s, opinions from this time still continue. Smokey Bear remains a popular symbol and the face of wildfire management in the United States today, despite representing outdated ideas spurred on by the tensions of WWII. Although he is a friendly face and represents a positive message, especially in

a time where wildfires are more destructive than ever, Smokey represents a dangerous and ineffective form of habitat management, and perhaps it's time for him to retire.

A Land Without Fire

The laws established in the United States about suppression were built on ignorance and fear rather than scientific facts, lived experiences, or basic observations about how fire affects an ecosystem, and the land suffered because of this. Like other key parts of nature's lifecycle, the removal of fire from an ecosystem is detrimental to the health and survival of most species within the suppressed habitat. After a century of aggressive fire suppression and the persistence of that original fear, ecosystems are suffering. To understand the consequences of fire loss fully, one must understand what occurs in a habitat goes through that loss.

Plants are especially affected by suppression compared to other organisms because they're the ones who are changed by disturbances like fire the most. In forests and woodlands, the periodic removal of dense undergrowth allows for more growing room for larger trees, and thinning out saplings means trees won't be growing too close together and competing for resources. Less dense wooded areas mean healthier trees can produce more nuts or seeds that other animals can feed on, and the potential for a disease or parasite rapidly spreading amongst trees will be less devastating to a forest if the trees are spread out and interacting with each other less. Without fire, dense brush grows without limits, saplings that would've died out otherwise grow into adults, and older trees suffer by having to work harder to acquire the resources necessary to maintain their growth. Trees are smaller, weaker, and more prone to disease and insect infestations than in forests with regular clearing, and ailments spread more easily between trees from being so close together (Asaro et al. 2023). Biodiversity drops as trees dominate and underbrush thickens, causing smaller plants, especially shade-intolerant ones, to die out. Other

organisms that rely on plants other than trees are not able to live in the ecosystem, and animal diversity decreases along with the plants. Invasive species that are more tolerant of changing conditions are able to outcompete native species under stress and will take over as the ecosystem weakens. Lower biodiversity also leads to a higher potential for a single event, like a sudden fire or a particularly bad bark beetle infestation, to wipe out the ecosystem completely.

In the Willamette Valley, a major consequence of fire suppression has been the encroachment of dense conifer-dominated forests in areas where oak woodland, upland prairie, or wetlands have historically occurred (Grand 2024). Upland species are less fire-resistant than wetland species since fire occurs less frequently in their habitats, and were historically removed by Kalapuya burns or naturally started fires. However, fire-sensitive upland species can move into historically open wetland habitats without that occasional thinning occurring. This creates foliage cover over wetlands and prairies, forces out local species, increases competition between plants for resources like water and sun, and destroys the ecosystems, converting them to forests with increased shade and moisture (Grand 2024). In oak woodlands, fast-growing conifers like the Douglas-fir (*Pseudotsuga menziesii*) can thrive without fires present, and in turn strangle out the shade-intolerant oak trees and their dependent organisms. This, along with the continual increase of human activity like logging and agriculture, has significantly decreased oak habitat throughout the Willamette Valley (Figure 1).

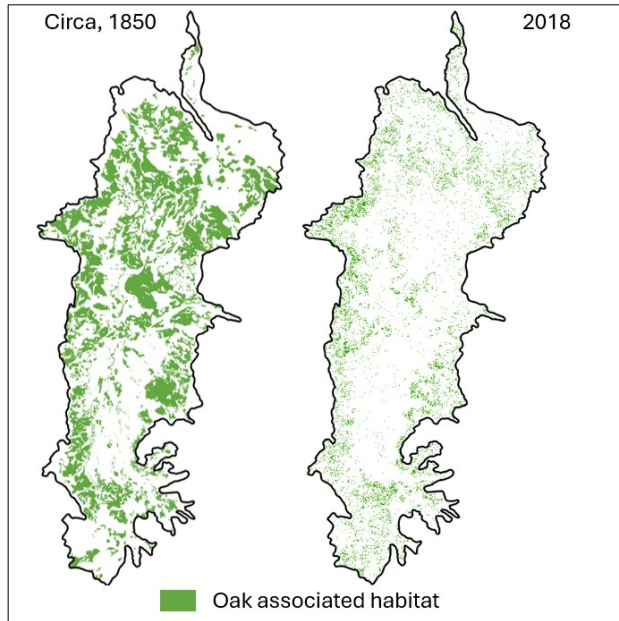


Figure 1: Oak-associated Habitat Decline in the Willamette Valley

Side-by-side visual representation of the decline of oak-associated habitats between 1850 and 2018 (Credit: Lauren Grand, Oregon State University, with data from Christy et al. 2011 & Kagan et al. 2018)

One of the most ironic consequences of fire suppression is that when fire is finally allowed to occur, whether by human choice or not, it comes back even bigger than before. Debris builds up if it is not periodically cleared (yes, it will decompose over time, but not quickly enough to maintain bare ground), so there are layers upon layers of conifer needles, cones, leaves, sticks, grasses, and dead plants that have been drying out for decades. Any fire needs easy-to-burn kindling to get going, and these detritus layers are a highway of easy kindling throughout an entire habitat. Wildfires can spread much further when this amount of fuel is available to burn, especially when it's packed closely together from years of unchecked growth. The fire can also burn much hotter and for much longer, meaning that large, old trees that would

survive a normal burn can potentially die in these much larger wildfires. Even species that are designed to benefit from fires will die if temperatures get too hot. These high-intensity wildfires will burn much more in a suppressed ecosystem because that cycle has been moving towards another fire since the suppression was implemented, and the consequences are greater for it. Without the removal of brush before a fire is lit, wildfires will continue to be large enough, and the dreaded Fire Season will continue to be a yearly occurrence.

Fire, as a consistent part of the natural cycle, is so vital for maintaining healthy ecosystems that without it, every part of the ecosystem suffers. Many different consequences come to an ecosystem that experiences this loss of disturbance, and without a reintroduction of burns, it's likely that the natural cycle will not recover.

