DESTINATION
DAM REMOVAL

designing historical narratives into
post-industrial landscapes

Carolyn Corl

Approval

Project Chair: _____
Mark R. Eischeid

Committee: _____
Chris Enright

Committee: _____
Kory Russell

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Abstract

In recent decades, dam removals on American rivers have accelerated due to environmental concerns for stream ecology coinciding with the obsolescence of dam infrastructure built in the early 20th century. In some cases, parts of a dam's structure are left behind to minimize riverbank disturbance or to appease community members who oppose dam removal for its cultural significance. Like other post-industrial landscapes, the traces and ruins associated with dam infrastructure tell a story of the site before, during and after the infrastructure severely altered the landscape. At dam removal sites specifically, acknowledging this narrative of landscape change and recovery is a unique design opportunity that cannot be addressed through restoration or preservation alone. But through literature review and case study analyses, this project builds a design framework for engaging with the traces left behind by dam removal. By examining how landscape architects have previously worked with other types of post-industrial landscape remnants to elicit a site's narrative through design, a decision-making procedure for proposing design interventions for historic remnants and how to make them compatible with an overall design concept was developed. The design intervention framework is then exemplified through a proposed site design at the former Savage Rapids Dam on the Rogue River in Southern Oregon.

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To my family and friends, thank you for your support and love.

Thank you to the community members of the Rogue Valley who helped in my site research.

I also want to acknowledge that the site for this project is located on the ancestral homelands of the Takelma people who lived in the Rogue River Valley for millennia. Today, the Confederated Tribes of Grand Ronde Community of Oregon and the Confederated Tribes of the Siletz Indians identify their members as living descendants of the Takelma people, who joined these tribes when they were forcibly removed by colonists during the Rogue River War in the 1850s.

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"Out of a ruin a new symbol emerges,
and a landscape finds form and
comes alive."

- John Brinckerhoff Jackson
A Sense of Place, a Sense of Time
New Haven: Yale University Press, 1994, ix.

CHAPTER 1:
Introduction

1.1 PROJECT SCOPE

As many types of twentieth century infrastructure continue to deteriorate, we will be left with landscapes scattered with industrial ruins. This dilemma continues to be addressed by landscape architects, who use design to reframe outdated post-industrial infrastructure as cultural and recreational resources for public access. In recent years, one type of infrastructure that continues to become obsolete is the dam. Dams become obsolete for several reasons, whether they have become too costly to maintain, have become unsafe, they are negatively impacting stream ecology or their utility has been replaced by new technology (O'Connor, 2015). Since 2012, more than 1,200 dams have been removed in the United States, with 99 dams removed in 2018 alone (American Rivers, 2020). As dams are removed, their ruins often remain in the landscape to minimize disturbance on riverbanks because they are so structurally embedded into the river's edge during initial construction. The rapid transformation of a river's ecological health can be witnessed firsthand by visiting these dam removal sites, making them popular destinations for environmental enthusiasts. Sometimes dam remnants are also often left behind in the landscape to give community members a piece of history to hold on to (Weir, 2021), which also attracts people who are interested in the cultural heritage of dam sites. Because of these varying interests in dam removal sites, dam ruins present unique opportunities for landscape architects to design visitor access that fully acknowledges a site's change over time, encompassing narratives of both culture and ecology. The research presented here foregrounds dam ruins as post-industrial artifacts that reveal a site's cultural and environmental history. The objective of this project is to create a narrative-driven design framework for providing visitor access at historic dam removal sites that enhances recreation with place-making.

While dam removal is a national issue, this project is focused on dam removals that have occurred along the Rogue River in Southern Oregon (Figure 1.1) The Rogue has long been famous for its plentiful Coho salmon runs and several dam removals in recent decades have benefitted the habitat restoration for the Coho and other native anadromous fish species. This project will specifically examine the Savage Rapids Dam removal site, which was the most contested of the three Rogue River dam removals that occurred along a twenty-mile stretch of the Middle Rogue River (Figure 1.2). The three dams were each installed for different purposes at different times, but all were centered around the Euro-American colonial settling and farming of the Rogue River Basin in the late 19th century and the early 20th century. As federal standards for dams and fish ladders changed and the old infrastructure began to fail, the dams were removed. The first dam to be removed was the Gold Hill Dam in 2008, a diversion dam used by the town of Gold Hill for water and energy and built in the 1940's. Next to be removed was Savage Rapids Dam in 2009, which was an irrigation dam built to serve surrounding farmland in 1922. Last to come down was Gold Ray Dam in 2010, which was built in 1904 to supply hydroelectricity to a gold mine and then later to power the local area's grid until 1972. With the removal of these three dams salmon populations have begun to rise. Now that there are 157 miles of undammed river uptream of the Rogue's mouth at the Pacific Ocean, fish can migrate more easily and the nutrient cycles of the river have

improved. All that remains of these dams are concrete ruins at the river's edge that allude to the dams that once existed.

