CONFLUENCE: ECOLOGY AND CULTURE AT THE FORKS OF THE WILLAMETTE RIVER, OREGON

by

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The confluence of the Coast and Middle Forks of the Willamette River in Lane County, Oregon is the setting for an environmental history. Focused on an ecological unit rather than a political one, this history traces the use and perception of the confluence area by Kalapuya Indians, Euroamerican settlers, and their descendants. Each phase of human history has shaped the ecology of the confluence, but always in concert with natural forces. In general, efforts to control events such as flooding have failed, suggesting that humans need to adapt to their environments rather than attempting to control them.

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DEDICATION

Towards a healthy relationship between people and the land.

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CHAPTER I

INTRODUCTION

History traditionally has seen the land as a backdrop against which the drama of human activity is carried out. This is apparent in the spatial boundaries that historians have chosen for their studies. A historian might choose to study the western United States, for example, or the State of Oregon, Lane County, or Eugene City. These political units often do not correspond to environmental boundaries or ecological regions. Historians have chosen to use political boundaries because they correspond to how modern humans see the landscape. But the reality of everyday life, carried on within ecosystems, is difficult to apprehend from other than an ecological perspective. This historical study, therefore, focuses on an ecologically-defined area, the confluence of the Coast Fork and Middle Fork Willamette Rivers in Lane County, Oregon (figure 1).

Of course, despite the shift in perspective, humans continue to play a significant part in this ecological drama. The confluence area is defined here as the region where the influence of all three rivers that flow into it are felt—the Coast Fork and Middle Fork, and their product, the mainstem Willamette. In human terms, the confluence is bounded on the downstream side by the Main

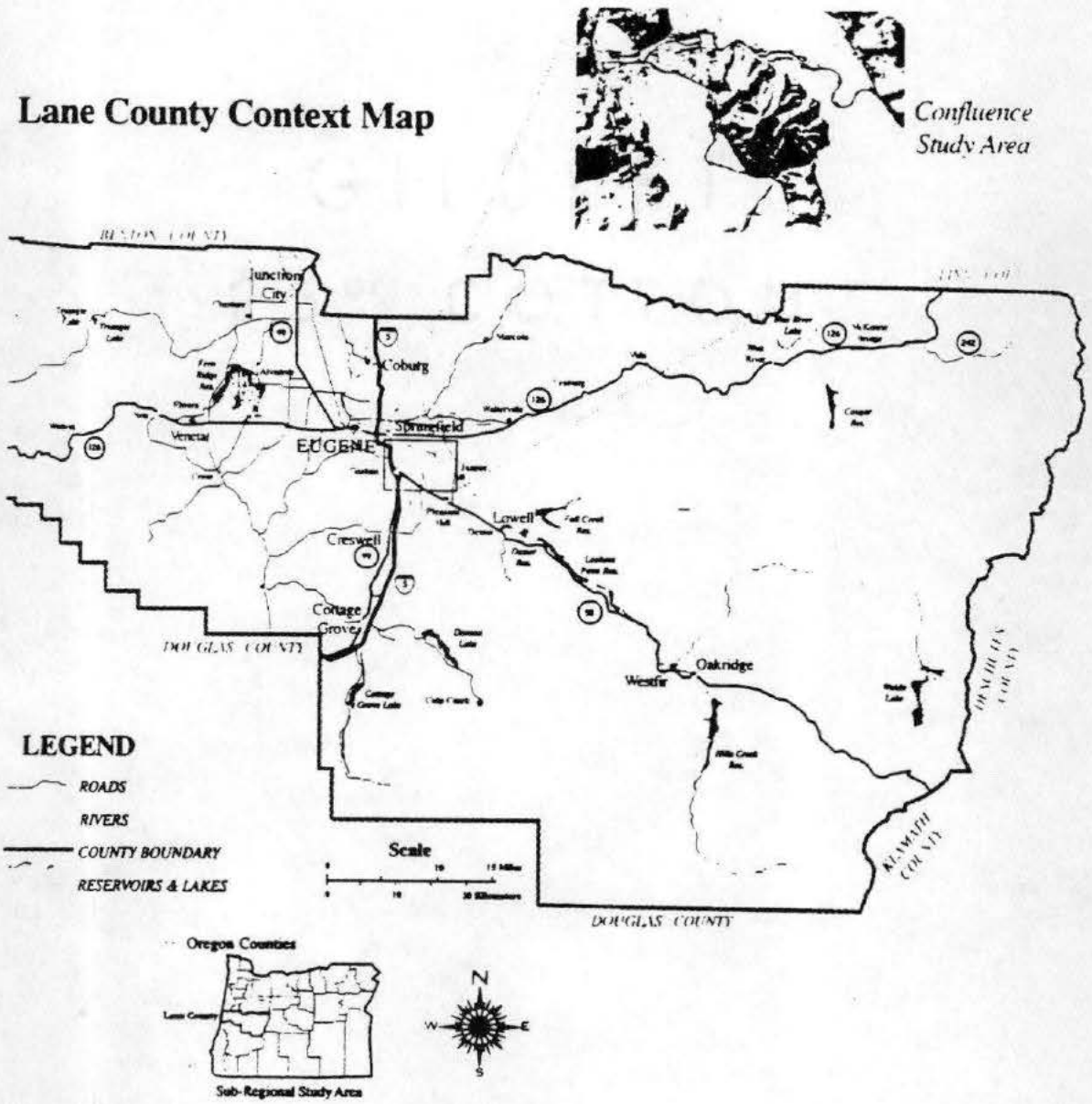

FIGURE 1. Lane County Context Map
Source: Todd/Liberty Associates, *The Coast Fork/Middle Fork Willamette River Confluence Area: An Atlas* (Corvallis, Oregon: Oregon Department of Fish and Wildlife, 1996), 2.

Street bridge over the Willamette connecting Eugene and Springfield; to the north by the Seavey Loop bridge over the Coast Fork, leading to Mt. Pisgah Arboretum; and on the east by the bridge over the Middle Fork at the hamlet of Jasper, Oregon.[1] Basically it is the land and water surrounding Mt. Pisgah, downstream to the actual mixing of the rivers (figure 2).

Places where one river joins with another such as the confluence are ecological hotspots, places where species richness is highest in a system (species from both streams are present, as well as some species often not found in either tributary). In the Willamette River system, floodplain forests at tributary junctions trap nutrients and provide concentrations of nutrients and diversity of habitats that create niches for species.[2] This richness may have led the Kalapuya Indians, residents for 8,000 years, to use the confluence area as a source of food or other resources.

The first Euroamericans in the Willamette Valley trapped beaver along the river floodplain for the Hudson's Bay Company. The first permanent Euroamerican settlers in the Upper Willamette Valley settled just upstream of the Willamette confluence, and found little use for the confluence area except its trees for firewood and building materials. In the twentieth century, advances in

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[1] Throughout this paper the study area will be referred to as "the confluence of the Willamette," or "the confluence area."

[2] Stan Gregory, Professor, Department of Fish and Wildlife, Oregon State University, Personal Communication, January 16, 1996.

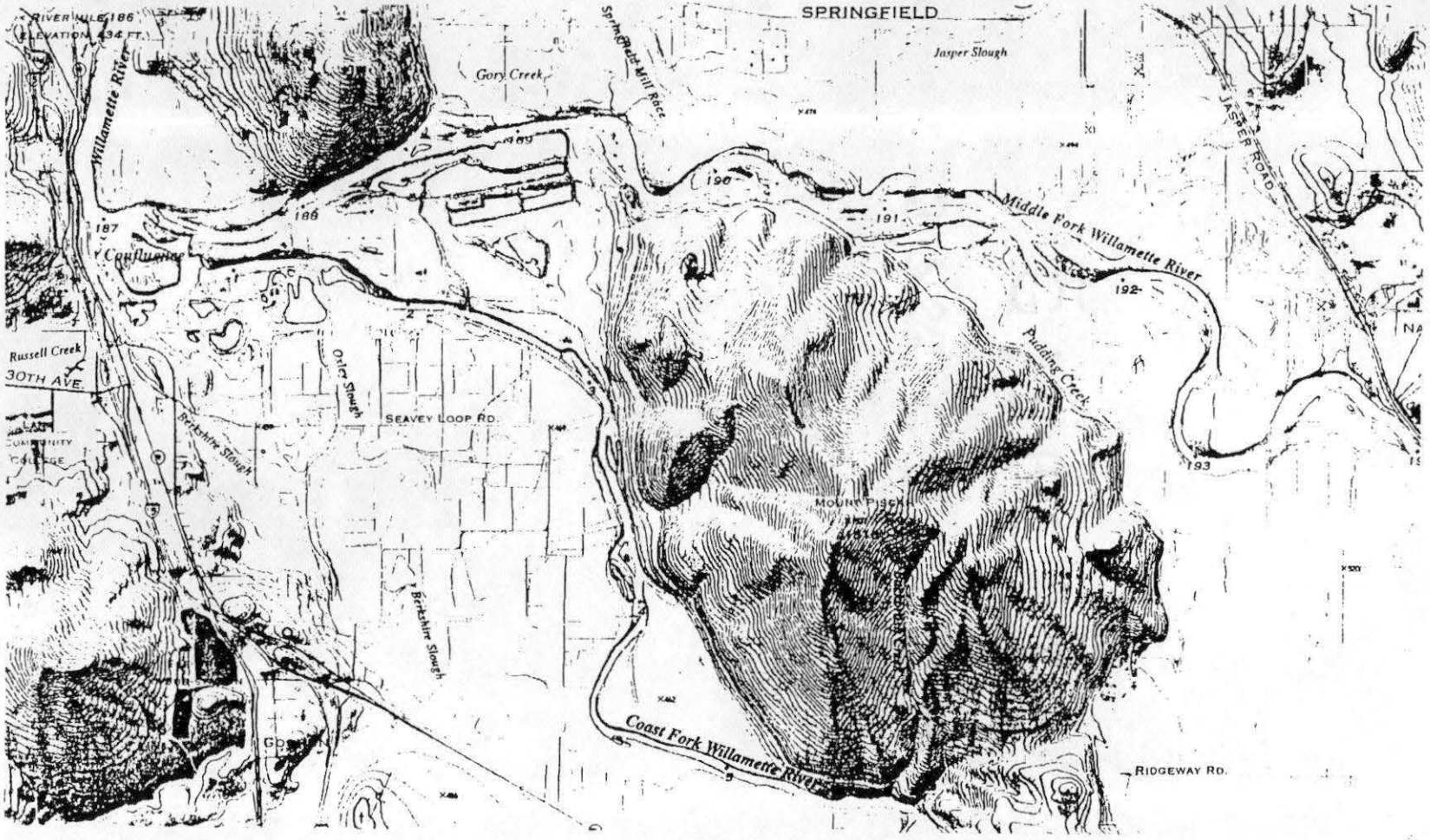

FIGURE 2. Coast Fork/Middle Fork Confluence Area Map
Source: Todd/Liberty Associates, *The Coast Fork/Middle Fork Confluence Area: An Atlas* (Corvallis, Oregon: Oregon Department of Fish and Wildlife, 1996), 6.

irrigation, crop diversification and flood control allowed increased use of the confluence floodplain for agriculture.[3]

At least since the 1940s, the confluence area has been used for gravel extraction, as is evident from aerial photographs. In the latter part of the twentieth century, the confluence has been used by Lane County recreationists. In the most recent past, this area has been valued for its ecological potential. In 1997, Friends of Buford Park and Mt. Pisgah, a non-profit organization, began preparing a restoration plan for the confluence area, emphasizing its pre-Euroamerican ecology. These human uses for this place indicate the diversity of attitudes that people have had toward this ever-changing environment. This thesis intends to explore those attitudes and their manifestations in the land.

Complicated relationships characterize the human history of the confluence. Kalapuya peoples lived closely with the landscape, adapting themselves to its natural cycles and products, and modifying environments to suit their own needs. Through myth and culture, they explained their place in the world. Euroamerican trappers and then settlers in the nineteenth century brought cultural attitudes from the eastern United States and Midwest, including expectations of the land and the Native people. Their insecurity was passed to following generations, who continued the transformation of the landscape as

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[3] Early settlers in the Calapooia River valley avoided the floodplain areas due to (justified) fear of flooding, according to Peter Boag. Peter G. Boag, *Environment and Experience: Settlement Culture in Nineteenth-Century Oregon* (Berkeley, California: University of California Press, 1992), 46-47.

they joined a world market. Technological advances and flood control dams encouraged greater use of the confluence in the twentieth century for floodplain agriculture, gravel mining, and residential development.

In the 1960s and 1970s, confluence-area residents recognized the loss of open space, and governments, inspired by a rational planning paradigm, attempted to resolve land-use conflicts by dividing the confluence into park and long-term gravel mining zones. Finally, however, continued flooding demonstrated that attempts to control the confluence must recognize the power of non-human events to shape that environment. Ultimately, the confluence is only partially a human creation.

In short, the history of this one unique place illustrates the whole cycle of American environmental history: from a complex Native American relationship with the land—one that included both humans and their environment in a dialogue of change—to a transformation of the landscape in an increasingly commodity-oriented society, to finally perhaps the beginnings of an understanding of the land as home.

Why the Confluence?

The confluence of the Middle Fork and Coast Fork Willamette Rivers is a unique landscape, a place where the influences of both of the rivers that join to form it, as well as that river itself, are felt. The confluence is a place of great

ecological richness and variety. The changes caused by the two rivers coming together—a wide floodplain, a diversity of plants and animals from the colder, faster, Middle Fork and the slower, warmer, lower, more meandering Coast Fork—create a diversity of habitats that allow more, and different, species to live at the confluence than at any point upstream.

Today the confluence is valuable property, coveted for its ecological and recreational value by state and Federal agencies and by local environmental groups. The Kalapuya Indians may have used it seasonally for thousands of years, hunting ducks along the backwaters and harvesting plants from the floodplain. But for most of the past 150 years it has been unwanted, "useless." This lack of utility meant that the state inherited the flood-prone confluence area, while the more accessible lands around it filled with settlement. As a result, the confluence has been a de facto wildlife preserve in the midst of an industrializing and urbanizing landscape.

The confluence is a place where different currents flow together, a place where winter floods and summer low flows combine to create an explosion of life. It is a messy place, filled with mud and piles of driftwood and willow-covered islands in the delta of the tributary rivers. It is also a place that has been largely ignored by people since the end of Indian occupancy, except for the gravel mining industry, which has gouged huge holes in the floodplain. The

irony is rich: the abandoned gravel ponds, blights on the landscape, provide good habitat for waterfowl.

The confluence is also a metaphor for the relationship between the modern world and nature. The confluence is wild, uncontrolled by the actions of humans. Shy and rare animals and plants live there, out of reach of the threat of pavement. Today it is possible to go there and feel alone, while being surrounded by the city. Yet it is a completely managed environment: almost all of the flow entering the confluence is controlled by six dams upstream. And gravel trucks rumble five days a week through most of the year.

Finally, the confluence is today a repository of hope. Volunteers at the large open-space preserve in the confluence see it as an opportunity to restore some of the disappearing environments—and their dependent endangered animals and plants—that once characterized the Willamette Valley. The supreme irony is that, as some of the last open space in the area, the confluence is important to many people. Yet it is ecologically valuable today precisely because it has been economically valueless for so long.

Organization

This study will begin by briefly summarizing the geologic history of the confluence area, with attention to soils, climate, and basic vegetation history.

Next, it will discuss human management of the confluence, beginning with the Kalapuya people and ending with the rise of conservation, organized planning of resources and the call for protection of the confluence area that led to the creation of a regional open space park in the 1970s. This study focuses on several distinct periods of human occupancy and ecological change in the confluence and its larger context, the Upper Willamette Valley. The key transitions are:

1. the end of Kalapuya management and early white settlement in the 1840s and 50s, with a radical shift from prairies to fenced agricultural land;
2. from the early, semi-subsistence pioneer economy to the regional and global export economy, made possible by improved transportation (steamboats, railroads) and increased industrialization in the 1880s and 90s, resulting in extensive clearing of the riparian forest for fuel and for transportation corridors through the confluence;
3. the 1940s-60s construction of reservoirs upstream on both Forks of the Willamette, which radically changed the timing and volume of flow in the confluence area and led to a perception of lessened danger from flooding, resulting in greater use of the floodplain for agriculture and gravel extraction;
4. the ambivalent mixture in the late 1960s and early 1970s of rational planning by Lane County governments, growing preservationist ethos and dawning appreciation for ecological processes, evident in the creation of Howard Buford Recreation Area (Mt. Pisgah).

CHAPTER II

THE INDIGENOUS LANDSCAPE

The confluence of the Coast Fork and Middle Forks of the Willamette River existed for many thousands of years before humans inhabited the area. Its basic ecology evolved without humans. The major processes that shaped the confluence are still present. Though the confluence may appear stable, it is actually constantly changing to reflect climate, geologic activity, and the rise and fall of water. The operation of these forces demonstrates a basic truth: change over time—history—is not merely the result of human action. The world is constantly changed by forces beyond human control.

The confluence is a product of the two rivers that drain into it. Each is a major river system in its own right. The Coast Fork basin covers about 665 square miles of land, and the Middle Fork basin encompasses 1,354. Between them, area draining to the confluence totals 2,019 square miles, almost 17% of the drainage basin of the entire Willamette River.[1]

The confluence of the Middle Fork and Coast Fork Willamette Rivers is located in the southern part of the Willamette Valley, in western Oregon. The

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[1] State Water Resources Board, *Willamette River Basin* (Salem, Oregon: [Oregon] State Water Resources Board, 1967), 1.

Willamette Valley is a wide depression between the Coast Range mountains to the west and the Cascade Mountain to the east. Ranging from 30-50 km in width, and about 200 km in length, the Valley sits on a slowly dropping piece of the earth's crust.[2]

In the southern end of the Valley, the land is a mixture of volcanic and sedimentary rocks—sandstones, mudstones—that formed under the crushing weight of an ocean, 35-55 million years ago. Over the top of this material lie up to 270 feet of accumulated deposits from eroding mountains, sediments from enormous lakes that filled the Valley following the last ice age, and more recent river-borne silt, sand and gravel.[3]

The Willamette River has been steadily building up the floor of its valley since a wall of lava—today called Willamette Falls—blocked off the north end of the Valley 15-17 million years ago.[4] The Valley floor gently slopes from its southern end near the confluence to Willamette Falls at the north end; as a result, the Willamette River meanders through the Valley, with few rapids along its length.[5] Just downstream of the confluence, the Willamette River cuts through basalt flows probably contemporary to the ones that produced Willamette Falls.[6]

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[2] David Alt and Donald W. Hyndman, *Northwest Exposures: a Geologic Story of the Northwest* Missoula, Montana: Mountain Press Publishing Company, 1995), 295.
[3] Alt and Hyndman, *Northwest Exposures*, 218-219.
[4] Ibid., 295.
[5] Jerry F. Franklin and C. T. Dyrness, *Natural Vegetation of Oregon and Washington* (Corvallis, Oregon: Oregon State University Press, 1988), 15-16.
[6] Ewart M. Baldwin, "Field Trip No. 2: Eugene to Coos Bay via Reedsport," in W. D. Wilkinson, ed. *Field Guidebook: Geologic Trips Along Oregon Highways*, State of Oregon Department of Geology

These basalt flows came from volcanoes to the east, which today form the headwaters of the Middle Fork Willamette River.

Uplifting of the earth's crust and enormous quantities of lava combined to create the Cascade Mountains beginning about 17 million years ago. The rising mountains caused a dramatic shift in climate in Oregon. Moisture-bearing clouds now drop their water as rain or snow as they rise over the obstacle of the Cascades.[7]

The southern Willamette Valley remains largely unchanged since the end of the last ice age, as it has slowly filled with silt and sand from the rivers draining the dying glaciers in the Cascades and from the abundant rainfall of the Coast Range mountains.[8] The climate, however, has changed dramatically several times in the past few thousand years.[9]

Paleoecologists have reconstructed the climate history of the Willamette Valley during the last 20,000 years. At the height of the last ice age in the Pacific Northwest, about 15,000 years ago, glaciers covering the Cascade Mountains were testament to the cold conditions that characterized the Willamette Valley.