3: After Fire

Post-burn Successional Stages

Most ecosystems have a cycle of successional stages following any event that wrought significant change on the established habitat. These stages are marked by the changes in plant and animal presence after a large-scale change occurs. There are two types of successional stages, marked by the state of the ecosystem preceding the event, the amount of change brought on by the event, and the amount of time it takes for organisms, primarily plants, to reestablish themselves. Primary succession occurs when the habitat has never had life before, like a new lava flow or freshly exposed sea floor, and these successional stages will happen very slowly since there are few to no nutrients available in the soil right afterwards for organisms to utilize. Secondary succession, on the other hand, occurs when an established habitat experiences a devastating event, and since the nutrients and organisms within the dirt are not completely destroyed, the ecosystem bounces back from the event much quicker (Witynski). Normally after a fire, secondary succession will follow since the event is a normal occurrence, soil nutrients aren't being burned, and fire-resistant species can grow back quickly following the event. Often, fire can even recycle nutrients from dead material, returning vital resources like carbon back into the natural cycle (Witynski). Because so much fire suppression has occurred and modern wildfires are often more destructive and hotter than healthy fires, however, larger wildfires can damage an ecosystem so severely by wiping out trees and other large plants, destroying soil, and killing even the fire-resistant species that primary succession can occur instead.

Controlled burns never burn hot enough to cause this much change in an ecosystem, meaning that following them, the successional stages occur quickly after the flames subside. In ecosystems like the prairies of the Willamette Valley, where fire is a very common occurrence

rather than an occasional one, fire-resistant species like camas may not even be removed in the fire, and will maintain themselves as the successional organisms return. The first to actually return to the area are the “pioneer species”, which are hardy, resilient organisms that require fewer nutrients in general (or aren’t picky about the nutrients they consume). Seeds and rhizomes left in the soil, undamaged by the flames, grow the first plants in the burned area, and are joined by seeds or spores that come in via the wind. These plants, mostly grasses and perennials, are often fast-growing and thrive in open areas with lots of sun and little competition. Insects are quick to return if they don’t require specific habitat parameters. Generalist bird species like crows, ravens, starlings, raptors, vultures, and jays, which have flexible dietary and habitat needs, also return quickly, feasting on the dead organisms the fire left behind, the fruits of the pioneer plants, and the insects that have little shelter to hide out in. Those first plant species eventually add nutrients to the soil that the fire may have removed, leading to larger plants with more specific needs to establish themselves in the area (Conte 2025). The pioneer plants may die out once other species return, now having to compete for resources. Small mammals return with these intermediate plants, as do raptors and songbirds. In forest habitats, trees will eventually regrow. Bird species with more specific niches, like flycatchers, gamebirds, and some songbirds, and insects like dragonflies and butterflies, will return when the ecosystem has fully “recovered” from the disturbance near the end of the successional stages. The habitat doesn’t necessarily recover, though, since fire is just another part of the cycle within the ecosystem; instead, the habitat is changed and reborn, different from before but healthy and ready to support new life.

This burst in diversity following a fire can be explained by the intermediate disturbance hypothesis. Originally conceived in the 1940s, the hypothesis theorizes that ecosystems are the healthiest and most diverse when a moderate amount of disturbance occurs within them

(Wilkinson 1999). Since most organisms cannot tolerate high levels of stress in their habitat, they will die out when high levels of disturbance are occurring; if little disturbance is occurring, diversity decreases due to competitive exclusion by dominant species (Wilkinson 1999). As I described in the post-fire successional stages, the disturbance has paved the way for an ecosystem to be rejuvenated, clearing out the old and making way for the new. When the successional stages are finished after a controlled burn, diversity is highest, the habitat is healthiest, and other disturbances like wildfires are less likely to occur, which minimizes future disruption to the ecosystem and allows for the new biodiversity to increase and continue.

I had the privilege of visiting two places near Eugene for this project that had been the sites of prescribed fires and were now in different stages of succession. The first had been burned fifteen days before my visit, and was well within the pioneer stage, with all of the expected species interacting with the recently disturbed habitat. The second had been burned a year earlier, and intermediate species were prevalent throughout it, showing much more recovery than the first site. These real-time effects of controlled burns were easily accessible and observable, and these sites show that using fire for ecological restoration is working.

Site 1: Burn Unit #49, in the Pioneer Succession Phase

I was invited to tag along with my thesis advisor's "Learning with Fire" class on a field trip in October 2024 to that year's burn unit #49, a meadow southwest of Eugene that's part of the 252-acre Coyote Spencer Wetlands. It's located down Crow Road and across from a homestead with crowing chickens (which could be heard all the way from the meadow) and a local tea house. The meadow is surrounded by oak woodland, dominated by Oregon white oak and intermingled with Oregon ash, but to the west lies Coyote Creek, a tributary of the Long Tom River, and past that are hills covered in dense conifer forest. It was remarkably quiet in this

privately-owned meadow, save for the chickens across the road and the calls of birds in the surrounding trees, and we had the privilege to meet with some of the team who had led a prescribed burn in the meadow fifteen days before we visited, on October 3rd, 2024. They were part of the McKenzie River Trust, a nonprofit land trust focused on conservation and restoration in the McKenzie River basin, which bought most of the Coyote Spencer Wetlands in March 2012 (some sections were acquired in later years) with the help of a North American Wetlands Conservation Act grant. They've been restoring and protecting the area ever since.

As part of the restoration initiative by the McKenzie River Trust and its partners, prescribed burns have been reintroduced into the upland prairie and oak ecosystems to remove invasive plants and mimic the natural cycle of nature after human disturbance. This particular burn had been planned meticulously. Multiple controlled burns across the country during the season had already escaped containment, they explained, and besides the safety risks and the potential for damaging habitat that hadn't been prepared to be burned, it was bad press, since the news often latches onto the mistakes made by fire prescribers rather than reporting on the long list of benefits that successful and contained burns have. Even though 99% of prescribed fires don't go past their barriers, it's still vital to take as many precautions as possible, and this one was no exception. Weather conditions were monitored for weeks leading up to the burn, looking for days with moderate temperatures so the brush wouldn't be too dry, and low wind speeds at the right angles, since wind can pick up material from the fire and carry it to areas that aren't supposed to be ignited, push it towards the people nearby who are watching the fire, or bring the smoke towards populated areas. Fuel and dirt moisture were monitored to make sure things would burn correctly; too much moisture means a poor burn, and too little moisture increases the risk of things getting out of control.