By reviewing design literature and a series of design case studies that explore other types of post-industrial ruins, a design framework for historical narrative contextualization of dam ruins will be established and applied to the ruins at Savage Rapids Dam and its surrounding site. The case studies include a range of design projects that address design approaches to industrial ruins, ranging from grain mills and shipyards to gas and iron plants. By understanding that these design interventions resulted from an intricate site-based knowledge of historic traces, a strategy for inventorying features left behind by previous industrial use will be demonstrated at a dam removal site. This inventory model guides designers to think about how each trace can be used in a spectrum of design intervention: to keep as is, modify, repurpose or reconstruct. Ultimately, the project demonstrates how designing with these interventions communicates a dam removal site's complex narrative of disruption and recovery.

***Figure 1.1**: Location of the Rogue River in Oregon*

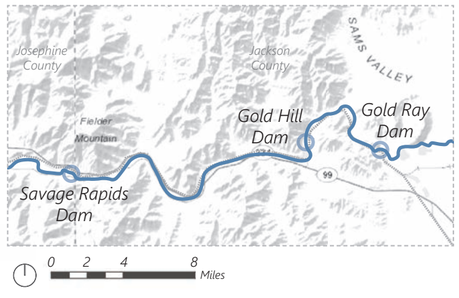


***Figure 1.2**: Locations of dam removals on the Rogue River*

1.2 SIGNIFICANCE

One reason landscape architects often design with post-industrial ruins is to reuse these leftover objects to tell the story of a site's history. These objects can hold a potent symbolic meaning of the past and offer landscape architects an opportunity to curate the public's encounter with physical history.

We have seen this in projects across the country where outdated industrial infrastructure speaks to the regional industrial economy and is repurposed through design. One example of this is the Bethlehem Steel Stacks in Bethlehem, Pennsylvania. This steel factory in the heart of the Rust Belt supported the local economy by employing thousands of local people. Once the global economy shifted and the steel plant closed in 1995, the steel plant remained empty for fifteen years before it was repurposed by designers at WRT Design to become an arts and culture venue that acknowledges the site's history. While the steel plant's ruin-like structures are no longer in use, these architectural objects still hold value for the people of Bethlehem, making the park's historical narrative an important element throughout the design. There are many other examples of parks like these, each unique to an economic region that experienced change in a post-industrial economy. Sites with ruins from former shipyards, coal plants, paper mills and textile mills have been redesigned to tell the environmental history that is unique to a region's landscape.

The pre-industrial landscape heavily influences a region's industrial typology because its natural resources determine what can be extracted or exploited, whether it is access to coal in the mountains of Pennsylvania or access to the ocean from a seaport in Massachusetts. In the American west, the natural topography of rivers and their valleys in dry climates allowed water to be the resource that was extracted during settlement, making dam infrastructure an important agent in transforming the west into an industrialized system of agricultural irrigation and hydropower. Now many of these dams have been removed, and as a result, the physical remnants left behind by the process of dam removal have yet to be explored by designers through the same narrative-driven landscape architecture we have seen with other post-industrial ruins. This project situates dam removal sites in the West as a post-industrial landscape typology that is currently overlooked in contemporary landscape architecture.

Dam removal continues as more dams become obsolete and wildlife conservation becomes more imperative in the face of climate change. These sites present important opportunities for public access for several reasons:

1. They are valuable cultural landscapes that communicate the historical impacts of colonial settlement and environmental activism.

2. The dams themselves cannot be preserved after their removal according to conventional preservation practices, but design can be used to create meaningful experiences around the fragmented dam remnants.

3. The recreation opportunities associated with their reservoirs disappear with dam removal, revealing a need for new recreational programming at many of these sites.

DAMS + CULTURAL SIGNIFICANCE

Dam removal sites and their ruins deserve attention from landscape architects for their value as cultural landscapes with cultural artifacts. Dams have provided many jobs, helped irrigate miles of farmland and were seen as engineering marvels. At some sites, communities may wish to preserve traces of a dam's history because they can often be associated with early settlement of towns. In many rural communities, dams brought water and power to remote areas, creating the infrastructure necessary for the establishment of a town. On the other hand, a dam may have a more negative history because the construction of some dams submerged or impacted important fishing areas for indigenous peoples and this infrastructure is associated with the colonial settlement of the American West.

Another cultural value that dam removal sites hold is their representation of the restoration efforts by many people that resulted in dam removal. Dam removal visibly restores ecosystems by allowing for river sediment to flow naturally and restarts the nutrient cycle carried by migratory fish. At dam removal sites people can learn and reflect on this change and understand how the former infrastructure became harmful to the environment.