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and Mineral Industries Bulletin no. 50 (Portland, Oregon: State of Oregon Department of Geology and Mineral Industries, 1959), 34.

[7] "An Outline of Geology and Mineral Resources of Oregon," in W. D. Wilkinson, ed. *Field Guidebook: Geologic Trips Along Oregon Highways*, State of Oregon Department of Geology and Mineral Industries Bulletin no. 50 (Portland, Oregon: State of Oregon Department of Geology and Mineral Industries, 1959), 3.

[8] Muen Salah Qaddura, "A Regional Study of Cottage Grove, Oregon" (Unpublished M.S. Thesis, Department of Geography, University of Oregon, 1961), 24-25.

[9] Richard D. Cheatham, *Late Archaic Settlement Pattern in the Long Tom Sub-Basin, Upper Willamette Valley*, University of Oregon Anthropological Papers 39 (Eugene, Oregon: University of Oregon Department of Anthropology, 1988), 19, 22.

As the climate warmed over the next 5,000 years, the glaciers melted and vegetation changed. Between 5,000 and 10,000 years ago, dry and warm conditions were common in the Valley.[10] Pollen records indicate that the conditions found today in the Willamette Valley—cool and moist—became established only about 5,000 years ago.[11]

Climate records have been maintained throughout the Willamette River basin since the mid-nineteenth century. In an average year, the confluence area receives about 46 inches of precipitation, mostly as rain.[12] However, local precipitation is a minor part of the river flow in the confluence, which is controlled by the rainfall and snowmelt from the Coast Fork and Middle Fork River basins. The two basins differ in their climate and geology.

The Coast Fork basin has its headwaters in two places: the Coast Range mountains to the west, and the western Cascades to the east. Both receive most of their precipitation as rain between October and April, with winter snow as well. The Coast Fork flows through a long valley above the confluence, a valley which in many ways is the southernmost extension of the Willamette Valley

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[10] Cathy Whitlock, "Vegetational and Climatic History of the Pacific Northwest During the Last 20,000 Years: Implications for Understanding Present-Day Biodiversity," *Northwest Environmental Law Journal* 8 (1992), 341-346.

[11] Ibid., 350-351.

[12] William R. Patching, *Soil Survey of Lane County Area, Oregon* ([Washington, D.C.?]: U.S. Department of Agriculture, Soil Conservation Service, in Cooperation with United States Department of the Interior, Bureau of Land Management, Oregon Agricultural Experiment Station, and Lane County, 1987), 4, 244.

between Portland and Eugene. This gives the Coast Fork River Valley flora and fauna a similar composition to that of the Willamette Valley.

The Middle Fork Willamette River begins in the Cascade Mountains. Winter snow can remain late into the summer, and the highest peaks have year-round snowpacks. This watershed has a steep profile, only flattening as it approaches the confluence. In general, the Coast Fork basin is lower and warmer than the Middle Fork basin. Both watersheds, however, share similar seasonal water cycles.

The natural hydrological cycle in the Willamette Valley is winter and spring flooding as a result of rainfall and snowmelt, with river levels lowest in late summer.[13] Flooding was an annual reality in the Willamette Valley and its tributaries and played a key role in shaping and maintaining the ecology of the confluence area.

Anecdotal evidence from explorers and travelers in the Willamette Valley clearly shows that flooding was a feature of the pre-settlement Valley. American Navy Lieutenant Charles Wilkes spent several weeks in the Willamette Valley in late May and June of 1841 as part of an American exploring expedition. Wilkes observed the high waters of early spring runoff and spoke with Hudson's Bay Company personnel at Fort Vancouver. They confirmed that the Willamette

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[13] U. S. Department of Agriculture Soil Conservation Service, *Flood Plain Report, Seavy Loop Area, Lane County Oregon* (Portland, Oregon: U. S. Department of Agriculture Soil Conservation Service, 1971), 5.

overflowed its banks each year in spring and fall, often endangering crops in the low-lying prairies.[14]

Wilkes also commented on the flood damage he saw in the Valley. He wrote, "The [Willamette] river has here considerably worn the banks and if it goes on to the same extent it will not be many years before the richest portion of the Willamette Valley is lost."[15] Wilkes' fears were based on his experience with other river systems. While floods did erode Willamette River banks, they deposited material elsewhere, sustaining ecosystem productivity and diversity.

Flooding is a critical ecological process in streams. Floods wash, rearrange and sort sediments, providing new habitats. They also allow interactions between the aquatic and terrestrial systems in floodplains. Floodplains provide surfaces for plant and aquatic communities, offer refuges for animals in times of flood, and act as trickle filters for vast quantities of turbid water.[16] The organic material and fine silts that precipitate on floodplains become the source of highly fertile soils, and they create highly productive instream conditions. Two scientists described the effects of Willamette River floods this way:

> Fisheries of major rivers are known to be the most productive in years following major floods. ...Floods clean out silted habitats,

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[14] Charles Wilkes, *Diary of Wilkes in the Northwest*, ed. Edmund S. Meany (Seattle, Washington: University of Washington Press, 1926), 67.
[15] Wilkes, *Diary*, 64.
[16] Stan Gregory, Professor, Oregon State University, Personal Communication, January 30, 1997.

> scour deep pools, deposit new productive riffles and create complex accumulations of large wood.[17]

Flooding is particularly noticeable process at places where two rivers join. The confluence area functions differently during floods than does the mainstem Willamette. Floodwaters from tributaries often deposit a great deal of sediment at their junction with the slower mainstem, creating islands which then become covered with vegetation. Off-channel habitats offer refuges from the main current, where organisms can survive and recolonize the tributaries. As a result, confluence areas have a wide range of temperatures, nutrients and habitat conditions, and water chemistry. Tributary junctions are the most diverse places in the Willamette River system, though they have been relatively little studied.[18] The same dynamism that makes rivers productive and biodiverse interferes with human uses that depend on stability and predictability.

The question, "If a tree falls in the woods, and no one is there to hear it, does it make a sound?" might be restated, "If a river overflows its banks, and no houses are flooded, is it a natural disaster?" The constant flux of rivers becomes "disastrous" when human beings are negatively affected. If humans are not involved, floods are not disasters; they are natural fluctuations. Ecologists call floods and other events that affect living creatures "disturbances." For ecologists,

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[17] Christopher Orsinger and Stan Gregory, "Nature Will Always Have Her Way," *Portland Oregonian*, February 9, 1996: B13.

[18] Stan Gregory, Professor, Oregon State University, Personal Communication, February 12, 1996.

disturbance has long been a tricky subject. Nonetheless, the controversial subject of disturbance is the key to understanding ecosystem stability and change.

For a working definition, disturbance might be considered "any relatively discrete event that disrupts an ecosystem, community or population structure and changes food, habitat or physical environment."[19] Although characterized as "disruptions," disturbances can have both positive and negative results for individuals, populations, communities or ecosystems. Episodic disturbances such as flooding can play important roles in opening new habitat for colonizing species, distributing nutrients, and maintaining high productivity.

This discussion of disturbance is not intended to suggest that all disturbances are equal, that for instance, gravel mining in the confluence is no more disruptive than flooding was prior to the construction of the flood control reservoirs upstream. Because organisms adapt to the environment in which they live, they adapt to the disturbances found there. The recurrence interval, the magnitude, and the timing of disturbances are all important. Pre-dam flooding in the confluence, for example, was an expected event. Pioneering species such as black cottonwoods depended on regular flooding to create habitat. Others were opportunistic users of flooded areas. Ducks and geese, for instance, fed and nested in floodplain marshes.

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[19] S. T. A. Pickett and P. S. White, ed. *The Ecology of Natural Disturbance and Patch Dynamics* (Orlando, Florida: Academic Press, 1985).

Indeed, the almost predictable disturbance of the Willamette's riparian and floodplain ecosystems by flooding challenges the implication of the term "disturbance"—that such events are departures from established or stable norms. Paradoxically, "disturbances" are thus important components of a regular system.

Because most humans sense change only in the short term (the sky clearing after a storm, or the day turning to night) and we less readily perceive change over decades or lifetimes, there is a tendency to see landscapes—especially landscapes in which industrial capitalism has not operated, such as the confluence prior to 1855—as static over long periods of time. But, as paleoecologists studying lake and ocean sediments have demonstrated, change occurs at both very large time scales—crustal uplift of mountain ranges, for example—and at immediate, small time scales—such as a landslide triggered by an earthquake. Humans easily see and comprehend the change caused by the landslide but cannot perceive the mountains rising. One result of this gap between human perception and patterns of change is that people often believe ecosystems remain unchanged for long periods of time.[20]

In the Western tradition, change is seen as linear, as progress toward some more evolved or more highly efficient state. But ecological change occurs on a

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[20] Chris Maser, *Global Imperative: Harmonizing Culture and Nature* (Walpole, New Hampshire: Stillpoint Publishing, 1992), 159-160.

number of temporal and spatial scales at once, from individual organisms to geological movements, and often appears to be circular rather than linear. Rivers, for example, often reclaim abandoned channels, and often become more rather than less sinuous over time.

A consequence of the static view of pre-modern landscapes is that the people living in those landscapes are seen to have been static as well. If the landscape is not changing, then the people must not be either. But in fact, the confluence of the Coast and Middle Forks was changing—daily—and the people living there were adapting their cultures to react, as well as manipulating the environment to fit their needs.

The natural pattern of the confluence is a result of the physical reality which shaped it, like mountain snows, seasonal rainfall, flat topography. This pattern imposed certain restrictions on the lifestyle choices of the people who lived there. The Willamette River has a high falls near its confluence with the Columbia, which limited salmon runs. This fact, and the lack of good fishing locations upstream, meant that the people who came to inhabit the Valley did not rely on salmon as a staple food. Instead, they made use of a great diversity of natural resources, often manipulating ecosystems to encourage the production of desired plants and animals. In fact, it is impossible to speak of the history of the confluence without discussing its human occupants, who like any other natural force have shaped their environment.

CHAPTER III

KALAPUYAS AND THE CONFLUENCE

The inhabitants of the confluence area at the time of first recorded history were the Kalapuya people. Archaeologists disagree about when their ancestors arrived in the Willamette Valley, but it seems to have been as much as 8,000 years before present. In 1976 artifacts were uncovered at a highway construction site in the Salem area that were carbon-dated to about 8,000 B. P.[1] This find, and others in the central Valley, contain large stone points in association with mammoth bones, suggesting a reliance on big game hunting.[2]

Archaeologists believe that the ancestors of the historically-known Kalapuya adapted over millennia to the changing environmental conditions in the Willamette Valley. Based on changes in the tools and other artifacts found in sites, archaeologists have proposed five periods in Kalapuya history.[3] Essentially, the Kalapuya were moving away from a big-game economy towards one in

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[1] "Indian Artifacts Recovered at Salem Site," *Eugene Register-Guard*, August, 4, 1976 (Eugene, Oregon: Register-Guard Publishing, 1976), 10A.
[2] John Robert White, "Prehistoric Sites of the Upper Willamette Valley: A Proposed Typology" (Unpublished Ph.D. Dissertation, Department of Anthropology, University of Oregon, 1974), 74.
[3] Cheatham, *Late Archaic Settlement*, 183-186; Kathryn Anne Toepel, "The Flanagan Site: 6,000 Years of Occupation in the Upper Willamette Valley, Oregon" (Unpublished Ph.D. Dissertation, University of Oregon, 1985), 152-160; White, "Prehistoric Sites," 73-79.

which a diversity of hunting and gathering techniques predominated, especially the harvesting of camas lily bulbs.[4]

A major change in Kalapuya culture appears to have occurred during the transition from a warmer, drier climate, to a wetter, cooler climate which continues today. This climatic change produced a shift in vegetation and animal populations in the Willamette Valley, and archaeological materials show a corresponding decline in large spear and arrow points and an increase in camas ovens and other vegetable processing tools.[5] Most known archaeological sites and artifacts are dated to sometime after 3000 B.P., leading archaeologists to speculate that population growth increased greatly during the last three thousand years.[6] According to archaeologist Richard D. Cheatham, a change in climate from warm and dry to the cool, moist conditions found today coincided with increasing population to form the ethnographically-known Kalapuya culture that included specific seasonal activities and a dependence on camas.[7]

There are three coinciding trends here: climate change, cultural adaptation, and population growth. In the three thousand years before the

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[4] Cheatham, *Late Archaic Settlement*, 201-202.
[5] John R. White, "A Proposed Typology of Willamette Valley Sites" in C. Melvin Aikens, ed. *Archaeological Studies in the Willamette Valley, Oregon*, University of Oregon Anthropological Papers 8 (Eugene, Oregon: University of Oregon Department of Anthropology, 1975), 26, 99; White, "Prehistoric Sites," 78-80.
[6] Stephen Dow Beckham, Rick Minor, and Kathryn Anne Toepel, *Prehistory and History of BLM Lands in West-Central Oregon: A Cultural Resource Overview*, University of Oregon Anthropological Papers 25 (Eugene, Oregon: University of Oregon Department of Anthropology, 1981), 170; Cheatham, *Late Archaic Settlement*, 186; White, "Proposed Typology," 99.
[7] Cheatham, *Late Archaic Settlement*, 190.

arrival of European and American diseases and culture, the Kalapuya were successfully adapting to a changing environment. In this view, the Kalapuya at the time of contact had been adapting to their environment—and adapting their environment to their own needs—for thousands of years.

The Seasonal Round

The Kalapuya were not a salmon people like the coastal peoples to their west, or the Lower Columbia peoples to the north. Salmon were present in the Willamette River, but in limited numbers compared to the great runs of other Columbia River tributaries. A 45-foot high waterfall at the north end of the Valley prevented all but the strongest races of salmon from accessing the upper river.[8] Spring chinook salmon entered the Willamette from March through May, when spring snowmelt boosts the river. Higher flows allowed the powerful chinook salmon to swim up and over the torrents of water. Most other salmon return in summer and fall months, when the falls would have been impassable.[9]

In the absence of salmon, Kalapuya peoples made use of other foods produced by their landscape. They operated on a "seasonal round," an efficient economy which utilized the natural productivity of an area. This diversified

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[8] Barry McPherson, Fishery Restoration Leader, Oregon Department of Fish and Wildlife, Personal Communication, August 21, 1997.
[9] Ibid.

economy is characteristic of some of the most densely populated areas of Native North America.[10]

During winter months, archaeologists believe, Kalapuyans lived in permanent villages in the foothills and higher points above the floodplain. During the drier summer months, the Kalapuya inhabited temporary camps in the Valley itself, often located near food-gathering areas. The people who lived in the confluence area may have joined other Kalapuyans in a common camas harvesting area, the "Great Prairie," on the floodplain between the Long Tom and Willamette Rivers. [11]

The nearest archaeological sites to the confluence are located in the valley of the Coast Fork Willamette River, with one site on the east flank of Mt. Pisgah. Large sites are located on creeks running into the Lower Coast Fork, and small sites are scattered over the floodplain. This arrangement of large sites above the floodplain and smaller sites on it has suggested to archaeologists that the Kalapuya in those areas chose to site their more permanent villages out of reach

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[10] Maintaining such high populations was possible for Native peoples because they diversified their economies to take advantage of as many locally available foods and other resources as possible. Several environmental histories have focused on mechanisms that Native peoples used to prevent over-exploitation of resources. Two that focus on fisheries are Arthur McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980* (Cambridge, England: Cambridge University Press, 1986), and Joseph Evans Taylor III, "Steelhead's Mother was His Father, Salmon: Development and Declension of Aboriginal Conservation in the Oregon Country Salmon Fishery" (Unpublished M.A. Thesis, Department of History, University of Oregon, 1992).

[11] Cheatham, *Late Archaic Settlement*, 193, 204-205. Cheatham argues that the numerous large sites on the floodplain between the confluence of the McKenzie and Willamette Rivers to the east and Amazon Creek to the West could have been a joint use area for the Chelamela and Chafan peoples. Cheatham's argument is intriguing but I am not aware of any supporting literature.

of even the highest floods, and that the smaller sites represent food-gathering locations that might be used seasonally.[12]

Archaeologists have divided Kalapuya sites in the Upper Willamette Valley into categories based on the environment of each site.[13] Artifacts at each location indicate the resources that Kalapuyas sought there. For example, camas baking pits are commonly found in flood plain areas. Archaeological evidence that Kalapuya people used wetter environments like the confluence is abundant, with middens frequently appearing near abandoned stream channels. [14] Kalapuyas would have found a number of useful environments in the confluence area, including riparian forest, floodplain, grassy prairies, and uplands such as Mt. Pisgah that were safe from all flooding. The confluence is therefore a miniature concentration of all the environments that Kalapuya seem to have used.

Most accounts of the Kalapuya highlight their use of prairie resources. But they also made use of riparian resources. For the Kalapuya, important foods included the bulbs of a spring-flowering lily, camas; the seeds of the tarweed plant; deer; acorns; berries; and grasshoppers. All of these species thrived in the open wet prairies which benefited from annual burning. Early exploring

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[12] Beckham, Minor and Toepel, *Prehistory and History*, 147; Cheatham, *Late Archaic Settlement*, 192-193, 204-207.
[13] Cheatham, *Late Archaic Settlement*, 190-193; White, "Prehistoric Sites," 40-47.
[14] Lloyd Collins, "The Cultural Position of the Kalapuya in the Pacific Northwest" (Unpublished M.S. Thesis, Department of Anthropology, University of Oregon, 1951), 103.

expeditions reported that the Kalapuya harvested tarweed seeds and grasshoppers after they had set fires to burn away the sticky resin of the plants and kill the insects.[15]

Kalapuyans also used the resources available in the gallery forests, floodplain, and side channels that characterized the confluence. Waterfowl were abundant in the floodplains and marshy areas, where Euroamerican settlers found them in later years.[16] Camas was particularly common in the alluvial floodplains, reported David Douglas in 1825:

> Its roots form a great part of the natives' food; they are prepared as follows: a hole is scraped in the ground, in which are placed a number of flat stones on which the fire is placed and kept burning until sufficiently warm, when it is taken away. The cakes, which are formed by cutting or bruising the roots and then compressing into small bricks, are placed on the stones and covered with leaves, moss, or dry grass, with a layer of earth on the outside, and left until baked or roasted, which takes generally a night. They are moist when newly taken off the stones, and are hung up to dry. Then they are placed on shelves or boxes for winter use. When warm they taste much like baked pear… Flowers large, blue; abundant in all low alluvial plains on the margins of woods and banks of river.[17]

Kalapuyans also directly utilized riparian resources of the Willamette River floodplain in the confluence area. "Wocas," the seeds of the Yellow pond-lily, were an important food source for the Kalapuya and their neighbors to the

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[15] Douglas, *Journal*, 213-214; Carl L. Johannessen, William A. Davenport, Artimus Millet, and Steven McWilliams, "The Vegetation of the Willamette Valley," *Annals of the Association of American Geographers* 61 (2) :286—306; Wilkes, *Diary*, 53-54.

[16] Masterson, *One Woman's West*, 65.

[17] David Douglas, *Journal Kept by David Douglas During His Travels in North America 1823-1827* (New York: Antiquarian Press, 1959), 105-106. One and a half years later, descending the valley of

east, the Klamaths. According to a local historian in Cottage Grove, wocas was so important that a series of rituals for harvesting and preparation existed for this plant. Unlike other Kalapuya food crops, wocas was sometimes produced in abundance as a trade item.[18] As one observer described it, wocas-gathering was a difficult task:

> Women gathered the roots of the arrow-head lily by wading into a pond sometimes up to their waists. Separating the bulb with their toes they waited until it floated to the top then placed it in their light canoes. They often remained in the water thus for several hours even in the dead of winter.[19]

Related species of pond-lilies were utilized by aboriginal peoples throughout North America; in the Pacific Northwest, parts of the pond-lily were often used for medicinal purposes, to treat maladies ranging from common colds to cancer.[20] This aquatic plant, found in ponds and slow-moving rivers[21] must have been abundant in the sloughs and backwaters of the confluence area, where Kalapuya people could harvest it.