The team also described how much work was put into preparing for the burn, even when it was still unclear whether weather conditions would be good enough to support safe prescribed fires at all: larger stumps and heavier brush were cleared by hand from the area, which would've burned much differently than the target invasive grasses and plants that they were trying to remove, and mowers had been brought in to create clear barriers around where the fire would be contained. Even some of the flammable detritus from the surrounding oak woodland was cleared by the team because minimizing the risk of an out-of-control fire as much as possible leads to a safer, more effective burn experience.

When weather conditions finally allowed, the burn could occur. Volunteers and members of the McKenzie River Trust, the Long Tom Watershed Council, and the Oregon Department of State Lands stood on all sides to watch as the fire was lit (according to the team talking to us, the nature conservation organizations around Eugene are all very connected and collaborate on many restoration projects together). To begin the fire, a member of the Confederated Tribe of the Siletz Indians, Joe Scott, ceremoniously lit a pitch stick, a historical method used by many Indigenous tribes in the western U.S. to light fires (Oaster 2022), where branches are treated with highly flammable pitch, set on fire, and thrown into the intended area. After the first pitch stick was thrown, drip torches were used to ignite more sections. With all of the clearing and pruning that had been done prior to the burn, the fire had little to consume other than grasses, twigs, leaves, and other dry material, and was done burning within twenty minutes!

While the fire was over quickly, the site would be continually monitored for three days afterwards, mostly because the thatch layer over the ground had been so thick that the soil was burning along with the grasses. After being doused by the land stewards and nature alike (a heavy fog had settled over the meadow and had been remarkably effective at stifling any

remaining cinders), the fire was out, leaving behind blackened grass and the skeletons of plants like the invasive Queen Anne's lace (*Daucus carota*), thistles (*Silybum marianum*), and the occasional young tree (Figure 2). Volunteers had already begun spreading native plant seeds like camas, yarrow (*Achillea millefolium*), and many grasses across the meadow to help them establish before the remaining invasive species moved in.



Figure 2: Burnt thistle

A dead thistle plant found in the meadow. Taken by Zoe Hill Sparks, 18 Oct. 2024

Despite the blackened nature of the meadow post-fire, however, the meadow had not been destroyed by the fire at all, and this was already obvious when we visited soon after the event. Two of the invasive species that had been targeted to remove, meadow foxtail (*Alopecurus pratensis*), a Eurasian grass that represented a large percentage of the plant mass of the meadow before the burn, and wild teasel (*Dipsacus fullonum*), an herbaceous biennial introduced from Eurasia and northern Africa, were already pushing up past their charred brethren and dotting the ashes with bright sprigs of light green. Small insects, too fast to identify, were buzzing low over the ground, and I could hear crickets chirping from somewhere within the burned area. Nootka

rose bushes (*Rosa nutkana*), native to the western United States and notoriously hard to burn, were ever present and partially untouched, still standing tall and green in the meadow.

Surrounding the area were the untouched oak and ash trees, unburnt and showcasing their fall-brown leaves and lichen drapery, drifting in the low breeze passing through. From them, I could hear many species of birds normal for the habitat at the time of the year: cedar waxwings (*Bombycilla cedrorum*), Steller's jays (*Cyanocitta stelleri*), black-capped (*Poecile atricapillus*) and chestnut-backed chickadees (*Poecile rufescens*), spotted towhees (*Pipilo maculatus*), northern flickers (*Colaptes auratus*), and white-breasted nuthatches (*Sitta carolinensis*) were all calling happily, unaffected.

But the most telling of the survival and subsequent rebirth of the meadow was a small flock of dark-eyed juncos (*Junco hyemalis oregonus*) in the center of the burnt land. I was able to carefully walk out into the charred space and sit on a lump of dirt in the middle of it, away from the rest of the class on the field trip, to listen and observe what could be heard and observed. These juncos had found a tangle of rose bushes, one whose outer stems had been burned but whose inner stems had been protected and relatively untouched by the surrounding flames (Figure 3). Under these roses, and around the dried brown teasel and the skeletons of the Queen Anne's lace, were apparently things to eat for the juncos, perhaps insects coming out to explore their changed world or seeds that dropped prematurely from their casings because of the fire's heat. Whatever it was, the juncos seemed immensely pleased, hopping and chittering about on the ashy ground (Figure 4). They were the largest creatures in the meadow (besides me, of course, and they didn't refrain from showing their annoyance at my presence by taking flight when hopping too close to my boots and chirping indignantly in my direction). I was able to observe the direct benefit of a fire upon an organism that's an integral part of the ecology of that

habitat: the juncos had shelter from predators, plenty of food to gorge themselves on before their migration southward, and a home despite the destruction. This burn paved new ways for organisms to experience the meadow so quickly that the smell of smoke had not even had time to dissipate from the area.