Due to the significance of dam removals in environmental history, they are often visited by environmental enthusiasts, with people traveling to remote places to do sightseeing of dam removal sites. Figure 1.3 shows a piece of Savage Rapids Dam that was kept by one of the environmental litigators, Mike Sherwood, who worked in support of the dam removal, showing the sentimental importance of dam removal for some salmon

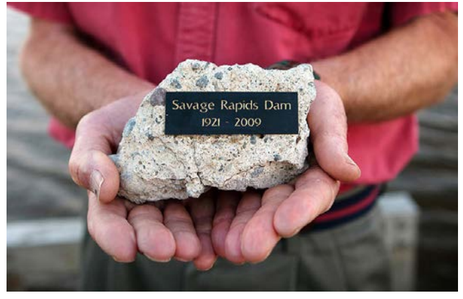


***Figure 1.3**: Concrete Chunk Keepsake from the Savage Rapids Dam Removal, from: Earth Justice, https://earthjustice.org/slideshow/saving-the-pacific-salmon, accessed May 6, 2021*

advocates. Visitation to these sites can be enhanced by providing visitor access through a narrative-embedded design and by protecting the dam ruins themselves.

In this project, various site histories are communicated through design by bringing attention to the change that the Rogue River has undergone due to human intervention over time, both positive and negative.

DAMS + PRESERVATION

This research explores how we can use design to balance historical narratives of objects across a spectrum of integrity to preserve the cultural heritage connected to dam structures, even after they are gone or partially removed. This is important for dam removal sites because they pose a unique challenge to the practice of historic preservation. Their infrastructure, while still intact, can be argued as a structure representing a period of significance for its design or its role in a historic narrative. But for a historic structure to be preserved, it must possess a certain amount of integrity. When a dam is removed, its structural integrity is destroyed, but the history left behind by dam removal may remain as a mark on the landscape that is outside of the scope of preservation defined by the National Historic Preservation Act. Section 106 of the NHPA requires that a structure must have enough physical integrity to show its character, be over fifty years old and have a historical significance tied to events or people (National Register Bulletin, 1995). Preservationists have discussed this dilemma regarding historic dam removals and their answer is to typically distill a site's history down into some sort of interpretive sign to stand in for preservation of the missing dam. Without the historic structure, interpretive signs must present the entire history of the landscape, through text and image only (Figure 1.3). Historic preservationist Althea Wunderler-Selby questioned whether interpretive interventions at some dam removal sites are effective enough to represent a dam's historic presence post-removal. Her research looked at several dam removal sites around the Pacific Northwest that have interpretive signage installed at overlooks and found that these signs did not entirely satisfy community members who were attached to the cultural meaning of the dam before removal. In a sense, the physical void left by the dam removal left a cultural void in the community's identity, and efforts to preserve the dam's memory through signage alone fall short. Preservationist Ian Stevenson

***Figure 1.4**: Interpretive Panel and Overlook at the Elwha Dam, from: A Mountain Hearth, https://www.mountainhearth.com/2016/04/an-elwha-without-dam-is-like-fish.html, accessed April 21, 2021*

agrees that this approach has the potential to only acknowledge limited scopes of history, either as, "... signaling that the dam-less landscape is a twenty-first century constructed artifact..." or that most interpretation only acknowledges industrial history while leaving out indigenous narratives like how the site was used for traditional fishing practices (Stevenson, 2017: 11). This project demonstrates that a narrative-driven landscape design of dam removal sites and their ruins can provide a more comprehensive and inclusive expression of site history, which goes beyond traditional preservationist interpretive interventions. The case studies do not rely

on interpretive signs alone to engage people with the remnants of their post-industrial uses, they rely on design interventions. This research demonstrates how designers can push beyond the limits of the interpretive panel to provide a four-dimensional experience of the site's history.

In cultural landscape preservation, the term "feature" is typically used to refer to any physical elements in the landscape that pertain to a site's historical significance. Since this project seeks to express more history than beyond what is physically present at the site, the term "trace" will be used to mean an element of site history that expresses a moment in time related to a site's historical narrative. A trace can be a visible artifact found in the site's landscape, or it can be an invisible memory documented by oral or written history, expressed through metaphor in design.

DAMS + RECREATION

In many cases dams are associated with recreation. The calm, deep water of reservoirs behind dams are typically used for boating, swimming and fishing. When a dam is removed, there is a new need for a recreational outlet at the site for the surrounding community. In the case of the Savage Rapids Dam, recreation was one of the issues at the center of public debate over dam removal. According to Josephine County Historian Joan Momsen,

> People who like[d] the boating, swimming and recreational aspect saw no reason to remove the dams… Savage Rapids Lake was the only close by lake that one could water ski on and taking that away meant people would have to drive further… Many of the motels, some on the river, are now apartments. People do not come as much (Momsen, 2021).

By redesigning dam removal sites for new recreational programming, like rafting, fishing, hiking and exploring the post-industrial dam ruins, tourism and local recreation can be revitalized after dam removal.

PROJECT AUDIENCE

In summary, dam removal sites present complex landscape narratives that deserve to be incorporated into design, much like other post-industrial sites. There is an opportunity at these sites to balance cultural preservation, recreation and ecological restoration through design for the benefit of the public and the ecoregion they are a part of. More broadly, this research is meant to benefit designers who find themselves grappling with complicated site histories and narratives relating to anthropogenic impacts on a landscape and to give them a design strategy for accounting for the many traces that industrial infrastructure leaves behind.