Another aquatic plant species used by the Kalapuya was the wapato; its root provided a starchy food. Wapato roots were collected from swamps and

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the Coast Fork Willamette River during a November storm, Douglas became violently ill after having some camas soup (Ibid., 235).

[18] Trask, Dove McKee, 1959. Quoted in Muen Salah Qaddura, "A Regional Study of Cottage Grove, Oregon" (Unpublished M.S. Thesis, Department of Geography, University of Oregon, 1960), 70.

[19] John Minto, *The Quarterly of the Oregon Historical Society* 1, no. 3 (September 1900), 304.

[20] Jim Pojar and Andy MacKinnon, *Plants of Coastal British Columbia* (Vancouver, British Columbia: Lone Pine Publishing, 1994), 349.

[21] Pojar and MacKinnon, *Plants of Coastal British Columbia*, 349.

streambanks using digging sticks.[22] Other riparian species used for food included cattail, yampa, and skunk cabbage. Kalapuyas also harvested a caterpillar associated with Oregon ash trees, which are indicators of wetland and flood-prone environments.[23]

Kalapuyas also directly utilized rivers for transport. Their canoe-making process resembled that of peoples throughout the Northwest, except that the canoes were often propelled with a pole rather than with paddles.[24] Canoes would have been especially important as a transportation mechanism for Kalapuyans because the Valley was flooded for many months of the year and rivers While little is known specifically about Kalapuya use of the confluence of the Coast and Middle Forks, it is clear that they depended on foods found in riverine environments as a basic part of their seasonal round.

Kalapuyas also utilized other environments, including grassy prairies, which they maintained through annual burning. Early European and American travelers in the Willamette Valley noted the extensive fires set by the Kalapuya in late summer and fall. Fire was a tool with many uses for the Kalapuya. Annual fires destroyed young trees and shrubs which otherwise would have encroached upon the prairies.[25] While Kalapuyans adapted their economy to make use of

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[22] Frances Cushing Hall, *Indian Life in the Willamette Valley* (Eugene, Oregon: the Author, 1981), 19.
[23] Ibid., 20; Martin, *Indians of the Willamette Valley*, 47.
[24] Hall, *Indian Life*, 24.
[25] Carl L. Johannessen, William A. Davenport, Artimus Millet and Steven McWilliams, "The Vegetation of the Willamette Valley," Annals of the Association of American Geographers 61 (1971), 291. See also Robert Boyd, "Strategies of Indian Burning in the Willamette Valley,"

naturally-produced foods, they also managed the landscape they lived in to create an abundance of those products.

Unfortunately, very little information exists about the Kalapuyas' deeper relationship to their environment. The view presented here is a simplification of what was undoubtedly an extremely complex relationship. Very little of the details of Kalapuya environmental practice is known. Kalapuyan thoughts about their place in the natural world are largely unrecoverable due to their dramatic decline following epidemics of smallpox, measles and malaria in the late eighteenth and early nineteenth centuries. By the time that Euroamericans began to describe the Willamette Valley in travel journals, the Kalapuyas had plummeted from an estimated 16,000 persons in the 1770s to a few hundred in 1851.[26]

Close Ties to the Land

Any attempt to understand the Kalapuyas' relationship to their environment must necessarily involve speculation. Ethnographic evidence—the Kalapuyas' own voices—is limited to interviews with three individuals done in

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Canadian Journal of Anthropology 5 no. 1 (1986), 65-86 and James R. Habeck, "The Original Vegetation of the Mid-Willamette Valley," *Northwest Science* 35 no. 2 (1961), 65-77.

[26] Robert T. Boyd, "Demographic History, 1774-1874," In *Handbook of North American Indians 7*, ed. William C. Sturtevant and Wayne Suttles, 135-148 (Washington, D. C.: Smithsonian Institution, 1990), 136, 147.

1914, and the 1920s and 1930s.[27] These few informants, recalling their childhood experiences, spoke sparsely and simply about their lives. The context within which Kalapuya myth and custom were lived went unrecorded. In the words of one interviewer:

> [The Kalapuya] expressed their feelings and ideas about their vanishing cultures in terse and almost laconic form. They always chose for overt mention only a few things. They implied and their native auditors understood all the other things that were not ever mentioned.[28]

This understatement and lack of context further limit the use of Kalapuya ethnographic material. As a result, historians are forced to rely on the writings of the few whites who wrote about the Kalapuya to determine what the Indians thought and felt. Encounters between Euroamericans and Natives sometimes demonstrate the vast perceptual gulf between the two peoples. Martha Masterson wrote about the rattlesnakes near her parent's homestead on the Coast Fork, which were the target of a settler campaign. Local Indians, however, disagreed with the idea of killing the snakes.

> Some of our neighbors collected the rattles of all the snakes they killed, showing how numerous they were. A Mr. Maloney who had a stock ranch near us had secured a string of rattles eight feet long. The Indians protested against the whites killing them, saying they

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[27] The paucity of ethnographic information about the Kalapuya is exacerbated by the way in which ethnographers collected their stories. The best sources available are found in Melville Jacobs, *Kalapuya Texts*, University of Washington Publications in Anthropology, 11 (Seattle, Washington: University of Washington Press, 1945). Jacobs was a linguist, and only became interested in the ethnographic content of his recordings when he realized how rich the stories were in their original languages. The information collected by Gatschet (1877) and Frachtenberg (1914) that Jacobs summarized in *Kalapuya Texts* was even less carefully collected.

[28] Melville Jacobs, "Santiam Kalapuya Ethnologic Texts," University of Washington Publications in Anthropology, 11 (Seattle, Washington: University of Washington Press, 1945), 6.

> gave us warning to keep away by rattling. They never killed them when they rattled, as that was the snakes' manner of saluting. If an Indian encountered one that did not rattle, then he felt it his duty to kill that silent enemy because it meant to strike, or it would have warned him.[29]

Implicit in this account is a relationship between Kalapuyas and their environment where both people and the land are non-passive participants in a kind of dialogue. The Kalapuyas' relationship with their environment is hinted at in their surviving myths. Myth characters were usually animals found in the Willamette Valley and neighboring areas. The stories contain detailed descriptions of animal behavior and demonstrate the Kalapuyas' careful knowledge of their surroundings. In one myth, Coyote gambles with a series of animal characters, his knowledge of their behavior enabling him to defeat them all.[30]

Kalapuya people experienced some relationship to their surroundings, but exactly what is unclear. As Melville Jacobs noticed, his informants could contain within a few words great volumes of understood information. This lived experience can only be guessed at with lists of objects recovered in archeological sites, maps of Kalapuya trails on the landscape, reconstructions of Kalapuya languages. One thing seems clear: the Kalapuya were imbedded in the land. Theirs was not a portable culture.

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[29] Martha Gay Masterson, *One Woman's West: Recollections of the Oregon Trail and Settling the Northwest Country*, ed. Lois Barton (Eugene, Oregon: Spencer Butte Press, 1986), 70-71.
[30] Albert S. Gatschet, Leo J. Frachtenberg, and Melville Jacobs, "Kalapuya Texts," University of Washington Publications in Anthropology 11 (Seattle: University of Washington, 1945), 205-215.

These people were deeply connected to their environment. Everything happened for a reason, and the Kalapuya paid close attention. One informant explained simply, "Long ago the people observed everything with care. If you had killed a deer, and then you wanted to skin it, and it arose, made its escape, they would say, 'It is bad.'"[31] Theirs was a world in which everyday life was imbued with layers of meaning.

The Kalapuya experience of the confluence area was undoubtedly very different from a modern experience. Perhaps they did not even see the confluence as a separate unit, as it has been treated here. Perhaps the confluence was only part of the larger landscape they inhabited. Or, perhaps Kalapuyas saw certain parts of the landscape as imbued with special meaning. Either way, the Kalapuyan view of the land was covered up by white settlers. The coming of Euroamericans disrupted the traditional religious system of the Kalapuya which relied on obtaining power from the guardian spirits. As one informant explained, the guardian spirits left the land of the Kalapuya when it was taken over by the whites:

> Now there are no more spirit-powers. But long ago there were many, when only Indians still lived here... But now there is nothing any longer in the water like long ago. And it is gone the very same way in the mountains, everything that lived in the mountains, the Indians made to be their spirit-powers, they are gone now. They all went back to the ocean.[32]

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[31] Melville Jacobs, "Santiam Kalapuya," 78. I have removed the explanatory remarks made by the ethnographer within the text.
[32] Gatschet, Frachtenberg and Jacobs, "Kalapuya Texts," 347.

The Euroamericans who replaced the Kalapuya had a very different approach to the landscape of the confluence. The Kalapuyas both managed and adapted to their environment. Euroamericans also depended on the land for their living, but their attitude toward it was as much a result of their cultural background as it was a result of personal knowledge of the place they inhabited.

CHAPTER IV

EUROAMERICAN SETTLEMENT, 1840-1900

American immigrants to the Willamette Valley were generally people with means in their home states. In order to finance the expensive trip to Oregon, they liquidated their possessions. Frequently they faced significant debt.[1] To make such a dramatic life change, the immigrants must have had tremendous motivation. Ultimately, their goal was to become financially independent, even wealthy. The means to this end was free land, which in turn could be converted into valuable products or sold. The land was "valuable" in a sense that it had not been for the Kalapuya.

Despite the wishes of early settlers to quickly become wealthy and comfortable, a lack of commercial opportunities in the mid-nineteenth century Oregon frontier meant that many lived a subsistence lifestyle. Immigrants often arrived in the Willamette Valley at the end of the growing season without property or food and had to struggle to survive the winter. In the following years, they strove to better themselves and to help the ever-increasing number of new migrants.[2] It was not until commercial opportunities arose—when markets

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[1] Burnett, *Recollections*, 183.
[2] Ibid., 169.

for their agricultural surpluses became available—that American settlers in the Willamette Valley could realize their dream of converting free land to wealth.

Farmers' inability to sell their agricultural production from the Willamette Valley was a real problem in the early years of settlement: they often had no cash to make necessary purchases, nor did they have shipping to get their products to Hawaii or other markets.[3] What salvaged the economic hopes of Willamette Valley settlers was the California gold rush, which created a seemingly infinite market in California for agricultural products from Oregon. This nearby market enabled Willamette Valley farmers to pay off their debts and to improve their farms.[4]

Despite the comment of an early pioneer that he knew of "no incident connected with [the early history of Oregon] worth preserving—nor a single character that rose above mediocrity—no display of heroism, patriotism or other of the sterner virtues—that exalt and preserve the names of men," there was by the end of the pioneer era a growing cult of the pioneer.[5] This affected sense of pride—visible in public monuments such as the statues of the "Pioneer Father" and "Pioneer Mother" on the University of Oregon campus—obscured the

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[3] Hubert Howe Bancroft, *History of Oregon*, Vol. 2, *1848-1888*, Vol. 30 of *Bancroft's Works* (San Francisco: The History Company, 1888), 21.
[4] Bancroft, *History of Oregon*, 51.
[5] Letter from Jesse Applegate to Elwood Evans, October 13, 1867, Oregon Historical Society Library, Portland, Oregon. Cited in James L. Carson, "A Social History of the Willamette Valley: 1890-1900" (Unpublished M.A. Thesis, Department of History, University of Oregon, 1953), 2-3. Originally quoted in Sydney Warren, *Farthest Frontier* (New York: MacMillan, 1949), 275.

complicated relationship between settlers and the native peoples and landscapes of the Willamette Valley. But ambivalence about the changes they wrought in the land and in their own lives as well is evident in settlers' diaries and letters. As Martha Gay Masterson wrote in her journal, "Life is made of sunshine and clouds."[6]

The changing nature of the people who inhabited the confluence—from Kalapuya to American settlers—meant a dramatic shift in the attitude of the people towards the land. The new attitude that land was free, that the land owed the people a living, and that "natural resources" were convertible into cash meant that great changes in the human relationship with the confluence, and in the ecology of the confluence itself, were in order. This was borne out in the late nineteenth and twentieth centuries with the rise of the export economy.

European culture arrived in the Pacific Northwest long before Europeans did, perhaps via the extensive Native American trading networks that spanned North America.[7] The first Europeans to explore the coastline in the eighteenth century noted the presence of European goods and iron tools among the Native peoples they met. Native peoples were quick to utilize European goods, often with their own interpretations of and use for such items. In one archaeological

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[6] Masterson, *One Woman's West*, 72.

[7] See for example, Colin G. Calloway, *Crown and Calumet: British-Indian Relations, 1783-1815* (Norman, Oklahoma: University of Oklahoma Press, 1987), overleaf map showing interconnected British and Indian trade networks.

site located south of the confluence area, a scraping tool made from a wine bottle accompanies other early nineteenth century objects.[8]

The Lewis and Clark expedition passed through the Lower Willamette River in 1805 and 1806 and Alexander Ross and a party from the ill-fated experiment at Astoria traveled briefly in the Willamette Valley, but it was not until the Hudson's Bay Company moved its headquarters to Vancouver that Europeans regularly passed through the Valley. The early trail followed the west bank of the Willamette Valley until it reached the Long Tom River, followed that stream for a distance, and passed through the hills near Spencer's Butte. It connected again to the valley of the Coast Fork at some point south of the confluence area and followed that stream up and out of the Willamette River Valley.[9]

European contact with the confluence area was thus limited even during the nineteenth century, when increasing numbers of British and Americans settled in the northern Valley. In 1845 a party of five Americans rode down the Willamette Valley looking for good homesteads. After crossing the Middle Fork of the Willamette River near present-day Jasper, two of the five men marked off 640 acre tracts just upstream of the confluence in present-day Pleasant Hill.[10]

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[8] White, *Proposed Typology*, 107.
[9] Bowen, *The Willamette Valley*, 13.
[10] Elijah Bristow Family Papers, Manuscript SFM 115, University of Oregon Special Collections.

Two of the riders, Elijah Bristow and Felix Dodson, decided to settle upstream from the confluence of the Coast and Middle Forks. Images of Bristow later in life show the seriousness of this man, who was already middle-aged when he settled in Oregon (figure 3). The possibly apocryphal story of Bristow's decision to settle at Pleasant Hill is romantically depicted,

> He halted and raising his hat, allowing the cooling breeze, fresh from the near rolling Pacific to play at will through his thin gray locks, he exclaimed: 'This is my claim! Here I will live, and when I die, here I shall be buried!'[11]

Bristow reportedly selected his claim because the view reminded him of his home in the mountains of Virginia.[12] Charles Wilkes six years earlier had compared the farm of James O'Neil in the northern Willamette Valley to the landscapes he remembered in the Connecticut Valley. Perhaps these men sought to describe the new in familiar terms, or perhaps they wanted to transform this new land into a comfortable one.

The second wave of settlement occurred in 1847, when a party from the south arrived, the first to include families. These immigrants settled near the budding community of Pleasant Hill, with the exception of Abraham Coryell and his son, Louis, who settled just west of the confluence of the Willamette in the spring of 1848.[13] As single men, these two were typical of the early pattern of

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[11] Walling, *Illustrated History*, 325.
[12] Elijah Bristow Family Papers, Manuscript SFM 115, University of Oregon Special Collections.
[13] Ibid., 326. Spellings of names varied greatly in the nineteenth century; Abraham is often spelled Abram, Louis is sometimes Lewis, and Coryell is written Cargill in one source. Conflicting documents variously place the Coryell's arrival date in 1847 and 1848.

ELIJAH BRISTOW,
PIONEER SETTLER OF LANE COUNTY,
OREGON.

FIGURE 3. Elijah Bristow, Confluence Pioneer
Source: A. G. Walling, *Illustrated History of Lane County, Oregon* (Portland, Oregon: House of Walling, 1884), 304.

migration to the Willamette Valley. Generally, one member of a family would come to Oregon to establish a land claim, returning later with the entire family.[14]

Clusters of settlement sprang up when members of the same communities in the eastern United States resettled in Oregon. In general, immigrants attempted to establish communities like the ones they left behind. These settlements tended to reinforce the mores of the society left behind.

Indian-White Relations

The settlers brought with them a set of beliefs about the Native inhabitants of the Willamette Valley that was created by the stories they had heard and by their interactions with Native peoples in the Mississippi Valley. They arrived with preconceived notions that distorted their understanding of the Native people just as much as it distorted their view of the land.

The relationship between Indians and Euroamericans was complicated. Some settlers distrusted and feared the Kalapuyas, but others relied on them for assistance. Botanist David Douglas interacted positively with Kalapuyas in his meetings with them between 1823-27.[15]

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[14] William A. Bowen, *The Willamette Valley: Migration and Settlement on the Oregon Frontier* (Seattle, Washington: University of Washington Press, 1978), 13, 50; Thomas B. Forster, *The Cultural and Historic Landscapes of Lane County, Oregon: Summary Report of the 1986 Cultural and Historic Landscape Study*. Thomas B. Forster, ed. (Eugene, Oregon: The Survey, 1986), 36.
[15] Douglas, *Journal*, 78-89.

Oregon was officially made part of the United States by the Oregon Treaty in June, 1846. The first law concerning Indian relations was the Organic Act of 1848, which gave the governor the role of superintendent of Indian affairs, including the power to make treaties. Early policy was to remove Indians from the Willamette Valley, but Kalapuyas refused to leave. Finally, most of the Willamette Valley's surviving Kalapuyas in 1854 were herded onto the Grande Ronde Reservation at the confluence of the Yamhill, Santiam and Willamette Rivers. As these attempts to eradicate Indian title to the Willamette Valley were being carried out, the first Donation Land Claim Act was passed in 1850. Much of the Willamette Valley was transferred from Kalapuya ownership to settlers by this law, even though no treaties had yet been signed between the Kalapuyas and the United States.[16]

Whites benefited by having Indians in the Willamette Valley, especially Indians cut off from their traditional economy. The policy of Oregon Commissioner of Indian Affairs Anson Dart was to keep the Kalapuyas in the Valley, where they supplied low-priced labor to the farmers.

In later years, the prejudice towards Native people continued to guide official policy, even at the more local level. The Eugene town council met March 13, 1871 and received a petition,

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[16] Stephen Dow Beckham, "History of Western Oregon Since 1846" In *Handbook of North American Indians 7*, ed. William C. Sturtevant and Wayne Suttles, 180-188 (Washington, D. C.: Smithsonian Institution, 1990), 180-182.

> [P]raying for the removal of Indians from the streets of Eugene City and setting forth that their presence was detrimental to the morals of the youth of the city and they did not belong to it but to their respective reservations.[17]

But not all Indian-White interaction occurred at the level of official policy. There were still Kalapuyas living in the valley of the Coast Fork Willamette River into the 1850s. Martha Masterson reported several incidents with Indians in her Camas Swale homestead. Groups of Indian men several times came into the house and searched for food. There was interaction among Indians and whites: sometimes Native people would demand pay for the land that the whites had settled.[18]

On another occasion, Martha was visiting her sister Mamie Gay Cogswell at the latter's home on the McKenzie when she was accosted by a Kalapuya from the Mohawk River Valley.

> I ran into the living room and saw Old Fisherman standing in the door of Mamie's bedroom with a sixshooter in his hand. He flourished the gun wildly about demanding pay for his land. Old Fisherman was a bad Indian who lived in the Mohawk country. He was really mean and wild when he got drunk.[19]

In Martha Masterson's family, as with other Willamette Valley settlers, the standard practice when confronted by Kalapuyas demanding payment for their land was to tell the Indians that they must negotiate with the "Boston Man," a reference to U. S. government agents.[20] Using law as a shield, white settlers

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[17] Walling, *Illustrated History*, 404.
[18] Masterson, *One Woman's West*, 67.
[19] Ibid., 75.
[20] Ibid., 67, 76.

gained control of the Willamette Valley's richest farmland. Having made the difficult trek to Oregon, settlers were not willing to abandon their land claims in the face of Indian protests. The immigrants had invested everything they had to get their free land in Oregon, and they meant to get their living from it. Natives were useful for their labor or could be tolerated, so long as the did not interfere with farm production.