Figures 3 and 4: Rose bushes (top) and the dark-eyed juncos underneath them (bottom)

A male and female pair of dark-eyed juncos in the middle of the burned meadow and the rose bushes that they were under. Photos taken by Zoe Hill Sparks, 8 Oct. 2024

The burn had been a success, being fully contained by the team and helping to clear out some of the introduced species that were strangling native ones. At the same time, however, as the speakers described to us, this would always be a disturbed system with invasive plants and long-lasting effects from years of human interaction, both directly and from surrounding areas

like up and downstream of Coyote Creek. It will never return to what it looked like when the Kalapuya were still the land stewards before the 1800s, but at the same time, restoration is still important for conserving wetlands in the Willamette Valley. The McKenzie River Trust has a focus on growth and adaptation to the changed world instead of a perfect recreation of historical wetland habitat, and it's working. The Coyote Spencer Wetlands are an expansive and intact swath of wetlands and oak woodland habitat, which are becoming increasingly difficult to find throughout the valley. Maintaining them can "enhance stream water quality, buffer floods, and provide an essential home and refuge for an array of native plants and animals" (McKenzie River Trust 2024). Wildfire danger has decreased each time a prescribed burn has been carried out in the valley, meaning overly destructive fires have less of a chance of injuring the vulnerable wetlands that land stewards have spent thousands of hours restoring. Other natural hazards are mitigated by prescribed burns as well: thinned areas post-restoration across the Willamette Valley saw less damage during the January 2024 ice storm than untouched forests, since the habitats were healthier overall and able to withstand extreme amounts of ice and subsequent flooding (Anyah Preston, personal communication). Fires have quick turnarounds on positive impacts that they bring about, and the meadow on Crow Road is just one example of that.

Site 2: Meadowlark Prairie, in the Intermediate Successional Phase

Not far from the charred meadow on Crow Road sits Meadowlark Prairie, a 380-acre protected restoration area co-managed by the Bureau of Land Management and the City of Eugene. On one side of Greenhill Road, the prairie covers a few acres of flat wetlands and a section of Amazon Creek, which flows throughout Eugene in artificial concrete confinement but broadens back into its natural path as it passes through. An overlook of the prairie boasts a parking lot, some picnic benches, a couple of informational signs for visitors, a bathroom, and a

sheltered view of the wide stretch of wetlands, which are flooded from late fall to mid-spring and dry out during the warmer summer months. There's a path that takes you down onto the prairie itself, and when the grass is low, you can take it to eventually walk along the creek bank. A sidewalk parallels the street for further dog-walking and bird-watching opportunities, and eventually, it becomes another parking lot with another bathroom. On the other side of the road from the first overlook, there's the animal shelter and private residential homes, surrounded by aesthetic non-native deciduous trees and a stand of tall conifers, mostly Ponderosa Pines, that watch over the open land.

Despite Greenhill Road running right through the area, the prairie is big enough and quiet enough for many species to live there. California ground squirrels (*Otospermophilus beecheyi*) scamper around the overlook area, begging for loose trail mix before slinking back into their burrows. Western gray squirrels (*Sciurus griseus*) live in the tall conifers across the way. One can find coyote tracks in the mud and black-tailed deer scat along the path through the prairie. I've seen a mink hunting along the creek's edge, and there have been invasive nutria (*Myocastor coypus*) up and downriver. Mosquitos lay their eggs in the standing wetland water; butterflies flit over the grasses; damselflies rest on the reeds between their midair races; and beetles can be found crawling over the brush. Fish inhabit the creek and American bullfrogs (*Lithobates catesbeianus*) croak loudly nearby, drowning out the songs of the native Pacific tree frogs (*Pseudacris regilla*).

The birds, however, are the biggest reason why Meadowlark Prairie has been given recreational infrastructure and given the loving care it deserves. Massive flocks of cackling (*Branta hutchinsii*) and Canada geese (*B. canadensis*) fly overhead, five hundred-fold or more, and rest in the less dense grass areas during their migrations. Ring-necked pheasants (*Phasianus*

colchicus), a non-native species introduced from Europe that has become naturalized into the ecosystem, skitter through the grasses and crow their displeasure at any passersby. Mallards (*Anas platyrhynchos*), northern pintails (*A. acuta*), green-winged teals (*A. carolinensis*), American wigeons (*Mareca americana*), and gadwalls (*M. strepera*), as well as many other species of duck, float lazily in the creek and build their nests tucked under the willows. Shorebirds like long-billed dowitchers (*Limnodromus scolopaceus*), black-necked stilts (*Himantopus mexicanus*), greater yellowlegs (*Tringa melanoleuca*), American avocets (*Recurvirostra americana*), and red-necked phalaropes (*Phalaropus lobatus*) forage for tasty insects as they balance on spindly legs, and Wilson's snipes (*Gallinago delicata*), killdeer (*Charadrius vociferus*), western (*Calidris mauri*) and spotted (*Actitis macularius*) sandpipers, and black-bellied plovers (*Pluvialis squatarola*) scamper about along the muddy banks of the creek. Red-tailed (*Buteo jamaicensis*) and Cooper's (*Astur cooperii*) hawks keep watch in the high conifer trees that border the prairie. Band-tailed pigeons (*Patagioenas fasciata*) sleep in the conifers, song sparrows (*Melospiza melodia*) call from the willows and savannah sparrows (*Passerculus sandwichensis*) from the brush, and California scrub-jays alternate screeching and scavenging for parking lot scraps. Red-winged blackbirds (*Agelaius phoeniceus*) show off their bright red epaulets while they call from the tops of the trees or deep amongst the prairie grasses, and Brewer's blackbirds (*Euphagus cyanocephalus*) saunter along, wobbly on their spindly legs. And of course, the namesake of the prairie and Oregon's beautiful State Bird, the western meadowlark (*Sturnella neglecta*), perches atop the highest bushes and dead snags across the land, topping off the wetland symphony by warbling its sweet song. These are just a few of the species that can be found at the prairie at any given time: migration, occasional rarities, and a

beautiful landscape relatively undisturbed by humans make this wetland a haven for dozens of species of birds, mammals, plants, fish, and insects.