1.3 RESEARCH GOALS, OBJECTIVES AND QUESTIONS

GOALS

This project came out of a recurring concern I had when conducting site research for each of my studio projects. This concern was that in learning about each site's rich history, I did not have a method for how to thoughtfully bring those stories into my designs. In some cases, these designs incorporated physical artifacts of that history, and in others, narratives that were no longer visible needed representation. I wondered how design could illuminate these histories in thoughtful ways that push beyond the interpretive panel found at many historic sites. Therefore, the first main goal for this project is to give designers a guide for design interventions that express a site's complex history.

My second goal is to establish dam removal sites as a type of post-industrial cultural landscape that can benefit from design by landscape architects for the sake of recreation, preservation and restoration.

OBJECTIVES

To achieve these goals, I needed to understand how landscape designers have previously dealt with this topic. Because of the amount of physical artifacts left behind at post-industrial sites, these types of landscapes have allowed designers to create visitor experiences around historic infrastructure to tell a site's history. This led me to search for my own post-industrial site that I could research and then test my design framework with. I discovered a rich infrastructure history at the Rogue River, where three dams were recently removed, and only the concrete ruins of the dams remained. My objectives for this project then became: to understand how other designers have designed with post-industrial site histories, to study the environmental history of Rogue River Valley and how the history of these dams shaped that region's history, and to explore how to reveal a historical narrative at a dam removal.

QUESTIONS

At a broad scale, this project investigates:

Is there a design framework that can translate design interventions across different post-industrial landscapes?

At a finer scale, this project explores:

How can the design framework be used to design at dam removal sites for public recreational use rooted in site history?

1.4 RESEARCH METHODS

This project uses literature review and case study analyses to build a design framework for engaging with the traces left behind by dam removal, based on how landscape architects have previously worked with other types of post-industrial landscape remnants to elicit a site's narrative through design. Ultimately the resulting framework is tested by applying it to a design that incorporates the various historic traces related to dam removal at Savage Rapids Dam on the Rogue River. The final design is then evaluated based on the values and strategies determined throughout the literature review and case studies. These methods will be discussed in terms of what information was gathered for the research, how it was synthesized, how it was used in design and the resulting approach to analysis.

LITERATURE REVIEW

The project began with a literature review of landscape design theory related to designing at sites with complex post-industrial histories. This also included reviewing literature that discusses approaches to expressing site narratives through site design. Sources came from journal articles and books. The literature review led to my own development of a design theory framework, which was then used to evaluate the case studies based on how closely they follow the approaches discussed in the literature.

CASE STUDIES

A review of case studies examined design projects and their approaches to designing with historic objects through the design theory framework established in the literature review. These case studies were chosen for their variety of geographic regions, post-industrial narratives expressed through design and for the importance of water to the industrial processes that historically impacted the landscapes, to parallel the impacts of dams found at this project's dam removal site. These projects include URBN Dry Dock No. 1, a former shipyard in Philadelphia, PA, Ballast Point Park, a former ballast quarry and oil processing plant in Sydney, Australia, Mill Ruins Park, a former grain mill in Minneapolis, MN, and Duisberg Nord, a former iron plant located in Duisberg, Germany. Information about these projects came from the websites of the design firms, published interviews with the designers, the Landscape Architecture Foundation's landscape performance case studies, the National Park Service website, journal articles and personal observation.

SITE BACKGROUND RESEARCH

Savage Rapids Dam and the surrounding Rogue River environment were researched to understand the site's entire historical narrative. This research began with archival research of government documents about the dam removal, an analysis of historic postcard imagery depicting the dam and the Rogue River to understand the cultural importance of the dam and the recreational culture of the Rogue River, and a review of archeological literature to understand the pre-contact history of this

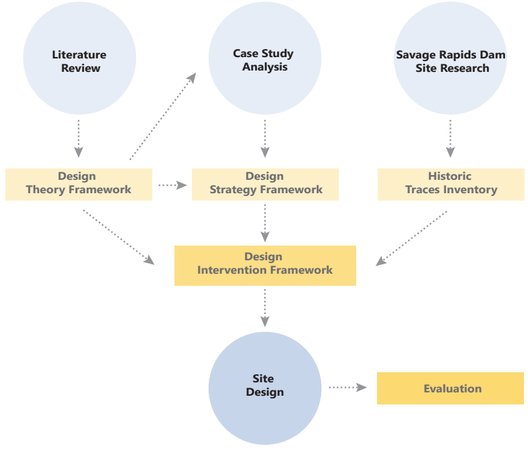


Figure 1.5: *Project Methodological Approach, where circles represent actions and rectangles reperesent products*

part of the Rogue River. Interviews with three people with specific knowledge of the Savage Rapids Dam site history were conducted by phone and email. Josephine County Historian Joan Momsen provided information regarding the community's response to dam removal and the site's former cultural significance as a recreation site through email correspondence on December 30, 2020. A phone interview with restoration ecologist Eugene Wier on January 11, 2021 discussed the dam removal, which he helped plan, and the subsequent riparian restoration project that he led through his employer, the Freshwater Trust. A phone interview with retired Southern Oregon University Native American Studies professor and local tribal member David West on January 22, 2021, discussed the pre-contact and contact-era history of the site. Three site visits were made in January, February and April of 2021 to document existing conditions with sketches and photography and to conduct a comprehensive inventory of the site's historic traces.