The reason settlers came to the Willamette Valley was to get free land. The legal mechanism that made settlement attractive was the Donation Land Claim Act. First offered by Senators Linn and Benton of Missouri in the 1840s, it was not passed until 1850.[21] However, thousands of American families had been inspired by the promise of enormous tracts of free land.

At least one settler was blunt about his reasons for coming to Oregon. Peter Burnett, District Attorney for Missouri before leaving for Oregon, wrote: "I went to Oregon for three purposes: 1. To assist in building up a great American community on the Pacific Coast. 2. To restore the health of Mrs. Burnett. 3. To become able to pay my debts."[22]

Burnett gives three of the basic reasons that settlers came—health, wealth and the desire for free land—the last being the means to become wealthy. Settlers

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[21] Dorothy O. Johansen, "The Roll (sic) of Land Laws in the Settlement of Oregon," in Portland Genealogical Forum, *Genealogical Material in Oregon Donation Land Claims, Volume 1* (Portland, Oregon: Genealogical Forum of Portland, 1957), v-vi.

[22] Peter H. Burnett, *Recollections and Opinions of an Old Pioneer* (New York: the Author, 1880). Reprinted in *Oregon Historical Quarterly* 5 (1904): 64-99, 139-198, 272-305, 370-401. This citation, pp. 183.

expected to use the free land they could claim in the Willamette Valley to materially improve their lives, to make profits and become wealthy.

Many settlers had come from the Upper Mississippi Valley, which in the 1830s had experienced devastating flooding and epidemics of malaria and other diseases. The flood-prone Mississippi Valley landscape was seen as unhealthy. Fear of flooding stayed with the settlers who came to Oregon, and for good reason. Eugene Skinner, founder of Eugene, Oregon, according to his grandson, "took a heavy cold from exposure, and was never well again" as a result of the 1861 flood.[23]

After 1860, desirable farm land in the southern Valley was almost all claimed; land claims as a way of settlement really only operated for a short period of time.[24] Nevertheless, donation land claims radically changed the human perspective and residence pattern in the Willamette Valley and in the confluence. Geometrical land claims divided the Valley into a patchwork of claimed land. Human control and dominance (even if only imaginary for a time) over the landscape is evident in the General Land Office map of Donation Land Claimants in the confluence area .

The confluence was not among the first properties claimed, probably because most of the area was swampy or forested. The open prairie lands such as

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[23] Lucia N. Moore, Nina W. McCornack, and Gladys W. McCready, *The Story of Eugene* (New York: Stratford House, 1949), 15.
[24] Forster , *Cultural and Historic Landscapes*, 37.

those that Elijah Bristow claimed upstream of the confluence in Pleasant Hill were the most valuable to the early settlers. Yet despite their trees, brush, and flood hazard, even the riparian lands in parts of the confluence were claimed. On the north bank of the Middle Fork just north of the actual junction of the two rivers, William L. and Eliza Jane Masterson chose a donation land claim in 1851.[25] The Mastersons claimed the upland area on the slope of the hill north of the confluence, but also a large swath of riparian forest and even a stretch of the river.[26] The Mastersons' small cleared field on the upland is visible in the 1853 General Land Office Survey (figure 4). Early settlers often tried to claim land that went from river bottom to hillside, in order to have a diversity of soil types in their claims.[27]

The Mastersons' confluence property was not a particularly valuable piece, with difficult access from the north and with much of his property subject to regular flooding, but it was 320 acres of free land. As with many of the later donation land claims, the Mastersons' claim was limited to 320 acres (couples who arrived before 1850 had been eligible for 640), and it was the leftover land not taken by earlier arrivals. The phenomena of such large tracts of free land

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[25] A. Claire Dunn, "Mary Masterson Dunn, Born in Eugene City, March 11, 1859," *Lane County Historian* 4 (1859), 3. The Mastersons referred to here were not the family of Martha Gay Masterson who kept a journal that became *One Woman's West*. Martha's maiden name was Gay. It is unclear whether her husband was related to the Mastersons who settled in the confluence.
[26] U. S. Surveyor General's Office, General Land Office Survey of 1853 Cadastral Maps and Surveyor's Notes, Township 18 South Range 2 West. Original maps and field notes are held by the Bureau of Land Management, Portland, Oregon.
[27] Moore, McCornack and McCready, *Story of Eugene*, 82.

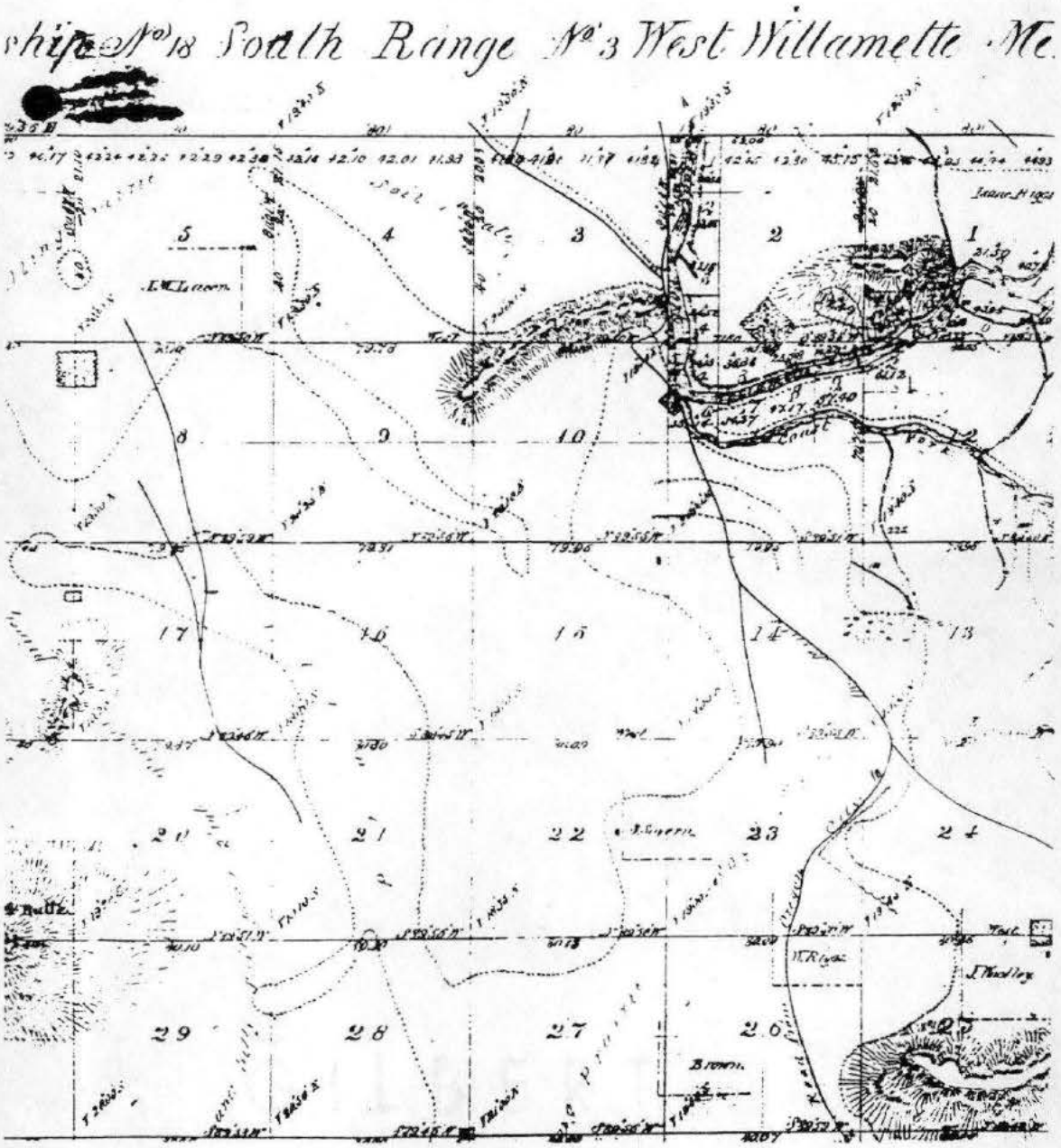

FIGURE 4. General Land Office Survey of the Confluence Area, 1853
Source: U. S. Surveyor General's Office, *General Land Office Survey of 1853 Cadastral Map, Township 18 South Range 3 West.*

meant that most of the Willamette Valley was claimed in only a few short years, even though population in the Valley was low. Individual farm families were scattered on their hundreds of acres of free land.[28]

Settler Economy

As historian Peter Boag has argued, the early subsistence economy of immigrants to the Upper Willamette Valley in many ways mimicked Kalapuya economies, with its heavy dependence on locally abundant foods such as wild game, fruits and fish. This subsistence lifestyle was not chosen by the settlers but was the result of scarcity. Supply routes to manufacturing centers in the eastern United States and Europe were long and haphazard, and large numbers of people immigrated by land to the Willamette Valley without access to supplies. A subsistence economy developed in the Willamette Valley to remedy the lack of even the most basic of materials utilized in mid-nineteenth-century society in the United States. Wheat, as the principal crop of most newcomers, became an imperfect means of exchange. One settler bartered legal services for sugar, which he could then trade for other articles.[29]

Despite the vast land holdings that eligible settlers could claim, labor shortages and the lack of a market for agricultural production meant only small

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[28] Ibid., 214.
[29] Burnett, *Recollections*, 177-178.

acreages were actually farmed in the early period. Settlers plowed a few acres for wheat and oats, and livestock was allowed to roam freely.[30] Even though individual holdings might exceed a square mile of land, only a small part was used by the earliest settlers.

Until the extension of transportation facilities to the Willamette Valley with steamboats and railroads, most settlers were reliant on local production for their needs. As a result, settlers were rich in land but poor in cash. Lieutenant Charles Wilkes described one such farm, that of James O'Neil in the northern Willamette Valley in 1841:

> O'Neil's farm is situated in a beautiful prairie of small extent with a fine forest encircling it & bordering on the river, it is gently undulating which takes away from its monotony. He had between 30 & 40 acres of wheat growing in fine order. It shows what ordinary industry will do in this Country 3 years since he came to the Valley with but a skin (as he expressed it) to his back.[31]

In 1847, the only flour mill in the Valley was at Oregon City, 100 miles north, and ten days travel. In 1848 a flour mill opened at Salem, and in 1849 a mill opened on the Calapooia River, only 25 miles from the budding settlements near the confluence area.[32] This facilitated transport of wheat to the mill for sale to local consumers, but not until transportation was improved could wheat be produced purely as a cash crop.

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[30] Forster, *Cultural and Historic Landscapes*, 38.
[31] Wilkes, *Diary*, 64.
[32] Walling, *Illustrated History*, 336.

Closer to the confluence area, one settler's memories were of a lifestyle that could be described as "semi-subsistence." Martha Gay Masterson's family largely consumed foods grown on their farm, but they also participated in the cash economy. Her brother James reported in his journal that "I went on the swale to kill geese," a use of the land that was remarkably similar to the Kalapuya who had also gone to Camas Swale to hunt wildfowl.[33]

Settler diaries from the 1850s indicate that they lived a life that was somewhat subsistence-based, somewhat market-based. It was not that they did not know about the market economy of the wider world; it was just that it had not yet reached the far corners of the Willamette Valley. Participation in the modern economy was possible, but difficult. When Mamie Gay was to be married in 1852, her father had to go all the way to Portland to buy a wedding dress, "not wishing to purchase his supplies retail."[34]

The settlers shared their labor and tools with neighbors, and they grew most of their own food. The Mastersons raised chickens, hogs, sheep, cattle and wheat, plus a large garden. James had an orchard as well as the other crops and livestock.[35] These animals and plants were not indigenous—they were imported with the settlers. As historian Alfred Crosby has written about colonists

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[33] Masterson, *One Woman's West*, 65.
[34] Ibid., 60.
[35] Ibid., 70.

elsewhere, the settlers in the Willamette Valley brought the biological basis of their economy with them.[36]

Settlers also brought an army of family members with them, if the Masterson family is typical. Such large families, the children taking claims near their parents, led to large areas of claimed land held by one family, as the Coryells did near the confluence. Another family reportedly had 20 children.[37] Despite their early subsistence lifestyle, settlers soon raised crops for sale. By 1849, wheat and flour were being shipped down the Columbia River to an exploding market in California.[38]

Wheat was the main crop of the early settlers. In the 1880s, wheat was still the major export crop, with transportation the key to successful export. In 1884, an observer described the agricultural export economy that fueled the growth of the Upper Willamette Valley in the late nineteenth century.

> [H]undreds and thousands of bushels of grain not needed for home consumption are yearly collected in the large warehouses at Eugene City and other places along the line of the Oregon and California railroad and thence shipped by way of Portland and the Columbia River to the large marts of the world beyond the sea.[39]

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[36] Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* (Cambridge, England: Cambridge University Press, 1986).
[37] Masterson, *One Woman's West*, 70.
[38] Dorothy O. Johansen, "The Land Base of Oregon's Economy," in Portland Genealogical Forum, *Genealogical Material in Oregon Donation Land Claims, Volume 2* (Portland, Oregon: Genealogical Forum of Portland, Oregon, 1959), iv, vi.
[39] Walling, *Illustrated History*, 302.

Transportation was the key to the southern Willamette Valley's involvement in export agriculture. Early transport was often by water. The first (and one of the only) steamer to make it to Springfield was the *Relief*, on December 28, 1861.[40] Boats rode high flows to Eugene four to six months of the year, stopping at farms along the river to drop off mail and pick up cordwood to fuel the boilers.[41] During the height of steamboat transportation on the Willamette River, many steamers tried to get to Springfield, but could not make it through the riffles above Eugene.[42] The steamboats were for a time the main means of transport connecting the Upper Willamette Valley to world agricultural markets. In 1873, the Willamette steamboat fleet transported 44,000 tons of wheat to oceangoing vessels on the Columbia River.[43]

The Oregon Military Road from Eugene to Butte Disappointment (Fall Creek) was completed July, 1866. The Oregon and California Railroad (O&C) reached Eugene in October of 1871. The O&C ran through Goshen, to the south of the confluence.[44] The O&C was purchased by the Southern Pacific Railroad in the late nineteenth century. After the turn of the century the Southern Pacific constructed the Natron cutoff which ran along the northeastern part of the confluence area from Springfield to Klamath Falls. This route made possible the

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[40] Ibid., 399.
[41] Elizabeth Yates, "Early Steamboating: Pioneer Thoroughfare to Eugene and Springfield Via Willamette River," *Lane County Historian* 4 (1959), 6-9.
[42] Moore, McCornack and McCready, *Story of Eugene*, 229.
[43] Yates, "Early Steamboating," 8.
[44] Walling, *Illustrated History*, 446.

rapid shipping of products to and from the eastern part of Oregon and spelled the end for steamboat service to the Upper Willamette Valley.[45]

Livestock raising was a major part of the early economy of the Willamette Valley, and another part of the settler's economic heritage. Pioneer Jesse Applegate described the members of an 1843 wagon train as "well-to-do farmers, or, rather graziers."[46] Cattle were a natural fit in the open prairie landscapes that covered much of Willamette Valley. Early settlers often had enormous herds of cattle that roamed semi-wild in the Valley. In the valley of the Coast Fork there were more than 500 cattle per household in 1850.[47] Upstream, however, cattle ranches were the primary reason for settlement on the prairies of the Coast Fork drainage.

In 1852, Martha Masterson's family came to the valley of the Coast Fork Willamette River seeking land to raise cattle. Only a few years after settlement had begun in the Willamette Valley, most of the prime farmland was already claimed. Martha wrote in her journal,

> About this time [summer 1852] father made up his mind to go farther south [from their new claim in the Albany area] and secure a stock ranch near the hills, as the valley land would soon all be fenced.[48]

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[45] Howard McKinley Corning, *Willamette River Landings* (Portland, Oregon: Oregon Historical Society, 1947), 120.
[46] Jesse Applegate, quoted in Dorothy O. Johansen, "Land Base of Oregon's Economy," i.
[47] Bowen, *The Willamette Valley*, 80-81.
[48] Masterson, *One Woman's West*, 59.

Cattle and sheep-raising were important industries in the Upper Willamette Valley, but other crops, such as oats, were also widely grown for export.[49] The farms upstream of the confluence in the valley of the Coast Fork became well-known for their livestock and for hops.[50] Hops was a successful crop of the fertile floodplain, the "bottomlands." Charles Wilkes noted the presence of hops at the Hudson Bay Company's Fort Vancouver in 1841; by the 1880s the floodplain of the Willamette was the premier hop-growing region of Oregon.[51] The Seavey Loop area along the Coast Fork just south of the confluence was an important hops-growing area, and hops were also grown on the north bank of the Middle Fork.[52]

Specialty crops, which later were to have an important impact in replacing the subsistence economy with an export-oriented economy, gained ground during the last decades of the nineteenth century. Two became important in the 1880s: flax for processing into clothing and linseed oil, and hops for breweries in Portland and Vancouver, Washington.[53]

Despite the richness of Willamette Valley soils and the favorable climate, farm production lagged behind its perceived potential until the later part of the nineteenth century. One reason may have been the large size of family-owned

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[49] Walling, *Illustrated History*, 470.
[50] Dorothy Velasco, *Lane County: an Illustrated History of the Emerald Empire* (Northridge, California: Windsor Publications, 1985), 111.
[51] Wilkes, *Diary*, 74; Walling, *Illustrated History*, 309, 471.
[52] Willamalane Park and Recreation District, *Dorris Ranch Plan*, 26-27.
[53] Velasco, *Lane County*, 69.

farms: land claims of several hundred acres could not possibly be worked by a single family with the technology of the nineteenth century.[54] Labor shortages were chronic in the nineteenth-century Willamette Valley.

Settlement in the Confluence

The Upper Willamette Valley including the confluence was a backwater compared to the settlements clustered near the main towns in the northern Valley. Settlement occurred after the best farm land in the rest of the valley was claimed. The first Euroamericans to settle in the southern Willamette Valley located themselves just upstream of the confluence between the Middle Fork and Coast Fork Willamette Rivers. The first American settlers in the confluence area itself arrived in 1847, as part of a group who came via the southern route. Middle-aged Abram Coryell and his son Lewis settled just south of the junction of the Coast and Middle Forks, according to an early historian.

> [The Coryells'] cabin, which was finished November 3, 1847, was the last house along the road till one reaches the Sacramento Valley. The next year L[ouis] Coryell and D. Hasty put in a ferry on the Umpqua. They expected a large immigration, but were disappointed, though they had a good trade in ferrying miners on their way to the gold fields in California. In May Coryell sold out to a Mr. Hendricks and went to the gold fields, where he remained a few years, when he returned to Lane County, where he still [1904] resides, an honored resident of Crow.[55]

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[54] Frances Fuller Victor, *The River of the West: the Adventures of Joe Meek. Volume Two: the Oregon Years.* (1870). Reprint, ed. Lee Nash. (Missoula: Mountain Press, 1985), 284.
[55] W. B. Dillard, "The Beginnings of Lane County," *Oregon Historical Quarterly* 5 (1904), 136.