From the short list just provided, one might expect that Meadowlark Prairie is untouched, a wild place surrounded by very un-wild human infrastructure, but that isn't the case. As pioneers settled the Willamette Valley, much of the fertile, rich land from centuries of wetland activity was transformed into agricultural fields, livestock grazing pastures, or developmental plots of houses to be built. Meadowlark Prairie became a private agricultural field and remained that way for decades. Despite the natural plants and animals being removed from the area and the land being converted to grow crops, the floodplain activities of the prairie did not cease. In response to this issue, the Army Corps of Engineers constructed the Fern Ridge Reservoir and redirected Amazon Creek into a concrete channel, both of which reduced the natural floodplain cycle significantly throughout the valley (West Eugene Wetlands Plan 1992). The creation of the reservoir, along with the establishment of hundreds of other new agricultural fields throughout the valley, led to a catastrophic loss of wet prairie habitat and forced out many open habitat species like Wilson's snipes, short-eared owls (*Asio flammeus flammeus*), streaked horned larks (*Eremophila alpestris strigata*), white-tailed deer, beavers, elk, and various amphibians native to the area (West Eugene Wetlands Guide 2006).

As more knowledge about functioning ecosystems, endangered species, and the maintenance of natural areas despite human development was gained, however, procedures were needed to reestablish wetlands in the Willamette Valley, like Meadowlark Prairie, as protected wildlife habitat. The water quality in many bodies of water was suffering, flooding was an issue in urban and agricultural areas, and without some big changes, wetlands would be removed completely from the valley. Another major push was the presence of multiple threatened species

in the Willamette Valley that were protected under the Endangered Species Act of 1973, including the Fender's blue butterfly (*Icaricia icarioides fenderi*) (Figure 5), its host plant Kincaid's lupine (*Lupinus sulphureus*), Willamette daisy (*Erigeron decumbens*) (Kreienbrink 2022), and the bird and mammal species mentioned above, which had significantly declined in population in the Valley after the significant loss of wet prairie habitat.

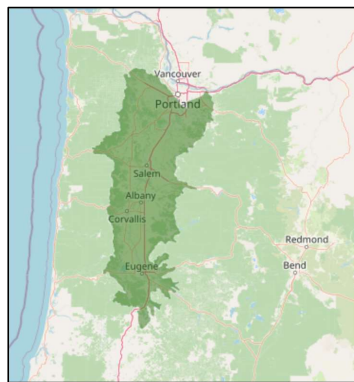


Figure 5: Fender's blue butterfly Range

Current range map of the Fender's blue butterfly. Range is in dark green, confined to the Willamette Valley between Washington and Lane Counties. (Credit: USFWS)

With changing opinions about the importance of functional ecology within the delicate ecosystems throughout the Willamette Valley, the city of Eugene began implementing new regulations and movements towards wetland restoration. In 1992, actual movement began towards active restoration as the city adopted the West Eugene Wetlands Plan, a comprehensive management plan designed to bring government agencies and citizens together to support the natural environment and urban expansion at the same time (West Eugene Wetlands Plan 1992). Following this plan, the Rivers to Ridges Partnership was formed in 1994, made up today of nineteen nature- and conservation-related agencies including the city of Eugene, the Oregon Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the aforementioned

McKenzie River Trust, the Bureau of Land Management, the Long Tom Watershed Council, and the U.S. Army Corps of Engineers, among others. This partnership united these agencies in protecting and restoring the wetlands around Eugene while providing outreach and educational opportunities to increase public awareness of why wetlands are important to maintain (City of Eugene 2022). These agencies have been working in collaboration, denoting each section of the West Eugene Wetlands to be managed by different groups so each was given the special care and dedication that it deserves throughout the restoration and stewardship process.

Many sites within the West Eugene Wetlands complex, including Meadowlark Prairie, required a significant amount of restoration, working to reverse the changes that a century of human interaction had incurred on the wetlands. At Meadowlark Prairie, the terrain had been majorly altered to transform the floodplain prairie into an agricultural field: barriers had been built around Amazon Creek to prevent the flooding of crops when water levels rose, and these had to be removed so the area could once again become a wetland. Invasive species and brush were removed by hand and through mowing, native plants were seeded, and the prairie was designated as a protected habitat for migrating birds. To effectively clear invasives and “restart” the prairie’s ecology, however, the next effective steps were to reintroduce fire. Laws had relaxed in the preceding years surrounding fire suppression, and it was no longer believed by ecology and forestry organizations that fire was an entirely negative force. Prescribed burns had already been slowly reintroduced to the Willamette Valley some years before the 1992 plan, but these were often used for research to observe what would occur to local forest and prairie after a fire occurred. Results had been promising, showing multiple native plants would thrive post-burn, often recovering quickly and experiencing a significant population increase while invasive species’ populations decreased (Alverson 2011); the data was implemented into the wetland

restoration plan and slowly, controlled burns were set when the right point in the restoration process was reached.

In October 2023, Meadowlark Prairie was burned under the careful watch of the Bureau of Land Management, an event that had not occurred there for decades. Only a section was burned, the field in front of the Greenhill Road overlook, stretching from the banks of Amazon Creek to the short slope that leads up to the parking lot and road (Figure 6). Strips were mowed along in the grass, designating barriers that the flames could not easily cross. When conditions allowed, the fire was set, doused, and monitored until it was certain that it was completely out.



Figure 6: Meadowlark Prairie burned section

A view of the burnt section of Meadowlark Prairie just after the prescribed fire in October 2023
(Credit: City of Eugene, 2024)

I visited with my Avian Ecology and Conservation class not long after, and it was black and ashy with the scragged remnants of blackberry bushes poking out of the charred ground. We stood at the overlook, not permitted to venture down into the grass so further disturbance wasn't introduced to the healing ecosystem, and instead stood by our van, looking for signs of life. In this early stage after a fire, the ground was teeming with scavenging birds taking full advantage

of the seeds and insects that had been freshly exposed. A huge flock of Brewer's blackbirds, red-winged blackbirds, and European starlings (*Sturnus vulgaris*), staples of the prairie, were practically blending in with the black ground as they strolled about and pecked at whatever tasty treasure they could find. Pairs of mourning doves (*Zenaida macroura*) flew in, pretty and pale against the dark grasses. Killdeer shrieked overhead before landing to scamper amongst the sparse plant life and shriek from the ground. Two northern harriers (*Circus hudsonius*), a species nicknamed "marsh hawk" for their affinity for swooping over open wetlands, flew low over the ground in search of rodents now exposed after the loss of their dense brush homes. What we were most excited about, however, was the meadowlark sitting atop a bare, blackened branch in the middle of the prairie, singing brightly despite the mess around it. It's always fun to find the namesake of a place at that place, and the knowledge that meadowlarks were just fine after the burn was quite meaningful. Its presence, loud and clear from the top of that desecrated branch, showed that the prairie was not destroyed at all by the thing that we believed was wholly devastating if it occurred.