SYNTHESIS

Once the design theory framework from the literature review was used to identify a design strategy framework from the case studies, these design strategies were used to establish a framework for creating specific interventions for historic traces. This matrix, called the "design intervention framework," allows designers to consider different types of design interventions, using intricate site-based knowledge of historic traces gained through inventorying features left behind by previous industrial use. This inventory-based model also guides designers to think about how design strategies for each trace can be used within a spectrum of intervention tactics (keep as-is, modify, repurpose or construct) similar to the types of interventions seen in the case studies.

DESIGN

To test the usefulness of the design intervention framework, a dam removal site with a complex environmental history was selected for an overall schematic design that combines each historic trace into

a cohesive narrative. The design intervention framework was used to aid in site design in a number of ways. Each inventoried trace was first considered using the design intervention framework matrix, to think about how a design could incorporate each trace. At the schematic scale, the design intervention framework was used to identify which of three design concepts was most compatible with accommodating as many of the traces as possible.

ANALYSIS

To understand if the design intervention framework is useful or not, the design was analyzed through the lens of the previously established design theory framework and design strategy framework. This analysis looks specifically at how the design intervention framework functioned as a tool for design, and not critiquing the design itself.

1.5 CHAPTER PREVIEW

Chapters 2 and 3 lay the groundwork for the project's Design Intervention Framework. Chapter 2 presents the discussion and findings from the literature review, resulting in a Design Theory Framework, while Chapter 3 shows the four case studies and the resulting Design Strategy Framework. Chapter 4 then presents the synthesis of the two frameworks into the Design Intervention Framework and discusses how it can be applied to a site with historic traces connected to a post-industrial narrative.

Chapter 5 presents the sociopolitical and environmental context for dam construction and dam removal in the Western United States, arguing that Savage Rapids Dam on the Rogue River is an exemplary dam removal site to study. The site's environmental history dating back to 9000 years ago is presented, as well as an inventory of current conditions at the dam site and the surrounding landscape.

Chapter 6 shows how the Design Intervention Framework is applied to designing the Savage Rapids Dam site. The process of using the matrix from the design intervention framework is demonstrated. The trace interventions are discussed within the context of a unifying design concept and then as individual features encountered in the landscape.

Chapter 7 evaluates the site design. Future applications at other dam removal sites are considered, as well as the transferability of the framework across post-industrial landscape typologies.

CHAPTER 2:
Design Theory

2.1 INTRODUCTION

In the last few decades, there has been a significant amount of literature on landscapes that engage with historic site features like post-industrial ruins (DeSilvey and Edensor, 2012). Something that all of these sources have in common is that they each explore the value that ruins hold for design opportunities, whether that value is aesthetic, cultural, economic or ecological. These different types of design approaches will be examined to show how designers can employ design strategies for ruins that establish a meaningful sense of place at these historic sites. Since there is a lack of literature surrounding the post-industrial design of dam removal ruins, these approaches can be used to support a design framework for such projects.

2.2 AESTHETIC VALUE OF RUINS IN DESIGN

We will first examine the purely aesthetic features of post-industrial ruins that attract landscape designers. At their surface, ruins from a former era have a distinct material quality to them that can inspire design for several reasons, which is worth unpacking.

The aesthetic appeal of ruins goes back far beyond the withering factories and processing plants of the 20th century. Crumbling Classical structures set against a backdrop of wild vegetation were popularly used to lead the eye across designed landscapes during the Enlightenment tradition of the 18th and 19th centuries. The mystery, scale and ambiguity of ruins makes them attractive to people, but can be easily mythologized (Chan, 2009). Chan warns that while industrial ruins fit well into the Enlightenment aesthetic that we are accustomed to as part of the Western landscape tradition, it is easy for the history behind ruins to be overshadowed by their aesthetic quality. She urges designers to, "...treat ruins primarily as historical evidence and secondarily as aesthetic devices" (Chan, 2009: 30). Designers should be aware if the historic artifacts they are designing with start to feel like they are only follies in the landscape. If they are treated only as follies, then the design will not be honoring the site's true narrative.

When considering ruins through this Enlightenment lens, we understand that they can be simultaneously romantic and dystopic (DeSilvey and Edensor, 2012). The visual attraction of post-industrial ruins comes from their appearances appealing to an earlier time period, inspiring a vague feeling of nostalgia, but also eliciting feelings of the sublime by appearing apocalyptic in their degraded condition (DeSilvey and Edensor, 2012). While designers should take Chan's advice by not solely relying on the sublime aesthetics of ruins for their design concepts, this dynamic aesthetic gives designers the opportunity to build off of a preexisting material quality. The design's material palette can at least be guided by this aged aesthetic to bring a sense of time into a design.