In the claim he filed with the Land Office in Oregon City, Lewis S. Coryell said he had arrived in Oregon Territory with his father Abraham and his brother George in late October of 1847. Lewis Coryell reported settling his claim at the confluence of the Middle and Coast Fork Willamette Rivers on July 6, 1852. He was 32 years old and married.[56]

George M. Coryell, nine years younger than his brother Lewis, stated that he had settled his claim on May 1, 1852. George had also married in Oregon, to Nancy McBee in 1851, so he was able to claim the full square mile of land that the DLCA allowed to the earliest settlers. George Coryell, acting as executor of his father Abraham's estate, reported that Abraham had settled his claim on June 20, 1853. Thus the three Coryells and their families were all donation land claimants, with over a thousand acres of land between them.[57]

The Coryells were among the thousands of land claimants who parceled up the Willamette Valley in the mid-nineteenth century. Like other immigrants, they came to Oregon for the promise of free land, and then struggled to make that land support them. In a new country with a fledgling economy, settlers were forced to support themselves in their new home. Settlers plowed the land for crops and imported cattle, sheep, horses and pigs, all of which ran free and

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[56] Genealogical Forum of Portland, Oregon, *Genealogical Material in Oregon Donation Land Claims, Volume 1* (Portland, Oregon: Genealogical Forum, 1957), claim no. 3042. Citations for this source will be given by claim number rather than page number.
[57] Ibid., claim no. 2599, 2616, 3042.

multiplied in the prairies. With the development of markets for their agricultural production, settlers increasingly transformed the land they had claimed.

The immigrants inherited a landscape created in part by annual burning by Kalapuyas; with the end of the fires, trees and shrubs began to colonize the open spaces. Environmental change during the settlement period mostly occurred in the prairies and oak woodlands where settlements clustered, and resulted as much from the end of Kalapuya practices as from settler activities.[58] The transformation of the riparian areas that followed in the twentieth century was prefigured by the settlers' division of the Willamette Valley into individually-owned parcels. Euroamericans in the twentieth century would confront the basic forces that shaped the Willamette Valley, even the floods that repeatedly devastated pioneer settlements in the nineteenth century.

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[58] Bowen, *The Willamette Valley*, 60-61.

CHAPTER V

ECONOMIC AND ECOLOGICAL CHANGE, 1920-1960

As market conditions improved in the late nineteenth century with the development of markets in California and elsewhere for wheat, wool, lumber and other products, Americans in the Willamette Valley increasingly modified their environment. More demand for wheat meant that the small 20-40 acre fields that early settlers had planted were replaced by hundreds of acres of plowed land. Herds of sheep and cattle spread throughout the Valley. Settlement increased in extent and in density. Transportation of goods to markets led to attempts to modify the Willamette River to make it safe for shipping and to the construction of roads and then railroads. By the 1880s, the human communities of the Upper Willamette Valley were sewn together by railroads in a network of commercial and social interaction (figure 5).

The transition from a subsistence agricultural lifestyle—one which was never completely divorced from the market, as has been shown here—was not automatic. The move to a market economy was intentional. The settlers who had migrated from the eastern United States had participated in the already "modern" economy of the middle west before coming to Oregon. There was a lag as the new economy developed, but more and more the Willamette Valley

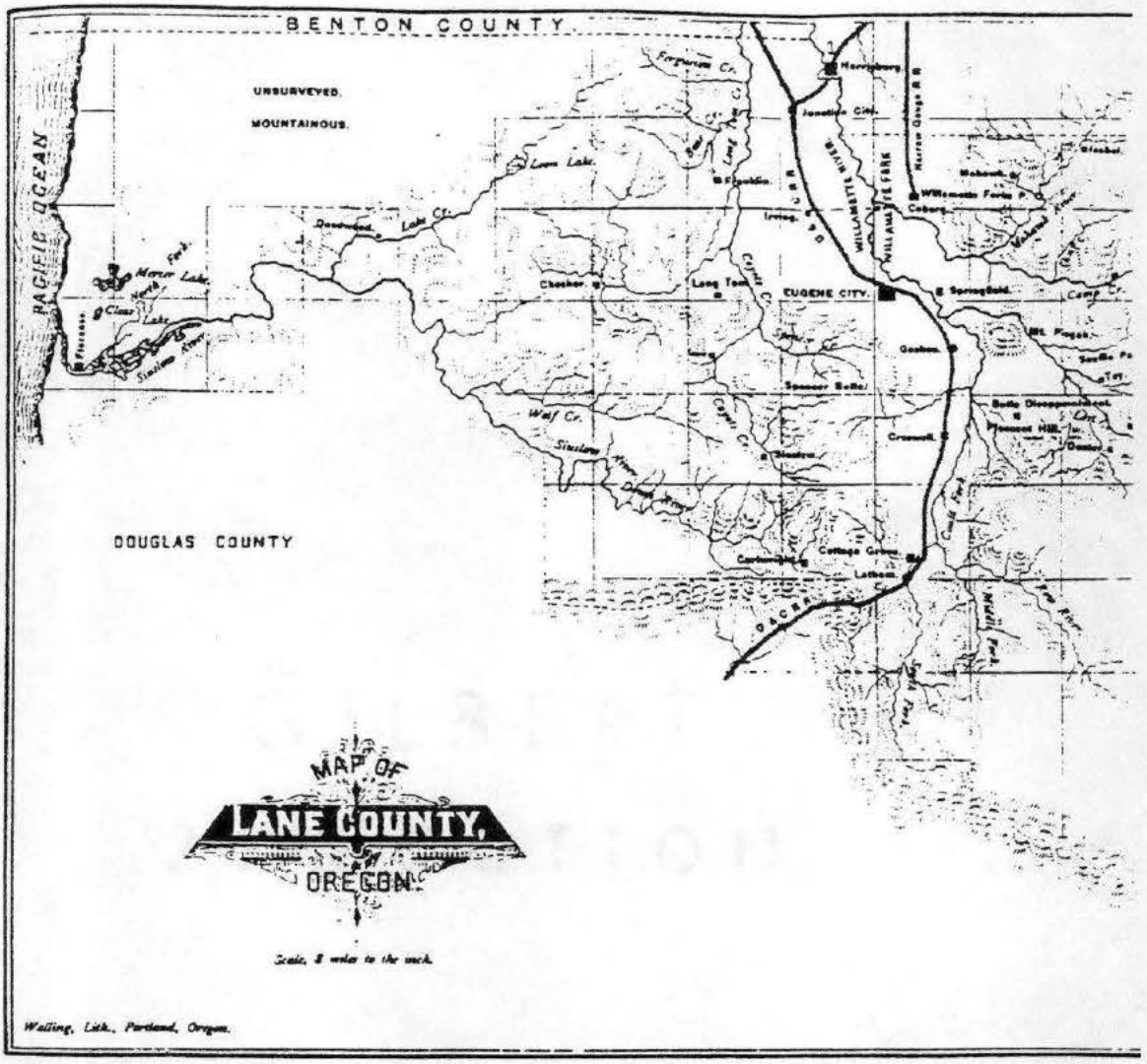

FIGURE 5. Map of Lane County, Oregon in 1884
Source: A. G. Walling, *Illustrated History of Lane County, Oregon* (Portland, Oregon: House of Walling, 1884), 300.

came to resemble the rest of modernizing America. Increasingly, people stopped trying to adapt to the natural rhythms of the Willamette Valley and concentrated on trying to change the natural forces they did not like, such as flooding.

Environmental change was the result of cultural change. Settlers had different expectations from the landscape than the Kalapuya had, especially in terms of how the land would support them. Technological advances and the creation of external markets for agricultural production meant the rise of an export economy in the Upper Willamette Valley, including the confluence area. Expansion into marginal lands, such as the river floodplains, occurred once it was financially worthwhile and as population pressures increased. And the population was booming, doubling every twenty years (table 1).

Table 1. Lane County Population Growth, 1850-1940

1850	1860	1880	1900	1920	1940
150	4,780	9,411	19,604	36,166	60,000

Source: Thomas B. Forster, *Cultural and Historic Landscapes of Lane County, Oregon* (Eugene, Oregon: The Survey, 1986), 36.

From a population of approximately 150 in 1850, Lane County grew to 4,780 in 1860, the first date for which census figures exist. The population doubled between 1860 and 1880 to 9,411, and doubled again by 1900 to 19,604. In 1920, the population was 36,166. By 1940 the county population was nearly

60,000 with one-third of the population residing in the largest county towns of Eugene and Springfield. That Lane County's population nearly doubled every twenty years between 1860 and 1940 is very significant for understanding the character of historic change in the area.

It seems likely (though we cannot know for sure) that the people who settled in the Willamette Valley had a unified perspective toward the land. Certainly, the demographic profile of the rural farm population was monolithic. Of 16,217 rural farm people tallied in the 1930 census in Lane County, only 28 were not white. Also remarkable was the high percentage of farms that were operated part-time. Of all the Willamette Valley counties, Lane County had the largest number of part-time farms.[1] Part-time farmers could also be loggers or have some other profession. In short, they stood with one foot in the agrarian world and one in the wage economy.

The increasing scale of industrial activity in the Valley meant that the ecology of the confluence was altered dramatically in a short period of time. These alterations came about due to modification of the watersheds of the Coast and Middle Forks, use of the river channel as a transportation mechanism for logs, and the clearing of the riparian gallery forest for fuel, timber and to create new agricultural land. These changes to the watershed and the physical environment of the confluence were accompanied by the complete regulation of

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[1] 1930 census data quoted in Oregon State Planning Board, *Willamette Valley Project*, 41.

flow in the confluence due to construction of flood control dams on the Coast and Middle Forks. The ecology of the confluence area was changed not only by the removal of streamside vegetation, but also by the alteration of its flow. The changes in the landscape were dramatic, nowhere more so than along the rivers.

Clearing the Gallery Forest

Early explorers and settlers frequently commented on the mature riparian vegetation extending out from both banks of the Willamette River. This "gallery forest" of massive cottonwoods, water-loving Oregon ash, maples and alders flourished in the wet areas along the river, nourished by winter flooding and protected by the wet soil and swamps from the Kalapuyas' annual prairie fires. White settlers cut into the gallery forest for building materials and for firewood, and along the Lower Willamette it was extensively cleared to provide fuel for the steamboats that navigated the river as far as Corvallis until the end of the nineteenth century.[2]

By the early 1880s, logging had still not gotten underway in most of Lane County. The only logged areas were along the rivers, so that the logs could be easily floated downstream. A. G. Walling reported in 1884 that "The forests

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[2] Corning, *Willamette River Landings*, 193-195.

remain in a great degree in virgin condition except for a short distance from the banks of the streams..."[3]

Log drives occurred to get the lumber from the woods to the mill. Springfield and Eugene-area sawmills were located on the Middle Fork upstream from the confluence and on the McKenzie River to the north. No sawmills were located in the confluence area, though one was begun in 1857 on a large slough of the Middle Fork east of Mt. Pisgah.[4] Sloughs were favored sites for sawmills, since the river provided an easy way to transport logs. One of the first area sawmills was constructed on a slough that flowed through Eugene, returning to the Willamette near the eastern base of Skinner's Butte. The slough was dredged to deepen it so it would provide more water power for the saw.[5] Perhaps this sawmill milled the riparian forest that once stood along the Willamette in Eugene.

Using waterways to transport logs caused considerable damage to stream beds and banks. This was particularly true when the log drives were accomplished by the technique, practiced well into the twentieth century, known as "splash-damming." Loggers created these artificial floods to move logs to the mill, but uncontrolled flooding was harmful to their industry. Heavy rains

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[3] Walling, *Illustrated History*, 472.
[4] Bristow, Elijah, "Excerpts from Elijah Lafayette Bristow's Letters, 1857-64," *Lane County Historian* 12 (1967), 73.
[5] Moore, McCornack and McCready, *The Story of Eugene*, 18, 249.

caused a massive flood in 1890. For two years previously, low flows had stranded piles of logs in the rivers. On the Mohawk River to the north of the confluence, the 1890 flood washed three years of labor out to sea.[6]

A late nineteenth century photograph in the confluence area shows cut logs stranded on a gravel bar. These may have been escapees from log drives higher up the rivers, destined for mills upstream of the confluence, or they may have been driven through the confluence to mills downstream. It remains unclear whether the confluence was spared the destruction that accompanied splash-damming and log drives.[7]

In the Upper Willamette Valley, the gallery forest was largely still intact into the early twentieth century.[8] In 1884, an observer described what the riparian forest looked like from Spencer's Butte in Eugene:

> From this vantage-ground is an unobstructed view of the course of the Willamette River for more than twenty miles above Eugene City, continuous groves of maple and other kinds of timber marking her course as far as the eye can reach.[9]

With the building of flood control dams in the 1940s, however, farmers began to clear the forest to access the rich floodplain soils beneath. As Geographer Jerry Towle noted, farmers only began removing the forest once

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[6] Merle S. Moore and Louis E. Polley, "Washington Adams, Pioneer on the Mohawk," *Lane County Historian* 3 (1958): 23.
[7] "Coryell Point, Looking South on Willamette, ca. 1885," Photograph no. R2W/58-94 (Held By Lane County Historical Museum, Eugene, Oregon).
[8] Jerry C. Towle, "The Changing Geography of Willamette Valley Woodlands," *Oregon Historical Quarterly* 83 no. 1 (1982), 81. Hereafter cited as "Changing Geography of Willamette Woodlands."
[9] Walling, *Illustrated History*, 301.

sprinkler irrigation with mobile pipe was invented, diversified crops (especially orchard crops) were promoted by farm extension agents, and flood control dams encouraged a perception that flooding was no longer a danger to the bottomlands. Between 1945 and 1969, irrigated farmland increased over 400 percent in the Upper Willamette Valley.[10]

Aerial photographs of the confluence area show that by 1936 some annual cropping was already occurring in what had once likely been gallery forest. By 1944, air photos show expanded clearing of the forest had occurred, and orchards—long-term investments requiring irrigation—were planted where the forest had stood.[11]

These orchards were the brainchild and property of George A. Dorris, entrepreneur, lawyer, and experimental horticulturist. In 1892, Dorris and his wife Lulu purchased 278 acres in the confluence on the north bank of the Middle Fork Willamette River. The land the Dorrises purchased was part of the original 320 acre Donation Land Claim of William and Eliza Masterson from the 1850s.[12]

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[10] Towle, "Changing Geography of Willamette Woodlands," 83.
[11] U. S. Army, *35v-133, 35v-134* [Aerial Photographs], 16DPU-4M726 [Pacific Northwest River Surveys], 1: 10,000, n. p.: U. S. Army, August 10, 1944; U. S. Army Corps of Engineers, *3998, 3999* [Aerial Photographs], Willamette Valley Project [Flight of Willamette River, Oregon], 1: 15,000 [Portland, Oregon?]: U. S. Army Corps of Engineers, August 15-27, 1936.
[12] Willamalane Park and Recreation District, *Dorris Ranch Plan*, 25.

The General Land Office survey of 1853 shows a small cleared field above the floodplain on this property.[13]

At the time the Dorrises purchased the land, hop fields were the major use.[14] Hops continued to be an important crop on the Dorris Ranch, as the property was known, through the turn of the century. Hops were also grown at this time on other flood plain lands in the confluence area, as photographs of the Seavey Road area show. The Dorrises cleared their hop fields and experimented with asparagus, artichokes, okra, peaches, plums, figs, table grapes, and strawberries in the first decade of the twentieth century. In 1905 they planted 100 filbert trees, and five years later they planted walnut trees. By 1912 the Dorrises were converting most of their acreage to orchards, with another planting of filberts. They experimented with cherries in 1920, but filberts would become the dominant agricultural crop on the Dorris Ranch property.[15] These orchards were planted in the fertile Willamette floodplain. Their existence depended on harnessing the Willamette's water for summer irrigation and controlling winter flooding.

Flooding was a fact of life in the pre-dam history of the Willamette Valley, one which determined the places where people could live. Pioneer Elijah Bristow

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[13] U. S. Surveyor General's Office. General Land Office Survey of 1853 Cadastral Maps and Surveyor's Notes, Township 18 South Range 3 West. Original maps and field notes are held by the Bureau of Land Management, Portland, Oregon.
[14] Willamalane Park and Recreation District, *Dorris Ranch Plan*, 25.
[15] Ibid., 27.

endured extreme flooding in the confluence during the winter of 1861 and 1862. In a letter to his brother, Bristow described the floods that left eighteen inches of water in his house in Pleasant Hill.

> This has been the worst winter I have ever experienced in Oregon. In December we had two floods, the Rivers raised so as to inundate almost the entire valley. for instance—the house that McWhitamore built at the crossing of the Coast Fork, was washed away Between the middle and McKensy forks, was one Solid Sheet of water also, from Eugene to Long Tom Hills.[16]

The Willamette overflowed its banks once every two years on average, but it was the really large floods, which returned about once every two decades, that threatened towns.

A major concern of early settlers was that winter and spring flooding would destroy their newly planted crops. This fear was imported, along with the crop species, from experiences in the Mississippi Valley, where spring snowmelt flooding was an ever-present danger to cereal crops. Charles Wilkes noted that flooding was a serious impediment to agriculture in the Pacific Northwest.

> In connection with this river [Columbia at Vancouver] are its prairies along it in some places they are of large extent with arms of the river flowing through them in various directions which are sufficiently deep for boat navigation. They are admirably adapted to grazing purposes, but for agriculture the farmer would be in continual apprehension of losing his crop and always will sow in uncertainty on account of the rise of the river, in proportion to which the water rises on the wheat it perishes so that unless the

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[16] Elijah Lafayette Bristow, "Letter to Henry Bristow March 18, 1862," In "The Letters of Elijah Lafayette Bristow and Minerva Jane Bristow of Pleasant Hill and Eugene City Oregon 1857 to 1864" (Unpublished Manuscript, Special Collections, University of Oregon Library, Eugene, Oregon, n.d.), 34.

> Wheat should be actually overtopt a small harvest might be expected (seed wheat).[17]

Wilkes' description fits the Willamette River as well, where floods threatened wheat, the preferred cereal crop of Euroamericans. Wilkes mentions that settlers attempted to plant corn but it would not grow along the Columbia or in the Willamette Valley. Corn was the preferred subsistence crop of American settlers in the Midwest and eastern United States. Wheat quickly proved successful in the Willamette Valley and provided an export crop. The winter of 1851-52 brought extensive flooding of the Willamette Valley. The new communities of Eugene City and Springfield were deluged by the floods, which destroyed several cabins. Destructive floods returned in 1861 and 1862, 1881 and 1882, 1890 and 1927 destroying homes, bridges and roads. Glenwood, a settlement in the floodplain just downstream of the confluence, was regularly flooded.[18]

The floods demonstrated where not to build towns, and they also showed the best locations to build water-powered mills. With the floods past, a few settlers built water-powered mills on artificially constructed canals in the Eugene and Springfield areas.[19] Among the first of these millraces was built in Springfield

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[17] Wilkes, *Diary*, 47-48.
[18] Velasco, *Lane County*, 56.
[19] Ibid., 30. The role of water power in American history, the controversies surrounding it, and the way in which it served as a crucial test case in American environmental and property law, is the subject of Theodore Steinberg's *Nature Incorporated: Industrialization and the Waters of New England* (Amherst, Massachusetts: University of Massachusetts Press, 1991).

in 1852 to divert water from the Middle Fork of the Willamette River to power a series of mills. This millrace reentered the mainstem Willamette River just downstream from the confluence.

Expanding Use of the Floodplain

One scholar of the transition from subsistence to market economy in the Willamette Valley observed that the end of the pioneer period was marked by the intensification of floodplain agriculture.[20] The earliest settlers avoided the floodplains. The gallery forest was gradually cut for fuel and timber for the early settlements. Floodplains were not valuable for farming until crops were diversified, irrigation was improved, and flood control projects were built.

Floodplain soils have excellent drainage—even considered "excessively well-drained" in the Lane County Soil Survey—because underlying the rich silt alluvial soils are extensive gravel deposits which conduct water away from the surface.[21] Such soils do not have high clay content, and therefore have little water-holding capacity in summertime, when rainfall is scarce in the Willamette Valley. But if irrigated, floodplain soils provide the best yields in the Willamette Valley.