I returned to Meadowlark Prairie in January 2025, on a sunny but icy morning. The trip was primarily for birding with my friend, Ben, who had been in that same Avian Ecology class and was now my favorite birding companion. We had poor luck earlier that morning along the Fern Ridge Reservoir, finding bare lakebed and icy puddles rather than the mud and shorebirds that other birders had reported just days before, and I urged Ben to stop at Meadowlark Prairie after I figured out there were long-billed dowitchers seen there within the last few days. He pulled his car into the overlook's parking lot, which was full of other vehicles despite the early hour, and we stepped out into the cold.

Commented [PB2]: Brewer's blackbirds, red-winged blackbirds and European starlings



Figure 7: Meadowlark Prairie, January 2025

Image of Meadowlark Prairie from the Greenhill Road overlook. Pictured is the previously burned side, recovered after a year of regrowth. (Credit: Zoe Hill Sparks, 25 Jan. 2025)

The prairie looked quite different from how I remembered it from a year before (Figure 7). The mowed section, the one that had split the prairie between “burn” and “no burn”, was still there, now a rough path from the parking lot to the bank of Amazon Creek. It was partially flooded, showing off the stage in the natural cycle that we’d reached at that point in the year: this was a wet prairie through and through, full of mud, sheets of ice, and a nutrient-rich soil preparing itself for the arid months of summertime. Around the path and across the flat land was all prairie grass, there didn’t seem to be much of a difference between the two sides of the prairie that had looked so different previously; after all, there were trees growing on either side, swaths of dry brown grass, and clumps of shrubs with bare, gray branches. Of course, we heard a meadowlark far off, always consistent at its eponymous prairie, as well as the trills of song sparrows from both the grass and the willows around the creek. It was a normal prairie all around on first glance, and if one wasn’t looking all too close, they would’ve never guessed that one side of this path had undergone an event that the other hadn’t.

But we *were* looking closely enough as we walked down the slope of the overlook and onto the path to observe the changes to look for birds. On our right, fire crossed through a year ago, and on the left, it was obvious fire had not crossed in many years. The unburnt side was littered with tall piles of Himalayan blackberry brambles (*Rubus armeniacus*), which stood out starkly from the grasses and brush; it was obvious that these blackberries were not native, overtaking the landscape and standing out amongst the local flora. Pacific blackberry (*Rubus ursinus*), the local cousin of the Himalayan blackberry, does not even occur in wetlands, preferring wooded areas and open forests instead (FEIS 2025). Like them, there were Ponderosa pine saplings at the edges of the grass, the successors of the conifer stand across Greenhill Road. Some were taller than Ben or I, obviously building complex root systems in the soft wetland soil and encroaching upon the open ecosystem. Between the trees and brambles, the grass was dense and seemed to represent only a few species that dominated the space. I do not know what species of these were native and which were not, but there was little diversity or changes in height and color amongst the foliage. We heard no bird calls coming from our left, and the only sign of life was far on the other side of the grassy stretch, where a flock of cackling geese was circling above the creek.

In contrast, the previously burnt side was much more open and diverse. A few tiny pine saplings sat up near the base of the parking lot, but they were young and fresh, obviously rooted after the fire. Blackberries were present, but they were sparser than the other side's, taking up much less space and blending in more as brush rather than an invasive. When I looked closely at the grasses around us, I saw a color difference between the two sides, and realized that this was from many different species growing on the burnt side, with rich green low-lying plants near the ground and browner grasses reaching above them. The plants looked healthier and sturdier than

the unburnt side, and while there were fewer shrubs present, those that were there were not overtaking the smaller plants around them and were instead a cohesive part of the landscape. There were birds on this side, too: the meadowlark that we'd heard earlier was sitting on a branch across the prairie from us, and as we walked, we flushed two very annoyed Wilson's snipes, who squawked their displeasure at our disturbance as they flew over us. Distantly and only for a moment, the thump of a pheasant's call could be heard from somewhere deep in the dense grasses. Even the flooded trail was affecting the two sides differently. The water continued far into the foliage on the recovering side, leading to thin sheets of ice covering some of the vibrant small plants, but the water didn't reach far into the unburned side, sitting mostly in divots in the dirt and away from the bases of grasses.