Since post-industrial ruins can inspire such complex emotions, one may wonder if most people simply find them beautiful or aesthetically pleasing. In Tim Edensor's book titled, *Industrial Ruins: Spaces, Aesthetics and Materiality*, he makes the assumption that most people find little aesthetic value in a landscape containing industrial ruins due to the amount of disorder that is visible. He disagrees with this, calling for a broader

definition of what is acceptable aesthetically in public landscapes. He argues that ruins present a unique contrast to conventional landscapes because their spatial organization is influenced by a previous purpose, which gives them a more dynamic influence on their spatial order (Edensor, 2005). By looking to the original design layout of an industrial site, a designer might take advantage of the purely aesthetic layout of leftover structures and features which would otherwise not exist. Letting this "disordered" space guide design will result in an aesthetically unique site plan.

2.3 CULTURAL VALUE OF RUINS IN DESIGN

The cultural value of ruins comes from their symbolic representation of a former time. This history is always associated with a cultural narrative, which designers can bring out through design in a number of ways.

First, it is important to identify what is meant by the term "narrative." Narrative in landscape design is defined by Matthew Potteiger and Jamie Purinton in their book, *Landscape Narratives*. They differentiate history and narrative, explaining that a site's history is what happened, while the site's narrative addresses how that history happened. It is the role of the designer to unfold the narrative through site design to communicate the cultural significance of a place (Potteiger and Purinton, 1998). They advise that when designers assemble site narratives, that a narrative must have a minimum of two events to illustrate cause and effect. A general narrative that arises for landscape designers are the relationship between cultural processes and ecological effects resulting from those cultural processes. In the case of post-industrial ruins, which typically allude to negative anthropocentric effects on the environment, this overall narrative structure is relevant. So, while ruins give designers an obvious starting point in assembling landscape narratives, it is important to first consider the structure of the narrative that the design will communicate.

Many people write about the narrative quality that sites with historic remnants lend themselves to due to their fragmentary nature. This is seen by some as an opportunity for design intervention to reveal the site's historical narrative. Robin Dripps, who writes about the nuances of a site's historic ground in her essay, "Groundwork," discusses the qualities of a site's ground and finding artifacts and clues that represent site history within the ground. Once the artifacts are discovered, she writes that, "...the potential of these clues lies in the suggestive possibilities that these seemingly incomplete artifacts offer, and their ability to be combined, reconfigured, or hybridized..." (Dripps, 2005:71). This summarizes the creative possibilities that designers can take advantage of as they build a narrative out of the visible history (ruins) and the hidden history of a site. Designers can combine and reconfigure spatial relationships of narrative elements around artifacts to tell a story.

In the same collection of essays as Dripps, Elizabeth Meyer addresses fragments as opportunities for communicating narrative in her essay, "Site Citations." Instead of looking at industrial ruins she takes a close look at another type of site remnant, the rock formations found at the Rambles in Central Park. While these are not ruins, they too signal processes from an earlier time. Using cross-section maps of Central Park's geology, Olmsted's team was able to unearth a portion of the large rocky outcropping to reveal part of the whole, suggesting the depth of the rock's structure below the surface. Exposing more of the rock also revealed marks left behind by glacial grinding. By taking advantage of the rock's size and texture in this way, Olmsted directed the narrative of geologic processes that unfolded on the site at one time. This idea can be applied to industrial ruins by considering how they may be hidden or revealed in a design to illustrate narrative.

By looking at sites that have ruins with varying degrees of integrity, there is a unique opportunity to explore a spectrum of narrative construction that shows both how history can be, to use John Dixon Hunt's phrasing, "found and exploited" (Hunt, 2014: 63) or how history might be "invented for a site" (Hunt, 2014: 106). Hunt's essays in *Historical Ground: The Role of History in Contemporary Landscape Architecture* examine, "...how the history of a particular site may be invoked and used in a new intervention" (Hunt, 2014: xiii). The collection of essays focus on two main themes, which are, "...how history is manifested in places that provide designers with the material for that reference, and then how history could be fabricated, manufactured or 'feigned' for sites..." (Hunt, 2014: xiv). This framing of contemporary design practice can be applied to sites with ruins, specifically by reading the physical conditions of a history-rich site and to designing with its remaining objects or in some case, its absence of objects. It leads designers to ask how "feigned" history can be a valuable tool in supporting hidden site narratives where the only visible history comes in the form of structural remnants.