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[20] Jerry C. Towle, "Woodland in the Willamette Valley: An Historical Geography" (Unpublished Ph.D. Dissertation, Department of Geography, University of Oregon, 1974), 91.
[21] Patching, *Soil Survey*, 114.

Today, most Willamette Valley "row crops"—annual food crops such as corn, beans, and peas that are traditionally grown in rows—are grown in floodplain soils. Orchards of fruit and nut trees are also concentrated in the floodplains, where they have replaced the native riparian forest. To plant the orchards, the original trees had to be cut down and the stumps removed, a process that occurred largely after the 1920s in the Willamette Valley.[22] Irrigation was the key to making the floodplain lands usable. But the rolling landscape and gentle gradient of the Willamette Valley floodplain conspired to make traditional flood irrigation (ditches and control gates to divert water from the river and spread it out over the soil at another location) difficult in the Valley. Willamette Valley farmers invented sprinkler irrigation with portable pipes in the 1940s, which enabled a single individual, with the aid of an electric pump, to effectively water a large area. The invention of sprinkler application and its application on Willamette River bottomlands created a revolution in local agriculture in the early twentieth century. In 24 years, from 1945 to 1969, irrigated acreage in the Willamette Valley grew by 400 percent.[23]

Market gardeners were among the first in the Willamette Valley to experiment with irrigation. Eugene's Frank Chase tried irrigation on his market gardens in 1890 and discovered that he could make substantially larger profits by

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[22] Towle, "Changing Geography of Willamette Woodlands," 81.
[23] Ibid., 83.

growing vegetables for retail sale than wheat for wholesale. One-half acre of irrigated celery earned him more than two acres of wheat.[24] Chase's transition from wheat grower to market gardener was part of a trend toward greater diversity in agriculture at the turn of the century, a trend that stabilized and enriched the local economy.[25]

In the late nineteenth century, residents of the southern Willamette Valley's dominant town, Eugene, sought economic growth to forward the town's ambitions, and locals turned to processing agricultural products. Eugene wanted to become a manufacturing center for the agricultural production of Lane County. Agricultural cooperatives were the means to that end.[26]

The cooperatives were first created as a response to a lack of markets for the burgeoning orchard industry in the confluence and elsewhere in Lane County. In 1958, Elwin McCornack of the Eugene Fruit Growers Association reflected on the company's fiftieth anniversary. The cooperatives, he said, had revolutionized agriculture in the Willamette Valley, creating an entirely new market for local crops.

> ...Lane County growers devised the first overhead sprinkler system to go into general use in the United States. The advent of

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[24] Velasco, *Lane County*, 69.
[25] Marcus Robbins, "Striving to Loosen the Bonds of Dependence: Eugene, Oregon, 1890 to 1929" (Unpublished M.A. Thesis, Department of History. University of Oregon, 1990), 182-188.
[26] Ibid., idem.

> sprinkler irrigation in this section opened up a whole new field of agricultural activity: the canning of vegetables.[27]

Hop yards and orchards in the confluence area played a large part in this transition to a diverse agricultural export economy. These newer, high-value crops grew well in the fertile alluvial soils of the confluence. Farmers just had to clear the trees to expose rich soil and pump river water to irrigate it. Another natural resource-dependent industry was added to the diversifying economy of the confluence area in the early twentieth century. Sand and gravel mining also relied on floodplains for its product—but the mining took place within the river itself as well as the floodplain.

Gravel and sand eroded from the mountains rimming the Upper Willamette Valley and washed downstream over thousands of years. Rivers move boulders, cobble, gravel, sand and silt by lifting them off the bottom and carrying them, in a process analogous to shaking up one of those liquid-filled holiday scenes and watching the "snow flakes" swirl around. In the holiday toy, the snowflakes slowly settle back to the floor as the turbidity of the liquid is reduced.

Similarly, rivers can carry material until the water's turbidity is reduced, as often happens when rivers leave a steep mountainous reach and enter a low-gradient valley. During floods and when gradients are steep, rivers are more

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[27] Elwin A. McCornack, "Eugene Fruit Growers Association: 50 Years of Service" *Lane County Historian 3* (1958), 15.

turbid and can transport larger particles and greater quantities of material. When the sediment-laden flow encounters an area of lesser turbulence, turbidity is suddenly reduced, and the sediments drop out. The heaviest materials are precipitated first, followed by the finer particles, until all of the suspended material is deposited.

One place where rivers often build significant bars of deposits is at confluences, where streams with different rates of flow meet. This process is so regular and occurred for so many thousands of years at the confluence of the Forks of the Willamette that finely sorted layers of gravel and sand have reached thicknesses of 90 feet or more.[28]

Deep and finely sorted layers of gravel and sand ("aggregate") are outstanding places to mine materials for building and road construction. At the confluence of the Forks of the Willamette, large-scale commercial mining operations for aggregate began in the 1940s. It is unclear if any gravel mining occurred in the confluence prior to the Wildish Company's operations in the 1940s. In the following decade, gravel and sand extraction in the confluence exceeded population growth in the Upper Willamette Valley (table 2). Between 1962 and 1973, sand and gravel mining in the confluence contributed much of

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[28] For sediment transport, see Donald J. Easterbrook, *Surface Processes and Landforms* (New York: MacMillan Publishing, 1993), 114-116; for sediment depth at the confluence, see Lane County Department of Environmental Management, *Aggregate Resource Study, Middle Fork Willamette River, Mile 187 to 194* ([Eugene, Oregon?] : The Department [1976?]), ii.

Lane County's overall aggregate production. In 1970, trucks hauled 1.4 million tons out of the confluence area, almost two-thirds of the entire Lane County production that year.[29]

TABLE 1. Ten Years of Aggregate Production in the Confluence

Year	Quantity (tons)	Tons per capita	Value (dollars)
1955	1,025,565	14.0	$1,058,724
1956	1,027,929	13.6	1,032,326
1957	972,932	12.5	1,014,627
1958	863,273	10.8	845,896
1959	764,295	9.2	733,667
1960	1,695,618	18.8	1,610,645
1961	1,273,567	13.5	1,381,570
1962	2,940,438	29.7	2,876,875
1963	2,555,739	24.6	2,660,433
1964	2,155,000	17.2	2,514,000
1965	2,222,000	17.2	2,470,000
Total	17,494,256		$18,198,763

Source: Central Lane Planning Council, *Sand and Gravel* (Eugene, Oregon: Central Lane Planning Council, 1968), 49.

[29] Lane County Department of Environmental Management, *Aggregate Resource Study*, 36.

While gravel mining had a long-term and continuing impact on the physical character and ecology of the confluence, another force would have an equally profound effect on the area. Built in part with the sand and gravel quarried in the confluence, dams on the Coast Fork and Middle Fork were constructed over a period spanning three decades, from the 1940s through 1969. These constructions would have a defining impact on the flow of the rivers that entered the confluence.

Regulating the Confluence's Flow

Euroamerican settlers experienced severe flooding in 1864, 1881 and 1882, 1890 and 1927.[30] Floods regularly destroyed houses and ruined farmland, but with the invention of the Federally-sponsored multiple-use dam, relief from flooding seemed possible. In the 1930s, multiple-purpose dam mania was sweeping the Columbia watershed, with dams planned to subdue the big river at Grand Coulee and Bonneville.[31]

Not to be outdone, the Oregon State Planning Board in 1935 submitted a plan to tame the Willamette River to Oregon Governor Charles H. Martin. D. C.

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[30] U.S. Geological Survey, *National Water Summary 1988-89—Hydrologic Events and Floods and Droughts*. U.S. Geological Survey Water Supply Paper 2375, 459-465 (Washington, D.C.: U.S. Geological Survey, 1991), 461.

[31] Dam building in the Pacific Northwest has been exhaustively studied. See, for example, Paul C. Pitzer, *Grand Coulee: Harnessing a Dream* (Pullman, Washington: Washington State University Press, 1994); William Dietrich, *Northwest Passage: The Great Columbia River* (New York: Simon & Schuster, 1995); and Richard White, *The Organic Machine* (New York: Hill and Wang, 1995).

Henny, chairman of the Oregon State Planning Board, formally presented his board's findings in a letter to Governor Charles Martin in 1935. The centerpiece of Henny's letter was a table comparing the Willamette Valley to Holland. Holland, the letter pointed out, had a population of 8 million people in 1935. With almost the exact same land area, the Willamette Valley's population stood at 600,000. In every respect of agricultural production, Holland far surpassed the Willamette Valley, despite a less favorable climate. The crucial difference between the two regions, Henny's table showed, was that rainfall in the Willamette Valley was "insufficient in summer" while the Dutch enjoyed "well distributed" rainfall. The implication was clear: the Willamette Valley could expand its population and agricultural production ten-fold by simply regulating the flow of its tributary streams.[32]

The Willamette Valley Project was the name given to "a comprehensive program for the development of the Willamette Valley in Oregon," a program which had at its center the planned construction of more than a dozen multiple-purpose dams on all the major tributaries of the Willamette River. While the Willamette Valley Project promised to create jobs for unemployed Oregonians, provide irrigation water for hundreds of farms, produce abundant and cheap electricity, prevent pollution, and make the Willamette safe for navigation, its

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[32] Oregon State Planning Board, *The Willamette Valley Project. Report of the State Planning Board to Governor Charles H. Martin on the Development of the Willamette River Water-shed* (Portland: Oregon State Planning Board, 1935), 2.

primary purpose was to reduce flooding in the Willamette Valley.[33] The first and most important steps in controlling flooding on the river would be accomplished through the construction of dams on the Coast Fork and Middle Fork Willamette Rivers.

Flood control in the Willamette Valley depended on large reservoirs funded by the federal government. Only the federal government had the economic might and the legal power to insist on their construction.[34] As two hydrologists put it, referring to the massive flood control projects on another river,

> Using all the means at our disposal, floods have not been eliminated from the Ohio, and probably never will be. Nevertheless, flood control efforts by building reservoirs will continue, because humans simply cannot tolerate the lack of control exhibited in nature and because there is very good evidence that such flood control is effective. It works. Not everywhere, every time, or to the degree claimed by many of its advocates, but well enough to convince governments, the major providers of flood control.[35]

Flood control in the Upper Willamette basin began in 1942 with the completion of Fern Ridge Reservoir on the Long Tom River. In 1945, Cottage Grove Reservoir was completed, with Dorena Reservoir following in 1949, both in the Coast Fork Willamette River drainage. The Willamette Project, designed

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[33] Oregon State Planning Board, *Willamette Valley Project*, 4, 7.
[34] Ryan Vincent Anderson, "Flooding and Settlement in the Upper Willamette Valley" (Unpublished M.A. Thesis, Department of Geography, University of Oregon, 1974), 52.
[35] Donald R. Satterlund and Paul W. Adams, *Wildland Watershed Management*, 2d edition (New York: John Wiley and Sons, 1992), 31.

primarily to reduce flood damages in the populous Valley, brought six dams to the watershed above the confluence by 1969, and many more throughout the Willamette basin.[36] By 1980, the Army Corps of Engineers managed a series of flood control reservoirs on the Upper Willamette River, including six upstream from the confluence (figure 6).

Flood control proponents had argued for years that the only way to gain maximum use of the Valley's rich floodplains was to reduce the annual flooding. Serious flooding in 1927 and 1945 helped to push the issue, and public support for the projects was high. With a war on and an undeniable need for relief from flooding, even people whose homes were drowned beneath the reservoirs raised little protest.[37]

In addition to flood control, dam proponents touted other benefits from the dams, including increased storage for irrigation and a powerful environmental argument: the reservoirs would release water during summer months, flushing the accumulated municipal sewage and mill effluents downstream. The well-known saying, "dilution is the solution to pollution," was

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[36] U. S. Army Corps of Engineers, *An Environmental Impact Statement on Operations and Maintenance of the Willamette River Reservoir System* (Portland, Oregon: Portland District U. S. Army Corps of Engineers, 1980), 1-3. Hereafter cited as *Operations and Maintenance.*

[37] Heritage Research Associates, *Historic Use of Six Reservoir Areas in the Upper Willamette Valley, Lane County, Oregon* (Portland, Oregon: U. S. Army Corps of Engineers, 1982), 144.

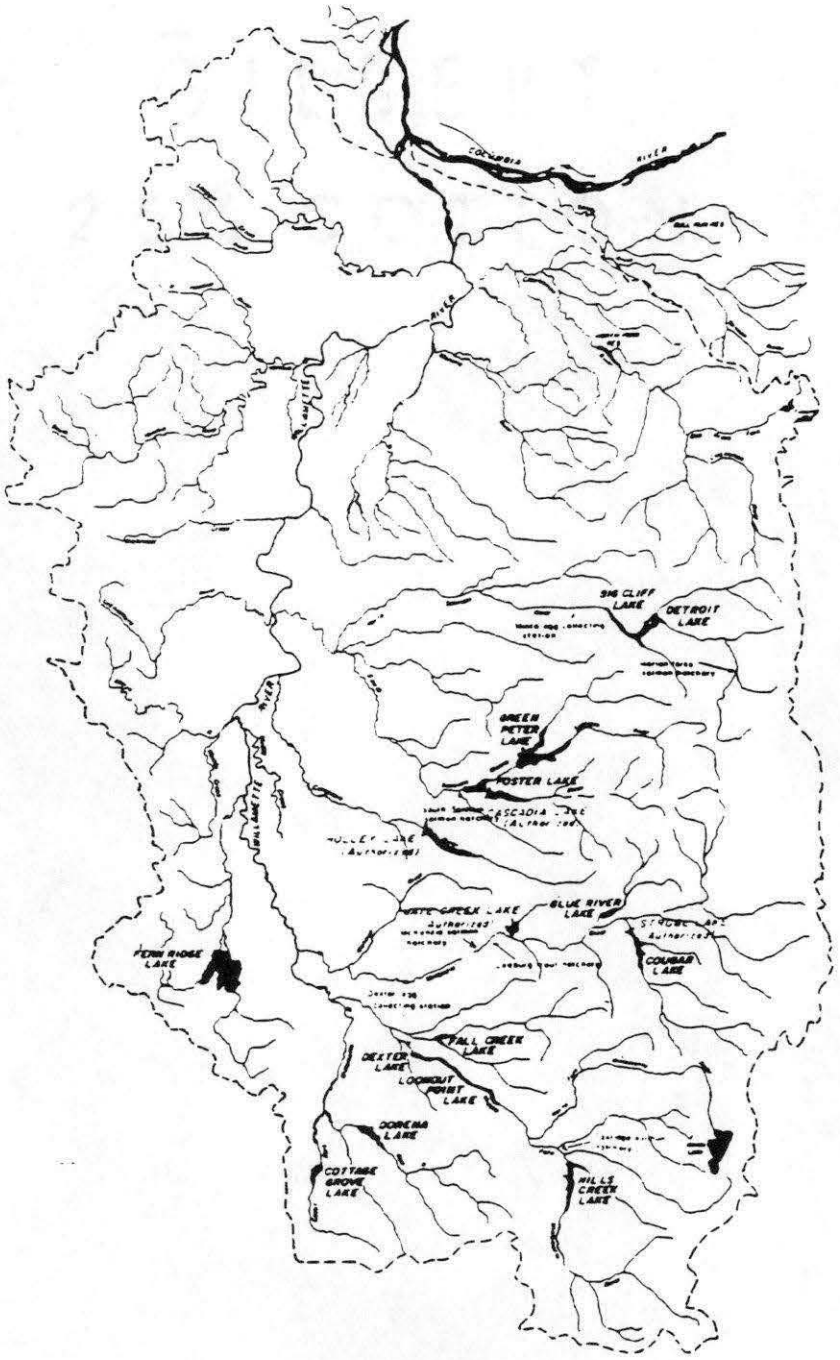

FIGURE 6. Willamette System of Reservoirs, 1980
Source: U. S. Army Corps of Engineers, *An Environmental Impact Statement on Operations and Maintenance of the Willamette River Reservoir System* (Portland, Oregon: Portland District U. S. Army Corps of Engineers, 1980), 1-3.

taken to heart by Oregonians in the twentieth century. Serious water quality problems in the Willamette River during the early twentieth century led to calls for increased management of the hydrology of the river to lessen the impact of vast releases of untreated municipal sewage and organic pulp mill wastes.[38]

Storage of spring runoff for release in the low-flow summer and fall months was seen as the solution. As late as 1971, government agencies were calling for increased river management to combat human-caused pollution.[39]

Most of the Willamette River's water quality problems began in Eugene and increased downstream as untreated sewage and industrial waste were dumped into the river. Fecal coliform counts above Eugene were "practically zero" in 1944, but below the city they climbed to extremely high levels as the river added waste from each community it passed.[40] The dilution solution was a success, according to many advocates of a cleaner Willamette. In combination with sewage treatment and cleaner industrial effluent, the summer releases helped clean up the river significantly, advocates claimed.

> [S]tarting in 1953, the flow of the Willamette River during the minimum flow period has almost doubled the average of prior years in-so-far as the minimum average monthly flow is concerned. It is believed that it would have been impossible to effect any marked improvement of water quality of the river without the augmented flow. The greater flow has been accomplished by release of water from the several upstream impoundments on a

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[38] F. D. Stricker, "Stream Pollution in Oregon," *Commonwealth Review* 12 no. 1 (1930): 17-24.
[39] U. S. Pacific Northwest River Basins Commission, *Columbia North Pacific Region Comprehensive Framework Study of Water and Related Land Resources: 1980, 2000, 2020* (n. p., n. d. [1971?]), 13.
[40] George W. Gleeson, *Return of a River: the Willamette River, Oregon* (Corvallis, Oregon: Water Resources Research Institute, Oregon State University, 1972), 40.

schedule of the U. S. Corps of Engineers aimed at a flow of 6,000 cfs, Salem gage.[41]

Unfortunately, the law of unintended consequences has plagued dam builders as much as any other group. Reservoir construction and operation had unexpected ecological impacts on the Willamette River and its tributaries. The Oregon State Game Commission and Fish Commission released a joint report in 1948 strongly criticizing the U. S. Army Corps of Engineers projections of threats to fish and wildlife from the proposed Willamette Valley Project dams. The state personnel were particularly concerned about the alteration of seasonal flow patterns in the river, with their unknown impacts to habitat.[42]

In 1980, officials from state and federal agencies accused the Willamette Valley reservoirs managed by the U. S. Army Corps of Engineers of degrading the Willamette River.[43] Unforeseen problems included everything from releases of excessively cold water to concentration of hazardous levels of mercury in Dorena Lake and alteration of downstream riparian vegetation.[44] The most wide-reaching impact of the dams, however, was their alteration of the river's flow.

The unregulated hydrological cycle in the confluence was for high flows to begin with the fall rains, culminating in winter flooding. After spring

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[41] Gleeson, *Return of a River*, 62-63.
[42] Oregon State Game Commission and Fish Commission of Oregon, *Fish and Wildlife Problems Arising from the Willamette Valley Project* (Portland, Oregon: Oregon State Game Commission and Fish Commission of Oregon, 1948), 3-5.
[43] U. S. Army Corps of Engineers, *Operations and Maintenance*, section 6, pages 4-12.
[44] Ibid., section 2, pages 20-23; section 4, page 1.

snowmelt had run through the system, summer flows were quite low, even to the point that the Willamette River would be reduced to a series of pools in summer.[45] Since dam construction in the 1940s, the pattern of winter flooding and summer low flows has been changed. This has had important effects on the ecology of the confluence area.