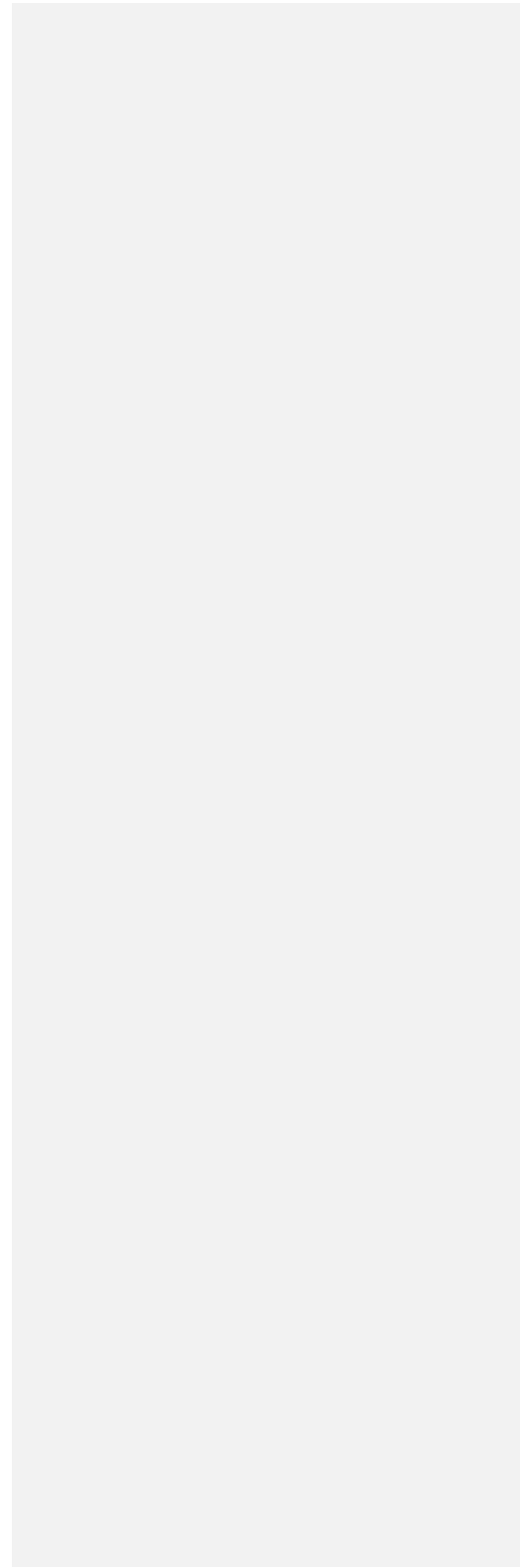
Although I never did see the Dowitchers that we had set out for, it was remarkable to observe the difference that a year of regrowth could make on a habitat so close to home. The prescribed fire from the year before hadn't completely wiped out the invasive plants in the prairie, nor had it stopped the slow crawl of Ponderosa pine saplings and Himalayan blackberries into the open land. It had, however, caused major visible changes, all of which have been beneficial in the restoration process of historical wetland habitat. Like the meadow on Crow Road, Meadowlark Prairie will never be perfectly restored to its natural state, but it's become an important location for animals and humans alike. From fish to insects to amphibians to mammals to dozens of native plants and more than 150 bird species, Meadowlark Prairie is a keystone habitat for the Willamette Valley, and by including prescribed burning as part of the ecological management plan, it is able to flourish and thrive.

6: Conclusion

In these previous pages, the goal was to show the benefits of controlled burns despite the constant fear built around fire for decades in the United States. The Willamette Valley is a wonderful example to showcase the benefits of prescribed fires in restoration because burns are such a vital part of the historic ecology here. Each habitat around Eugene, from the oak savannah to the wet prairies to the banks of the Willamette River, has been touched by the caring people who recognize the beauty and remarkable diversity that the valley has to offer. Active efforts are being made to restore the unique ecology of the valley that supports hundreds of species, from plants to mammals to birds, and controlled burns are and have always been a part of that. The Kalapuya shaped the landscape with fire, and fire must continue to shape it if restoration will actually occur. There are continual benefits following prescribed fires throughout the valley, from the resurgence of camas and other native plants at Meadowlark Prairie to the steadying populations of threatened species like streaked horned larks and Fender's blue butterflies in west Eugene. These benefits are found quickly after burns and long after, too; hundreds of bird species are able to migrate through or live in these habitats due to restored, healthy ecology and diverse ecosystems that are expanding every year.

Fire continues to be a complicated subject in the United States after decades of anti-fire propaganda being pushed by the government and its agencies, then the very real danger of modern wildfires and the threat that they pose to ecosystems. Fear is a fair emotion as we see the news summer after summer about devastating fires that destroy homes and thousands of acres of wild land. It's difficult to watch this or even experience the effects of big wildfires firsthand, but understanding that fire is both the problem and the solution is one that is vital in the face of this devastation. Controlled burns are the best way to combat these larger wildfires and restore

ecosystems to a healthy, vibrant state that mustn't be lost. Do the wildfires happening every year pose a significant threat to life as we know it? Perhaps, but not because they are fires. Their danger comes from them being unhealthy, unnatural fires, burning because of decades of misguided but well-meaning habitat management actions. The world needs healthy fires again; the world needs controlled burns.



Bibliography

- Allen, Cain. "Indian Burning in the Willamette Valley". *Oregon Historical Society*, 2003, <https://www.oregonhistoryproject.org/articles/historical-records/indian-burning-in-the-willamette-valley/>
- Alverson, Edward. *Use of Controlled Ecological Burns in Willamette Valley Native Prairies*. The Nature Conservancy, May 2011, www.eugene-or.gov/DocumentCenter/View/61413/Alverson-Fire-Justification-White-Paper-20110504. Accessed 2025.
- Anderson, Michelle D. "Fire Ecology." Species: *Pinus Contorta* Var. *Latifolia*, US Department of Agriculture, *Forest Service, Rocky Mountain Research Station, and Fire Sciences Laboratory*, 2003, www.fs.usda.gov/database/feis/plants/tree/pinconl/all.html#Cone%20serotiny
- Asaro, Christopher, et al. "Denser Forests across the USA Experience More Damage from Insects and Pathogens." *Scientific Reports*, vol. 13, no. 1, Mar. 2023, <https://doi.org/10.1038/s41598-023-30675-z>. Accessed 2025.
- Boyd, Robert. "Strategies of Indian Burning in the Willamette Valley." *Indians, Fire, and the Land in the Pacific Northwest*, edited by Robert Boyd, Oregon State University Press, 1999, pp. 94–138.
- "Chapter 133: An Act for the Government and Protection for Indians." The Statutes of California, Passed at the First Session of the Legislature, J. Winchester, 1850, pp. 408–9, <https://clerk.assembly.ca.gov/sites/clerk.assembly.ca.gov/files/archive/Statutes/1850/1850.pdf>. Accessed 2025.
- Cohen, Jack. "The Wildland-Urban Interface Fire Problem." *Fremontia*, vol. 38:2, Apr. 2010, pp. 16–22, https://www.fs.usda.gov/rm/pubs_other/rmrs_2010_cohen_j002.pdf.
- Conte, Christine. "How Ecosystems Recover after Wildfires." *Earth.org*, 24 Feb. 2025, <https://earth.org/how-ecosystems-recover-after-a-fire/>. Accessed 2025.
- "Coyote Spencer Wetlands - McKenzie River Trust | Protecting Lands in Western Oregon." *McKenzie River Trust*, 8 Apr. 2024, <https://mckenzie-river.org/property/coyote-spencer-wetlands/>. Accessed 2025.
- Donahue, Brennen. "The Big Burn of 1910." *Intermountain Histories*, 4 Sept. 2024, www.intermountainhistories.org/items/show/623. Accessed 2025.
- "Fender's Blue Butterfly (*Icaricia icarioides fenderi*)." *Species Range Maps*, U.S. Fish and Wildlife Service, <https://www.fws.gov/species/fenders-blue-butterfly-icaria-icarioides-fenderi/map>. Accessed 2025.