The author who most explicitly discusses the value of industrial ruins in revealing a site's cultural narrative through design is Elisabeth Chan in her essay, "What roles for ruins?" from 2009. In a response to contemporary park designs that overlook the cultural narrative associated with industrial ruins, Chan examines ways that designs involving ruins can address an honest representation of a site's historic narrative. She outlines these approaches in a list of guidelines, which are each relevant to this topic. The first point that she makes, which has already been discussed in terms of aesthetics, is that ruins should be treated as historic artifacts and not simply as sculptural fixtures that support site design (Chan, 2009). Secondly, she urges designers to consider how these ruins will be preserved alongside a design that will age as well. It is important for designers to design a place that will not only be relevant for today's users, but those in the future as well, and this also rings true for the narrative that the designer chooses to build. Thirdly. Chan advises that the historical narrative and context should be the primary guide for the design concept. History should guide everything because if the site's history gets lost in the design, it will be more difficult to uncover later (Chan, 2009). Her fourth guideline is to only rely on simple, minimal interventions that will not distract from the ruins too much or add false narrative context to them. The fifth guideline warns against what historic preservationists call, "rehabilitation, restoration or reconstruction" (Birnbaum, 1996). She believes that ruins should be left as-is and protected so that they are preserved in that state. Attempting to structurally rebuild what has been lost to time through design interferes with the narrative symbolized by the ruins. Her last guideline is to, "...program processes of discovery into the design of industrial ruin parks" (Chan, 2009:30). This aligns with

her advice to use minimal interventions because it places the ruins at the front of the design's program, so it is not distracted by other uses. Overall, Chan's guidelines for keeping a site's history intact alongside the physical remnants of that history very clearly warn against over-designing and over-programming. While ruins, as fragments, do offer designers an open-ended narrative, Chan's advice is to keep the design clear and simple.

2.4 ECOLOGICAL VALUE OF RUINS IN DESIGN

Post-industrial sites that feature ruins often leave behind a legacy of ecological harm due to their former industrial uses. Whether this impact is highly visible or invisible and subtle, the structural ruins that remain are the only figures onsite that can answer for these environmental harms. The people who caused the harm have long since left. This leads designers to treat the ruins and the contaminated landscape that they represent as poisonous relics to rebuild a healthy ecosystem around.

Creating this contrast between a ruined landscape and a remediated landscape is especially attractive to landscape architects because it shows people the process of healing that can occur from a restorative landscape design. If the ruins were not present, it would appear as if the industrial landscape was never here at all, and it is important to acknowledge this ecological transformation. Potteiger and Purinton describe the narrative opportunity that post-industrial wastelands afford designers when restoration occurs. The symbolism that Potteiger and Purinton address in looking at these wastelands are the clues in the landscape that can be tied to industrial use. These, "traces, fragments and abnormalities point to unnatural causes" and allow for designers to introduce a landscape narrative of change through intervention (Potteiger and Purinton, 1998: 214). At sites where ruins are less intact or the past anthropogenic mark on the land is less visible, narrative-driven design can help make these aspects of the site's history more visible.

Ruins that communicate a landscape's change from industry to remediation are important devices for acknowledging landscape history, especially in places where those former industries or infrastructures shaped the cultural and ecological development of an entire region. The ecological implications of an industrial economy are not restricted to the site, but the entire ecosystem that surrounds it. When designing at a site with industrial ruins, it is important to take advantage of connective links to the greater context of the site to show how the history may have affected the environment. Thaïsa Way writes about how environmental context was used in Richard Haag's design of Gas Works Park in her essay titled, "Landscapes of industrial excess: A thick sections approach to Gas Works Park" (2013). Gas Works, which features the ruins of a former gas plant and tar refinery, is located on a hill overlooking Lake Union and the surrounding Seattle area. Way mentions that this was formerly a sacred viewpoint to local indigenous peoples that eventually become littered and contaminated by industrial use. She suggests that Haag designed the viewsheds of the site to capture the region's wealth of natural resources, like the Puget Sound, Olympic and Cascade Mountains, to be considered alongside the tall stacks of the gas plant. While they may seem like opposing forces ecologically, these elements capture the history of Seattle. Seattle is a place that has an identity closely tied to natural resources, but Haag is presenting a wider scope of Seattle's historical identity by offering views of the green, remediated promontory alongside rusted gas plants and snow-capped mountains. The arrangement of views gives visitors a comprehensive understanding of the place by sharing this complex ecological narrative at such a large scale. This context-scale is an important consideration for designers who want to show ecological change at a site scale.

2.5 ECONOMIC VALUE OF RUINS IN DESIGN

Part of what makes industrial ruins intriguing to people is their symbolism of failure in the face of an economic shift. They can even be seen as physical evidence of global capitalism's flawed structure (DeSilvey and Edinsor, 2012). This is of course a narrative that may be expressed through a site design, but many designers will also see industrial ruins as an opportunity for economic renewal, especially in urban environments where land is in high demand.