The size and frequency of floods in the Willamette River basin have been estimated by both the U.S. Army Corps of Engineers and the U. S. Geological Survey (USGS). Flood sizes and frequencies are extrapolated from historical data, so accuracy is directly related to the length of the record. The longer the period of record, the more accurate estimates of flood sizes and return intervals (10-year, 20-year, 50-year, 100-year) will be. The USGS flow gauge at Albany has been in operation since 1870. With 127 years of data, hydrologists are able to estimate typical flood levels and their return interval (the likelihood that a flood of the given magnitude would occur in a given number of years). From 1899 to 1964, floods occurred every year except two.[46]

Flow to the confluence has been regulated by Cottage Grove (functional since 1942), Dorena (since 1949), Lookout Point (since 1954), Hills Creek (operational in 1963), and Fall Creek Reservoirs. These reservoirs, and others on every major tributary of the Willamette River, were built to reduce flooding in

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[45] U. S. Army Corps of Engineers, *3998, 3999* [Aerial Photographs], August 15-27, 1936.
[46] Cheatham, *Settlement Pattern*, 19-21.

the populous Willamette Valley. Since 1954, three-quarters of the drainage area above the confluence has been regulated by dams.[47]

Reservoirs control flooding by trapping flow behind dams. During a storm, runoff is captured in the reservoir. Only some of that water is released immediately, keeping flood levels lower. Once the threat of flooding is past, the reservoirs release the stored water gradually. They thus dampen the natural flux of the hydrologic system.

Flood control reservoirs also release water during the dry period of the year, keeping flows artificially high during low-water periods. Increased summer flows benefit irrigators and recreationists. The reservoirs have changed the natural hydrological cycle of the confluence area. Flooding naturally occurred November through April, with most severe flooding occurring between December 15 and January 15.[48]

The US Army Corps of Engineers has estimated the reduction in flooding caused by the reservoirs above the confluence. The Corps estimates that before the dams, peak flood flows at their gage at river mile 185, just downstream from the confluence, would have been approximately 199,000 cubic feet per second (cfs) in a 100-year event. Following the construction of the reservoirs, the Corps estimates that the same flood would be reduced by 63% to about 74,000 cfs at the

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[47] Patricia A. Benner and James R. Sedell, "Upper Willamette River Landscape: A Historic Perspective," in *River Quality: Dynamics and Restoration*, ed. A. Laenen and D. A. Dunnette, 23-47 (Boca Raton, Florida: CRC Press, 1997), 37.

Springfield gauge.[49] Another way to envision the magnitude of this change is to consider that floods that occurred once every decade before the dams would be considered 100-year floods were they to occur today.[50]

Flood control reservoirs on the Willamette have not just reduced the size of the largest floods. Smaller floods that occurred every one-to-five years prior to the dams have been even more dramatically reduced by the reservoirs. In the confluence before the dams, flooding often occurred several times a year. The owners of the Dorris Ranch property on the north bank of the Middle Fork in the confluence area had to build extensive revetments to prevent flood waters from eroding their orchard land in the early twentieth century.[51]

Dams affected the most basic ecological factor in the confluence, the flow of water. The USGS maintained a gage on the bridge between Glenwood and Springfield (just below the confluence) from 1911 to 1957. Except for the war years of 1914-18, the gage faithfully tracked the flow of the mainstem Willamette just below the confluence. Until 1942, when Cottage Grove Reservoir began to control the flow of the Upper Coast Fork, the gage was measuring the natural flow of the river. Summer flows were lower, and winter flows were higher, than after the dams were constructed. The lowest flow recorded at the Springfield

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[48] Anderson, *Flooding*, 9.
[49] Peter C. Klingeman and Jeffrey B. Bradley, *Willamette River Basin Cumulative Frequency Curve Maximum Annual Discharge Graphs for Albany, Salem and Harrisburg Gauges* (Portland, Oregon: U. S. Army Corps of Engineers Hydrology Section, 1982).
[50] Benner and Sedell, *Upper Willamette River*, Table 1 (p. 39).
[51] Willamalane Park and Recreation District, *Dorris Ranch Plan*, 58.

gage was only 500 cfs on August 11, 1926; the highest was during the devastating flooding of December 29, 1945.[52]

After dam construction, minimum and maximum daily Willamette River flows were much less extreme. The bottom line is that natural variability had been suppressed in the confluence. But it was not eradicated: witness the flooding that occurred in 1945, 1964 and 1996. Floods still occurred in the confluence, but only the big ones. The regular small floods that maintained the connection between the floodplain and the river were reduced greatly.

There is a paradox here: flood control dams have reduced the number of episodes when water cannot be contained within the banks of the Coast and Middle Fork Willamette Rivers and spills out onto the surrounding land (flooding), particularly the most severe events. However, the flood control reservoirs function by holding back runoff until the danger of flooding is past. At that point they must release as much water as possible to empty the reservoir for the next storm event. Willamette River tributaries below dams are often filled to just within the tops of their banks during the winter rainy season as dam managers prepare for the big one. This steady, high flow was not the original pattern of the Willamette and, reported the U.S. Army Corps of Engineers in

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[52] Roy E. Wellman, Janice M. Gordon, and Robert L. Moffatt, *Statistical Summaries of Streamflow Data in Oregon: Volume 2—Annual Low and High Flow, and Instantaneous Peak Flow*. U.S. Geological Survey open-file report 93-63 (Portland, Oregon: the Survey, 1993), 194. Note that the 1945 flooding occurred after Cottage Grove Reservoir was functional.

1975, it "probably results in significantly increased rates of bank erosion downstream" over the natural flood cycle.[53]

The U. S. Army Corps of Engineers recognized that flood control reservoirs would create a downstream erosion problem, and the same 1938 legislation that created the reservoirs also funded a system of rock bank protection structures known as revetments. By 1974 the U.S. Army Corps of Engineers had constructed revetments along 106 miles of Willamette River and tributary stream banks, including three miles of revetments below Dorena Reservoir on the Coast Fork.[54]In the confluence area, six revetments were constructed on the Middle Fork and five were constructed on the Coast Fork. These were permanent bank protection structures requiring periodic maintenance and cleaning by the U. S. Army Corps of Engineers.[55]

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[53] U. S. Army Engineer District, *Corps of Engineers Actions Affecting Riverbank and Channels in Willamette River Basin, Oregon* (Portland, Oregon: U. S. Army Engineer District, 1975), 1-3. Hereafter cited as *Riverbank and Channels*.

[54] U. S. Army Engineer District, *Riverbank and Channels*, table 1-1 (page 1-2). The U. S. Army Corps of Engineers first received authority in the 1871 River and Harbor Act to remove snags, boulders, and overhanging trees, construct training walls, and deepen shoals in the Willamette River from Portland to Eugene. For more about ecological impacts of U. S. Army Corps of Engineers snagging, dredging and channel modification in the Willamette River, see Patricia A. Benner and James R. Sedell, "Upper Willamette River Landscape: a Historic Perspective," in A. Laenen and D. A. Dunnette, ed., *River Quality: Dynamics and Restoration* (Boca Raton, Florida: CRC Press, 1997), Chris Maser and James R. Sedell, *From the Forest to the Sea: the Ecology of Wood in Streams, Rivers, Estuaries and Oceans* (Delray Beach, Florida: St. Lucie Press, 1994) and James R. Sedell and Judith L. Froggett, "Importance of Streamside Forests to Large Rivers: the Isolation of the Willamette River, Oregon, USA from its Floodplain," *Verhandlung International Vereinigen Limnologie* (Stuttgart) 22 (Dec. 1984): 1828-1834.

[55] U. S. Army Engineer District, *Riverbank and Channels*, page 2 of plate 1.

Revetments may have had significant impacts on the ability of the river to meander within its historic floodplain. A U. S. Army Corps of Engineers report in 1975 found that no study had ever been done of the impact of revetments on stream meandering, but noted one study linked revetments and increased scouring of streambeds.[56]

Alternative means existed to prevent erosion, such as planting streamside trees and shrubs, but a 1976 report commissioned by the Corps found that "natural methods of bank stabilization have a limited role in the Willamette for halting erosion" primarily because even heavily vegetated banks experience some natural erosion. The Corps concluded that bank stabilization is an attempt to freeze a dynamic natural process; a formidable task that requires massive stone revetments.[57]

People build dams on rivers for many reasons: to generate hydroelectric power, for flood control, to store water for irrigation, to maintain flows for navigation, and for recreation. The intended purpose of the dam has a great deal to do with where it is constructed and how it is operated. On the Willamette River, the dams of the Willamette Valley Project were specifically authorized to reduce flooding in the Willamette Valley. They were also intended to generate hydroelectric power, provide water for irrigation, aid navigation, benefit fish life

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[56] Ibid., 4-1.

[57] Peter C. Klingeman and Jeffrey B. Bradley, *Willamette River Basin Streambank Stabilization by Natural Means*, Report Prepared for U. S. Department of the Army, Portland District, Corps of

by guaranteeing minimum instream flows and dilute pollution by maintaining adequate flows. Additionally, incidental benefits were expected from the dams, such as municipal and industrial water supply and wildlife habitat.[58] Intended to create change, the Willamette Valley Project turned out to be an agent of both hoped-for and undesired changes. For every benefit the project gave, it took something else away.

Beginning in 1937, aerial photographs of the Willamette River basin provide a visual record of physical change in the confluence. In summer of 1937, for instance, the Middle Fork at the confluence is a narrow ribbon of water between large gravel beaches. The bleached skeletons of huge trees are stranded above the last riffle before the joining of the rivers. The Coast Fork in the same photo is a series of pools separated by wet gravel. Dense willows overhang the narrow stream, and numerous oxbow ponds and former channels are visible to the south. Evidence of gravel mining is confined to the southwest corner of the confluence area, where a few pits are being worked. Below the junction of the two rivers, a huge gravel bar juts out into the river.[59]

In air photos taken in summer 1952, gravel pits dot the area along the Coast Fork, the large driftwood on the Middle Fork is gone, and an orchard has

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Engineers (Corvallis, Oregon: Water Resources Research Institute, Oregon State University, 1976), 2-3, 233.

[58] U. S. Army Corps of Engineers, *Operations and Maintenance*, i.

[59] U. S. Army Corps of Engineers, *3998, 3999* [Aerial Photographs], August 15-27, 1936.

been planted in the peninsula between the two rivers. A steady stream of water flows from the Coast Fork into the confluence. The increased flows in 1952 might represent supplemental flows from Dorena Reservoir.[60]

Not only did dams themselves create environmental change, they also encouraged greater use of the floodplain for gravel mining, agriculture, and housing. After the dams were built, builders felt safe in constructing neighborhoods where floodwaters had recently spread. In a review of the impacts of Willamette Valley reservoirs, the U. S. Army Corps of Engineers boasted that "Reservoir flood control has been a very important encouragement to flood plain development in Eugene/Springfield," and went on to name specific developments—shopping centers, neighborhoods, the City of Eugene's sewage treatment plant—that were constructed in the Willamette River floodplain because of the protection of dams upstream.[61]

Prior to the dams, flooding in the southern Valley was as intense as it was to the north. Descriptions of the floods of 1861 and 1881 in Eugene are similar to descriptions of flooding in towns throughout the Valley. In December of 1881, for instance, many residents of Eugene had to move out of their homes, and damage to town infrastructure was severe. The bridge to the north of town was destroyed

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[60] Pacific Aerial Surveys, Seattle, Washington, *LCI-23N-29, LCI-23N-30* [Aerial Photographs], Flight of Lane County, Oregon, 1: 12,000 (Eugene, Oregon: Chickering and Green, August 7, 1952).

[61] U. S. Army Corps of Engineers, *Operations and Maintenance*, section 2, page 13.

when an immense raft of logs tore the bridge from its pilings. The railroad tracks leading south were also washed out, and the approach to the Springfield bridge was swept away. The flooding encouraged increased discussion of whether channelization of the Willamette's banks would reduce flooding in Eugene.[62]

Indeed, U. S. Army Corps of Engineers efforts to improve the Willamette River for navigation from Oregon City to Eugene had been under way since 1870. Snag boats such as the *Mathloma* pulled sunken trees out the river and used them to fill side channels. The Corps also attempted to direct the river's flow with "wing dams" to scour a deeper channel. "Skinners Bar dam" built downstream from Eugene, was over 1500 feet long.[63]

Efforts in the 1930s to get the dams built were no doubt driven in part by the nationwide demand for public works projects to give employment to the unemployed, but they also had environmental reasons. The Oregon State Planning Board's 1935 report to Governor Martin recommended an "emergency construction project" to strengthen the eroding banks of the Willamette River below the confluence down to Harrisburg. They wrote,

> The purpose of this project is to protect the banks of the river against this erosion, to aid in confining the river to its channel through deepening of the channel, with resulting improvement to navigation and to stop meandering of the river.[64]

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[62] Walling, *Illustrated History*, 337.
[63] Benner and Sedell, *Upper Willamette River*, 26-29.
[64] Oregon State Planning Board, *Willamette Valley Project*, 12.

Efforts to shape the Willamette Valley often had multiple goals. The dams of the Willamette Valley Project were supposed to create a Holland in the Willamette Valley, a densely populated, technologically advanced society thriving due to its control over nature. But controlling nature created unexpected problems, and the dams could not provide everything they were asked to. Reshaping the environment turned out to be as problematic as it was successful.

Increasingly, the settler economy of the mid-nineteenth century gave way to a market-oriented, export economy in the last decades of the nineteenth century. This direction carried on through the middle of the twentieth century, with significant alteration of the natural environment. By the 1940s, aerial photographs were showing a confluence greatly marked by the actions of people. Abandoned gravel pits clustered along the southern edge of the confluence of the Coast and Middle Forks like bomb craters, and temporary access roads meant that large portions of the confluence area were kept denuded of all vegetation. Orchards in the floodplain led to the removal of the riparian forest, and cattle grazed in the uplands. Flood control dams upstream on both the Coast Fork and Middle Fork reduced winter flood heights and increased summer flows.

Flood control projects have not reduced the danger of flooding, as witnessed by the 1964 flood—the highest at Salem since 1861 despite the existence of all but two of the current dams—but have succeeded in changing the perception of flood hazard. Once the perception of hazard was reduced, people

felt comfortable exploiting floodplain areas. The financial incentives to farm in the floodplain were not counterbalanced by incentives to protect riparian areas. Ironically, the widespread clearing of the gallery forest along the rivers for cropland increased the destruction from flooding. As early as 1864 George Perkins Marsh recognized that riparian forests and large woody debris in the floodplain slowed and trapped floodwaters, and that clearing the land of vegetation resulted in reduced infiltration and increased runoff.[65]

Demographic change contributed to a distancing of the people of the confluence area from their environment. The population of the Willamette Valley was an increasingly urban one in the twentieth century. By 1930, 61.9 percent of the Valley's inhabitants lived in cities. Less than half of the rural population, about 18 percent of the total populace, lived on farms.[66] Most twentieth-century residents of the Willamette Valley now used the "outdoors" for recreation, not as a source of food. This had profound implications for how they interpreted the landscape.

After the arrival of the railroad and the consequent development of an export-based economy, the opportunity to create an indigenous local culture in the confluence area declined. "Rural free delivery" in 1896 meant rural people could order any product they desired. Modern emporiums, like Sears, Roebuck

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[65] Marsh, George Perkins, *Man and Nature*, John Lowenthal, ed. (Cambridge, Massachusetts: Harvard University Press, 1864 Reprint 1964), 195.
[66] 1930 Census—quoted in Oregon State Planning Board, *Willamette Valley Project*, 20.

Company in Chicago, linked Oregonians with other Americans into a national consumer culture.[67] Inhabitants of the Willamette Valley increasingly needed cash to participate in the national and international economy. Local knowledge and skills to inhabit their place seemed less relevant, and the landscape itself was a marketable commodity.

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[67] *1897 Sears, Roebuck Catalogue*, ed. Fred L. Israel (New York: Chelsea House Publishers, 1968).

CHAPTER VI

TENSION, 1960-1990—USE VERSUS PRESERVATION

Population growth and rising consumer expectations in the second half of the twentieth century had a dramatic effect on the ecology of the confluence. After slowing in the 1930s during the world-wide depression, the population of Lane County boomed during and after World War II. The number of people living in Eugene doubled from 1940 to 1950, and it tripled in Springfield during those same years.[1] The post-war economic boom created an increased demand for the natural resources of the confluence area, from gravel for roads to land for houses. Land values increased, and the rapidly expanding urban areas of Eugene and Springfield spread into the open spaces on their fringes.

The uncared-for landscape of the confluence became valuable when it appeared Mt. Pisgah would be developed. Conflict erupted over the destiny of the confluence area as gravel mining operators and open space preservationists fought over a shrinking pool of available land. Despite the rapid growth around it, the confluence area became an island of green space in the expanding urban environment of late-twentieth century Eugene and Springfield.

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[1] Velasco, *Lane County*, 111.

The fight to preserve the Mt. Pisgah and confluence area illustrates how values had shifted by the 1970s. There were two major conflicts in the confluence during the 1960s and '70s. One involved how much protection to give the riparian and agricultural lands from gravel extraction (the traditional extractive land use in the confluence). The other was over protection of the greater Mt. Pisgah area from suburban development. The latter conflict had its roots in contemporary statewide efforts to protect agricultural land and prevent urban sprawl.

By 1970 official plans for a large, open space regional park at Mt. Pisgah had been drawn up. These plans envisioned all of the lands between the Coast and Middle Forks—including hundreds of acres of privately-held land—as part of the park.[2] On one side of these conflicts was the sand and gravel industry of Lane County. Wildish Land and Gravel Company was the largest land owner and gravel extraction company in the confluence area, having purchased several hundred acres in the confluence and Glenwood since the 1940s. Wildish sought to protect its gravel-mining operation from new regulations. Wildish, together with other Lane County gravel extractors, began to push Lane County government to adopt a special zoning category for gravel and sand extraction. The sand and gravel industry saw a land zoning ordinance as a necessary insurance against the growing resentment of adjacent landowners and the

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[2] Lane County Department of Environmental Management, *Aggregate Resource Study*, iv.

general public, which increasingly saw gravel mining as "noisy, dirty, and contributing to a lowering of property values and quality of life."[3]

After two staff reports recommending an ordinance to the Lane County Planning Commission were rejected, gravel industry spokespeople wrote their own in 1969. After much compromise and negotiation, the Lane County Planning Commission created a new zoning designation for sand and gravel extraction, and another for gravel processing. Two areas in Lane County were dedicated to long-term extraction of aggregate resources: the confluence of the McKenzie and Willamette Rivers, and the confluence of the Coast and Middle Forks of the Willamette.[4]

Beginning in the 1960s, local governments regulated the use of the complicated riparian and floodplain areas along the Willamette River by assigning fixed long-term uses to specific locations. The intention was to reduce flood damage to structures and to resolve conflicts over land use. In the late 1960s, Lane County government attempted to resolve conflicts between preservationists and the gravel industry by dividing the confluence into zones for each. This artificial division of a unified ecosystem meant that human needs could be met, but it ignored natural processes.

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[3] Central Lane Planning Council, *Sand and Gravel: an Examination of the Eugene-Springfield Area's Sand and Gravel Industry—its Aims, its Future, and the Planning Problems it Presents* (Eugene, Oregon: Central Lane Planning Council, 1968), Chapter Three: "The Neighbor Nobody Wants."
[4] Lane County Department of Environmental Management, *Aggregate Resource Study*, 8-9, 12.

The Central Lane Planning Council (CLPC) tried to mediate between Lane County gravel operators, whose operations were concentrated in the floodplain of the Willamette River, and their critics. A major criticism was that gravel mining left the land stripped and bare, useless for all practical purposes. The CLPC found in its report that gravel operators "lacked personal motivation to rehabilitate their resource—depleted lands." Mined land owners had a financial incentive to leave mined land in its degraded form because: "1) the operator has amortized the costs of owning and holding the land by appropriately pricing the aggregate products removed; and 2) the tax rate on resource-depleted lands is generally low—such lands have little if any value."[5]

In other words, once the land had been mined, it had no further economic potential. There was no reason to restore mined land—it was cheapest to leave the land in its degraded condition. Obviously, this considered only one kind of value for land. Environmental economists have pointed out in recent years that ecosystems are the fundamental basis of all human wealth. Yet "ecosystem goods and services" are rarely considered in traditional rational planning.[6]

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[5] Central Lane Planning Council, *Sand and Gravel*, 8.