- Forest and Rangeland Ecosystem Science Center. “Birds as Indicators of Ecosystem Health.” *USGS*, 18 May 2022, www.usgs.gov/centers/forest-and-rangeland-ecosystem-science-center/science/birds-indicators-ecosystem-health. Accessed 2025.
- Grand, Lauren. “Fire Adapted Oak Habitats in the South Willamette Valley.” *OSU Extension Service*, 16 Apr. 2024, <https://extension.oregonstate.edu/catalog/pub/em-9425-fire-adapted-oak-habitats-south-willamette-valley>. Accessed 2025.
- Johnson, A. Sydney, and Philip E. Hale. “The Historical Foundations of Prescribed Burning for Wildlife: A Southeastern Perspective.” *U.S. Department of Agriculture, Forest Service, Northeastern Research Station*, 2002, www.nrs.fs.usda.gov/pubs/gtr/gtr_ne288/gtr_ne288_011.pdf. Accessed 2025.
- Kreider, Mark R., et al. “Fire Suppression Makes Wildfires More Severe and Accentuates Impacts of Climate Change and Fuel Accumulation.” *Nature Communications*, vol. 15, no. 1, Mar. 2024, p. 2412, <https://doi.org/10.1038/s41467-024-46702-0>.
- Kreienbrink, Kailey. “Endangered Species in the West Eugene Wetlands.” *Willamette Resources and Educational Network (WREN)*, 1 July 2022, www.wewetlands.org/endangered-species-in-the-west-eugene-wetlands/.
- Krueger, Jeffrey, et al. “6.2 Management Techniques.” *Practical Guidelines for Wetland Prairie Restoration in the Willamette Valley*, Oregon, Eugene, OR, 2014, pp. 80–82, https://cascadiaprairieoak.org/wp-content/uploads/2014/12/Wetland-Prairie-Guide-FINAL-8_25_14-1.pdf. Accessed 2025.
- McDonald, Rachel. “Land Managers point to benefits of controlled burning in Willamette Valley.” *KLCC*, 8 May 2024, <https://www.klcc.org/environment/2024-05-08/land-managers-point-to-benefits-of-controlled-burning-in-willamette-valley>
- Oaster, B. ‘Toastie’. “What If Indigenous Women Ran Controlled Burns?” *High Country News*, 30 Dec. 2022, www.hcn.org/issues/55-1/indigenous-affairs-wildfire-what-if-indigenous-women-ran-controlled-burns/. Accessed 2025.
- Rivers to Ridges Partnership Plans Fall Ecological Burns*. City of Eugene, 2024, www.eugene-or.gov/CivicAlerts.aspx?AID=6749&ARC=15626. Accessed 2025.
- Schulze, W., et al. “Quantification of insect nitrogen utilization by the Venus fly trap *Dionaea Muscipula* catching prey with highly variable isotope signatures.” *Journal of Experimental Botany*, vol. 52, no. 358, 1 May 2001, pp. 1041–1049, <https://doi.org/10.1093/jexbot/52.358.1041>.
- Southard, Lewis. “The History of Cooperative Forest Fire Control and the Weeks Act”. *Forest History Today*, Spring-Fall 2011, pp. 17-20, https://foresthstory.org/wp-content/uploads/2017/01/Cooperative_Fire_Control.pdf.
- Taft, Oriane W., and Susan M. Haig. “Historical Wetlands in Oregon’s Willamette Valley: Implications for Restoration of Winter Waterbird Habitat.” *WETLANDS*, vol. 23, no. 1,

Mar. 2003, pp. 51–64,
https://digitalcommons.unl.edu/usgsstaffpub/694?utm_source=digitalcommons.unl.edu%2Fusgsstaffpub%2F694&utm_medium=PDF&utm_campaign=PDFCoverPages. USGS Staff - Published Research. Accessed 27 May 2025.

Tirmenstein, D. “*Rubus ursinus*”. *Fire Effects Information Systems [Online]*, U.S Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, 1989,
<https://www.fs.usda.gov/database/feis/plants/shrub/ruburs/all.html#:~:text=GENERAL%20DISTRIBUTION%20%3A%20California%20blackberry%20grows,Mexico%20%5B9%2C55%5D>. Accessed 2025.

The Clarke-McNary Act. 2019, <https://foresthistor.org/wp-content/uploads/2019/06/Clarke-McNary.pdf>. Accessed 2025.

“West Eugene Wetlands Plan.” *City of Eugene and Lane County*, May 2004,
https://www.livabilitylane.org/files/West-Eugene-Wetlands-Plan-Full_201205041630363420.pdf. Accessed 2025.

“Wetlands.” *City of Eugene*, www.eugene-or.gov/644/Wetlands. Accessed 2025.

Wilkinson, David M. “The Disturbing History of Intermediate Disturbance.” *Oikos*, vol. 84, no. 1, Jan. 1999, pp. 145–47. *JSTOR*, <https://doi.org/10.2307/3546874>. Accessed 2025.

Witynski, Max. “Ecological Succession, Explained.” *UChicago News*, University of Chicago,
<https://news.uchicago.edu/explainer/what-is-ecological-succession#primarysecondary>.