[6] Environmental economists attempt to assign monetary values to "ecosystem good and services" provided by undegraded environments in part to allow cost-benefit analyses consider the economic value of undeveloped land. See Robert Costanza, Ralph d'Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V. O'Neill, Jose Paruelo, Robert G. Raskin, Paul Sutton and Marjan van den Belt. "The Value of the World's Ecosystem Services and Natural Capital." *Nature* 387 (May 15, 1997), 254-255, 259.

Instead, in 1968 the planners tried to show gravel operators the potential of their degraded land for industrial and residential development and for recreation. The CLPC proposed that gravel operators should submit detailed "rehabilitation plans" before beginning mining activities. These rehabilitation plans would be based on the highest and best re-use potential assigned to the land by the county general plan.[7] As the county planners put it, "Why should a sand and gravel operator spend extra time and money rehabilitating a mining site? If for no other reason, simply because it can be profitable."[8]

Ultimately, county staff believed, most mined land was best suited for recreation. Recreation was a booming industry, and facilities were needed to provide this commodity to the paying public. The gravel-bearing lands of the confluence and elsewhere along the rivers were excellent recreation sites. Planners concluded,

> It seems likely that rehabilitation for recreation uses will prove to be the best plan for flood plain sites. This likelihood fits in with previous recommendations regarding the future location of mining sites on publicly owned riverbank lands where eventual development of recreational sites is most desirable.[9]

County officials illustrated what mined land might look like after reclamation with a series of sketches of a location in the confluence known as the Clearwater site. This publicly-owned riparian land was to be mined by the

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[7] Central Lane Planning Council, *Sand and Gravel*, 44.
[8] Ibid., 35.
[9] Ibid., idem.

Wildish Sand and Gravel Company, then returned to the state. Lane County planners suggested that the land might be made into a "family recreation area."

This view of the Clearwater site, perfectly demonstrated in the alternative futures proposed by the Planning Council, shows how both government and private industry had a reductionist vision of the land. Just as dam builders attempted to control the Willamette's flow, and gravel miners had a limited view of the confluence, planners imposed their own simplified vision of the confluence area.

The fragmented ownership of confluence lands reflects conflicting land uses in the area. Public land in the confluence is split between local, state and federal ownership. The Dorris Ranch, which is a historic filbert ranch owned and operated by the Willamalane Park and Recreation District, is managed for multiple purposes. Its 1986 facilities plan divides the property into "zones" where various activities are promoted. For example, the "visitor support zone" offers tourists "comfort facilities such as parking, restrooms, waiting areas, and related elements."[10] An "environmental resource zone" offers "more traditional 'natural park' opportunities." Its riparian area section is intended to enable visitors to experience a Willamette Valley floodplain forest, and also to serve as a wildlife refuge.[11]

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[10] Willamalane Park and Recreation District, *Dorris Ranch Plan*, 49.
[11] Ibid., 62.

Ironically, the Dorris Ranch park was mostly riparian gallery forest before extensive land clearing for orchards occurred in the early decades of the twentieth century. Naming a portion of the land as wildlife refuge is a nod to that past, one that is largely superficial. The Dorris Ranch attempts to preserve a little bit of everything in its past "natural" floodplain forest, "historic" buildings, floodplain agriculture, and "visitor comfort facilities." Reflecting the culture around it, the Dorris Ranch wants to have it all.

This ambivalence about the purposes of the land is not new in the confluence. In 1912, George Dorris signed an agreement with the state of Oregon and Lane County to designate his property as a wild bird and game refuge for a two-year period. This occurred even as Dorris was expanding his agricultural lands at the expense of riparian vegetation and therefore wildlife habitat.[12] George Dorris' designation of a refuge in the confluence was only the first attempt to preserve the wildlife habitat and beauty of the area. Since the 1990s, the Bonneville Power Administration has been studying whether it should acquire the confluence area to mitigate for wildlife habitat destroyed in the construction and maintenance of Columbia River hydropower dams. The confluence is a natural choice because it is a place of high biodiversity. The presence of a breeding colony of Western pond turtles (a Federally listed

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[12] Willamalane Park and Recreation District, *Dorris Ranch Plan*, 28, 77; for expansion of orchard lands in this time period, ibid. 29.

endangered species) on the Coast Fork would allow the BPA to protect that species as well.[13]

If the BPA were to acquire land in the confluence area, it would be managed for wildlife habitat. Restoration of the existing land would be an important part of such a strategy.

Preservation and Restoration

Another kind of vision of the confluence area appeared with the efforts to preserve Mount Pisgah and other lands in the confluence area in an open-space park. Parks are another kind of cultural interpretation of a landscape, one potentially as limited as an extractive interpretation. According to writer Peter Sauer, park land reduces a complex cultural and natural landscape to a sanitized form:

> Parks, particularly those that aspire to preserve intrinsically valuable land, are chameleonlike institutions, indistinguishable against the background of shifting cultural values and inseparable from the larger cultural landscape in which they reside—a landscape that is zoned to favor some lands as more valuable than others, to separate people from nature, and maintain a society that is similarly zoned, stratified, and fragmented.[14]

Sauer's point is that preserving land by setting it aside is a simplistic approach to a complicated problem: preserving a diverse and valuable human

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[13] Mark Nordquist, "Turtle Study Proves Revealing, " *The Rookery, Newsletter of the Friends of Buford Park & Mt. Pisgah* (Spring 1996), 6.
[14] Peter Sauer, "A Park for Washington County," *Orion* (Spring 1997): 9.

and natural landscape. In the case of the confluence, the problem is doubly difficult. What is perceived as most valuable is the confluence's potential to be, if restored, valuable wildlife habitat once again. But restored to what? The baseline example, if it could be recreated, is the confluence in the 1830s, prior to American settlement. But that landscape was at least in part a creation of the Kalapuya people. No one has suggested returning the land to the Kalapuya. What is desired here—a non-human landscape or simply a biodiverse one?

Ecologists differ about the role of restoration in maintaining biological diversity and preserving natural communities. British ecologists face a situation where the majority of native communities have been dramatically modified, and the majority of wildlife habitat is contained in "semi-natural" areas. Their concept of "semi-natural" communities embraces environments such as the confluence today: "plant communities which owe their character to some degree of human intervention, but remain composed of native species and have structural features corresponding to those of natural types."[15]

Such practically-minded ecologists see environments like the confluence of the Coast Fork and Middle Fork as appropriate locales to attempt restoration. Rather than agonizing about the relative level of human manipulation of the ecosystem, they are satisfied with habitats that support significant numbers of

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[15] C. Newbold, "Semi-Natural Habitats or Habitat Re-creation: Conflict or Partnership?" in *Biological Habitat Reconstruction*, ed. G. P. Buckley (London: Bellhaven Press, 1989), 9-10.

indigenous species. Perhaps this is ultimately what will happen in the confluence: ecologists will have to settle for a reasonably diverse environment, and not the environment that was. This would be a new perspective in the Euroamerican history of the Willamette Valley, one that simultaneously acknowledges the need for biodiversity and a lack of human control over the environment.

In the century and a half that Euroamericans have lived in and used the confluence, they have sought a diverse collection of products from it. Early settlement focused on the prairies, with grain crops and cattle grazing as the basis of the settler economy. Later in the nineteenth century, the gallery forest provided limited timber supplies, and the river itself provided a means to transport goods to markets and logs to sawmills in Eugene and Springfield. In the early twentieth century, hops were harvested in the floodplain lands, and some agriculturists experimented with numerous vegetable crops and fruit and nut orchards. At this time too, gravel and sand production began in the floodplain. Residents used the riparian areas for recreation from the earliest settlement period, but recreation became an industry in the leisure boom after World War II. Since the mid-nineteenth century, economic benefit has been the goal of most human activity in the confluence. Only since the 1970s have efforts to preserve the confluence involved other than a purely human orientation. And, of course, the economic rationale has not disappeared.

CHAPTER VII

CONCLUSIONS

The ownership and management issues that are at work in the Coast Fork/Middle Fork confluence area in the late 1990s are also at work in the other tributary junctions of the Willamette River. Typically the lands around the confluences are publicly owned, often leased to private users or with no management strategy at all. The floods of 1996 and 1997 graphically pointed out how strategic these floodplain lands are, and how important it is to have a management strategy for them that emphasizes their ecological role.

The Willamette River confluences are largely ignored at present. In other river systems, conflicts about private and public rights to riparian areas are more strident. David Hulse's vision of Willamette River tributary junctions as restored, publicly-owned ecological refuges within rapidly-urbanizing areas is only possible because the confluences are still relatively untouched.[16] A useful comparison is the Upper Mississippi basin, where levee districts constructed flood barriers along the Mississippi River and its tributary the Illinois River beginning in the late 1800s. Those levees have often failed in the past one

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[16] David Hulse, Professor, Department of Landscape Architecture, University of Oregon, Personal Communication, May 8, 1997.

hundred years, including spectacular failures in the 1993 flood, suggesting that continued flood control efforts are counter-productive. But most of the floodplain along the Upper Mississippi is heavily used for farms and residences. Setting aside riparian land for wildlife habitat will require a revolution in land ownership and perception in the Upper Mississippi Valley.[17]

In future years, the Willamette River may experience the same conflicts that are present in the Upper Mississippi. With similar histories of efforts to control flooding and encourage agricultural use of the floodplain, the Willamette and Mississippi Rivers also share a record of destruction of wildlife habitat and loss of biological diversity. At the present moment, however, the confluences along the Willamette are relatively undeveloped and unoccupied.

Change is characteristic, not only of human history, but also of the non-human, even what we would call the non-living, world. The difference is of scale. If one could watch the Willamette River on a geologic time frame, it would move in a fluid fashion, winding back and forth across the Valley, changing over the millennia like a living organism. At this level, the confluence can be understood as having a life of its own, and a history of its own.

Despite over fifty years of flood control efforts in the Willamette basin, floods continue to shape the landscape. Intense, sustained, warm rain on a deep

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[17] Daniel W. Schneider, "Enclosing the Floodplain: Resource Conflict on the Illinois River, 1880-1920," *Environmental History* 1 (April 1996), 86.

layer of snow in the Oregon Cascades led to severe flooding in the winter of 1996. High water moved through the confluence, reshaping islands and scouring sediments. New channels were carved and old channels were reclaimed. Just after the flood's peak in early February, a photographer in a small plane captured the muddy Coast Fork mixing with the clearer Middle Fork. Swirling currents covered much of the floodplain to the south of the confluence, and the gravel pits were partially filled with new deposits of sand and gravel.[18] Erosion and deposition acted to dramatically reshape the confluence, as they had many times before.

In the aftermath of the floods—the most destructive to human structures in the Willamette basin since 1964—calls for increased flood control were heard locally and regionally. Several Oregon legislators vowed to resurrect the proposed Gate Creek Dam on the McKenzie River, defunded during the 1970s due to projected costs and opposition from conservationists. It appeared to be a case of history repeating itself, with control and regulation again being urged. But other voices were also heard. Hydrologists and climatologists, citing historical data from gaging stations throughout the basin, demonstrated that the flood had been a minor event. New dams would be useless against the more

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[18] "The Silt-Laden Waters of the Coast Fork Mix with the Middle Fork During the Flood of 1996," [Photograph] *The Rookery, Newsletter of the Friends of Buford Park & Mount Pisgah*, Spring 1997.

severe flooding that can be expected.[19] The lesson of the 1996 floods was that controlling flooding was less effective than adapting to it by restricting development in the floodplain.

Other observers noted that the flooding had restored vitality to large floodplain areas. A scientist and a park manager, writing together in the editorial pages of the *Portland Oregonian*, pointed to the restorative benefits of the flood.

> [T]he floods occurring in Oregon now are moving more gravel, scouring more pools and creating more debris jams and complex habitat than all our human efforts can accomplish over the next century.[20]

Despite the prognosis that flooding will continue to shape the landscape of the confluence, humans are likely to experience more suffering due to flooding, and to continue to call for greater control over natural events. Human structures built in the floodplain at the confluence area are evidence that people are not going to accept that rivers determine human actions, but rather the contrary: people will continue to try to tell Nature what its actions—its "rights"—will be.[21]

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[19] Patrick Bartlein, Professor, Department of Geography, University of Oregon, Personal Communication, January 10, 1996.
[20] Gregory and Orsinger, "Nature Will Always Have Her Way," B13.
[21] For more on the autonomy of Nature, see David Igler, "When is a River not a River? Reclaiming Nature's Disorder in *Lux v. Haggin*," *Environmental History* 1 (April 1996): 53, 65.

People—and Nature—are Complicated

This thesis set out to find out why people were now interested in a specific landscape that generally failed to attract their attention for the past hundred years. Why this historic lack of interest in the confluence? Was it because the confluence was not useful to Euroamericans, because it did not produce, in its unaltered state, products which could easily be converted into cash in the American market? Such a simple economic explanation is contradicted by the actions of those who shaped the confluence area. Ambivalence is visible even in the earliest experiences of explorers and settlers. George Dorris declared his property a wildlife refuge, even as he "left the biggest stumps standing" in his haste to clear riparian forest for the Dorris family orchards.[22]

Ambivalence is a reflection of a universal fact: people are complicated. In this study people have often been treated as representatives of groups, behaving in pre-ordained or predictable ways based on their group identity ("Kalapuyas," "settlers," "conservationists"). But an honest appraisal of the history of humans and the confluence recognizes that there are no monolithic patterns. To say that the members of any group behaved in a single way contradicts the historical record. It is important to recognize that individuals do have choices, that history is not pre-ordained. George Dorris expressed his own complicated feelings both

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[22] Willamalane Park and Recreation District, *Dorris Ranch*, 29.

when he destroyed riparian forest and when he declared his property a wildlife refuge.

The Kalapuya experience seems equally complex. After 8,000 years, they found numerous uses for the many environments found in the confluence. In myth and taboo, they expressed their own complicated relationship to the landscape. The myth of the "disappearing Indian" sees Native Americans as having been driven to extinction by their inability to adapt to new circumstances, once they had been stripped of their authority and their landscapes had been altered.

The common understanding that sees Native people and their land as stagnant is biased. It ignores the history of human and natural change over time and devalues the sustainable ways that Indians molded their environment. It suggests that only Euroamericans are capable of rapid change, that their transformations of landscape area essentially good, and that Natives were incapable (not merely unwilling) to remake the natural world.

An equally false view sees the landscape as purely a human creation. The geologic and hydraulic history of the confluence demonstrates that landscapes are not static. Floods occur. The rivers assert themselves. This is the lesson that Euroamericans have failed to learn in the confluence area, though some individuals have shown glimmerings of understanding.

Fundamentally, people are complicated. Like the Kalapuyas' Coyote whose selfish actions both helped and harmed the people, those who shaped the confluence have a mixed record. Efforts in the 1970s to preserve the confluence by adding it to a county park while simultaneously declaring it a long-term gravel extraction area demonstrate this same ambivalence. They are also evidence of conflict about the use of the confluence area and reflect a lack of understanding that some uses are mutually exclusive.

I began this study thinking I would find a legacy of neglect and destruction by Euroamerican settlers and their descendants in the confluence area. Instead, I found the human history more complicated. Some settlers and explorers did fear the swamps and sloughs of the Willamette River, and by extension the confluence. Later, the settlers' descendants did construct flood control structures which radically disturbed the ecology of the confluence. But some of the early settlers chose to live along the rivers of the Willamette Valley seemingly for reasons other than purely economic. After all, the first settler in the southern Willamette Valley chose his claim because of its beauty and its familiarity, calling it a "pleasant hill."

This paper has pointed out the different ways that people though and acted over time. Their attitudes and actions are their history. Their constant partner in the dance of history has been the natural environment in which they live. The confluence too has been acting. Rivers are dynamic features of the

landscape, constantly changing over time. If we could see a movie of the confluence area showing it over a few thousand years of time (forward or backward from the present), we would see sandbars and islands being built and dismantled, vegetation growing, floods expanding banks and redrawing channels. It would appear organic, like a living organism at that level of resolution. Even flipping through aerial photographs of the confluence taken since 1936 can give the same feeling of life to the confluence.

Humans can only understand the time and space scales at which rivers operate in a metaphoric sense. We can only imagine rivers scrolling back and forth across their floodplains, abandoning old channels and carving new ones, laying down new gravel and sweeping away sediments deposited long before. We can see the results, though: flooding changing a seemingly stable environment literally overnight; vegetative succession; new animals and plants replacing the familiar suite of creatures. Whether humans understand their processes or not, rivers operate on their own. Humans ignore that nature acts on its own at our peril and loss.

Final Thoughts

On a sunny spring day, a friend and I canoed down the Middle Fork Willamette River through the confluence. The clear-green water was cold and refreshing on an unseasonably warm May day. Rounding the first bend in the

river, we startled a mature great blue heron, which lifted into the air with silent wing beats. The water level was ideal for canoeists, kept low by upstream reservoirs despite unusually high snowmelt in the mountain tributaries.

Evidence of winter flooding abounded: here a midstream island had been stripped of its willow thickets and covered with a new layer of gravel; there a side channel had been enlarged and now carried almost a third of the river's flow. Cottonwood and Douglas-fir trees littered the streamside gravel bars. Twice, ospreys flew overhead with fish in their talons.

We stopped to photograph an osprey nest just above the point where the Middle Fork merges with the Coast Fork—the "confluence proper"—and marveled at the collection of sticks perched atop an electrical power pole. The nest stood above a filbert orchard. Eroding banks threatened to take several of the trees in the next flood event. In the background, gravel trucks rumbled through the floodplain, carrying sand and gravel to the nearby processing plant. Sparrows flitted under the high voltage powerlines crossing the river.

Just below the joining of the Coast and Middle Forks, a number of nude bathers lounged on the far bank. A flock of mergansers passed overhead in vee formation. New leaves on the Oregon ash trees gleamed. The steady roar of cars on Interstate 5 to the west competed with a freight train's whistle on the Natron cutoff and the gurgle of the riffles. Around the next bend mobile home parks

faced each other across the river, riverside fences placed just above the high water mark.

On a cliff above the river, a new mansion overlooked the blue plastic tarps of the mobile home park, showing that the gentrification process has not yet run its course. Below the confluence, the Springfield millrace empties into the Willamette River. A park has been constructed there, and the local park district headquarters face a large industrial plant across the millrace.

My canoe trip illustrates how complicated the confluence is today. It is simultaneously a natural and cultural landscape. Human beings have dramatically altered the land, air and water of the confluence, and yet it continues to assert itself with every winter flood and summer growing season. Ecologically, the confluence is restoring itself, adding large woody debris and rearranging its channel, creating new habitats for a diverse suite of plants and animals.

A casual observer might never see the evidence of human manipulation of the confluence: the European annual grasses that have replaced native riparian vegetation; the non-native fish and bird species; the dredged and shaped levees along the orchards. Even an ecologist would admit that the confluence is a vibrant and diverse habitat, though not a "pristine" one, and definitely not the same place it was 150 years ago.

At every step in the human history of the confluence people have shaped their environment, melded it to their desires, created and destroyed. The common denominator since the passing of the Kalapuyas has been willful ignorance of the land's own capacity to change. It has been like a relationship where one partner treated the other as passive and pretended the silent partner was powerless. Flooding, one of the basic forms of expression in a river system, has repudiated the idea that the Willamette Valley landscape is passive. The shining promise that human ingenuity and technology would create a future independent of nature's limits has been repudiated by the reality of unintended consequences.

Perhaps there is a hopeful beginning to another history here: not another period of failed imagination and ignorance, but instead a maturing of the American dream: what the writer Barry Lopez calls "the rediscovery of North America," the realization that the greatest treasures in the American landscape are its biological and cultural diversity, not the products that can be made from them.[23] The confluence of the Coast and Middle Forks of the Willamette might be an example of the cycle of American environmental history finally coming full circle back to a vision of land as home.

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[23] Barry Lopez, *The Rediscovery of North America* (Lexington, Kentucky: University Press of Kentucky, 1990), 24.

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