If a designer's goal is to achieve economic revitalization, it is important to know how much a design can transform a historic place for its new purpose before all history is lost. Or, if a designer leaves too little untouched, they must consider if it will function well enough for contemporary economic needs. A review of industrial parks was undertaken by Hugh Hardy in a *Places Journal* article titled, "The Romance of Abandonment: Industrial Parks." Hardy discusses the spectrum of approaches that land developers and designers use when an industrial site is redeveloped. On one end of the spectrum is to completely clear the land and start with nothing. The other extreme is to fully commit to the site's industrial past by converting the ruins into a museum. In between these two, he says, there is flexibility for how stakeholders in the community and local economy might want designers to adapt and reuse the cultural artifacts of industrial ruins (Hardy, 2005). In an urban setting this may look like a mixed-use housing development, retail environment or a cultural landmark like a music venue. As long as the history of the place is not completely lost or overly exploited, this approach can be vital in the preservation of historic places. In less urban areas, we can assume that there might be less private investment to support projects like this. In this case public recreation funding may be able to support the integration of a historic ruin into a proposed trail or coupled with the funding of a new boat ramp facility. The project also might have the potential for drawing more tourism to a remote area, winning the support from local businesses and local governments who have a say in public project funding allocations.

A designer's insight on this varying degree of design intervention comes from designer Peter Latz, who is well known for his designs that successfully adapt and reuse industrial sites. He gives designers ideas for transforming post-industrial landscapes into cultural destinations as well as economic opportunities for the community. In Latz's personal writings about his project, Duisberg Nord, he outlines some of the main programmatic features of the design that in turn led to economic revitalization of a formerly vacant site (Latz, 2003). What is worth drawing from this account is how his approach always stayed loyal to the site's historical context, much like Chan urged designers to do in her guidelines. The former iron and

steel plant used to employ many in the area and Latz worked alongside several architects as the master plan for the site was developed to bring back the site's history of worker housing as new housing opportunities. He also attracted new users to the site by including a program of recreational tourism inspired by the site's industrial history, with many gardens, rock climbing walls and even a diving center. While not authentic to the site's historic uses, they are focused on experiencing and discovering what is left of the site's industrial heritage. This fits nicely in the center of Hardy's spectrum between museum and tear-down in terms of economic opportunities that were created as Duisberg Nord. Latz's design concepts were able to stay true to the history without making experiencing that history the site's only use, which helped the local economy.

2.6 DESIGN THEORY FRAMEWORK

By examining how scholars and designers have written about approaches to the design of post-industrial sites, we get a sense of the values and narratives that are central to each post-industrial landscape design. We know that ruins are aesthetically compelling because of their association with feelings of the sublime due to their scale and the crumbling, human-built contrast they offer against the power of nature. Ruins also symbolize a narrative of human history, which can be brought to the forefront in a design by using certain interventions to fill in narrative gaps that have gone missing in the deterioration of a ruin. In a similar way, a site's ecological change can be emphasized through design to reveal a narrative of industrial obsolescence in contrast to a resilient landscape. And with this obsolescence and cultural change, there often comes economic upheaval as well, which can either be expressed through a design narrative or through programmatic changes to a landscape that engage with potential new economic uses for a site.

These four approaches, shown in Figure 2.1, are too abstract to guide design until they are examined on the ground at built works of post-industrial landscape architecture. The next phase of inquiry will be guided with this four-pronged framework in mind, looking at case studies across different post-industrial landscape types. From there we will have proven examples of design strategies that are aligned with these four aspects of post-industrial design, and from there, design at a dam removal site on the Rogue River.

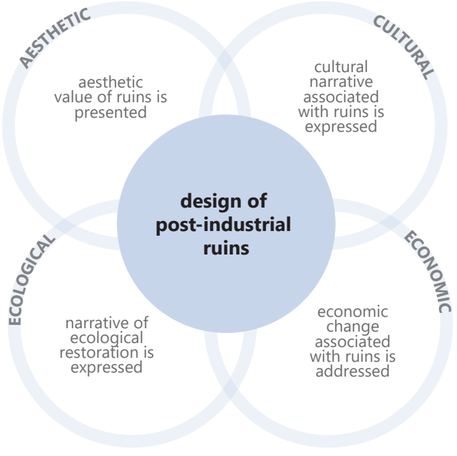


***Figure 2.1**: Design Theory Framework*

CHAPTER 3:
Case Studies

3.1 INTRODUCTION

To determine the most effective design approach for the traces left behind by dam removal, it is necessary to examine design strategies at sites with historic remnants. Since dam removal sites are an increasingly newer addition to the types of infrastructure ruins that designers may engage with, we must look beyond dams to other typologies of obsolete infrastructure from the nineteenth and twentieth centuries. The four projects that are reviewed in these case studies show examples of designers utilizing remnants from obsolete infrastructure to bring site narratives into programming for recreational use. Each differs in the type of ruin and the industrial history that it symbolizes, offering a broad spectrum of design approaches.

These case studies were reviewed using the theoretical framework assembled from the literature review of texts discussing contemporary design approaches at historic sites (Figure 2.1). In summary, the framework discusses how site history is expressed through aesthetic, cultural, ecological, and economic narratives alongside physical traces of infrastructure. Through these four lenses, we can examine the design strategies used by these designers, and how they can be seen as as transferable strategies that can be applied generally to obsolete infrastructure remnants. Figure 3.1 shows how the four approaches from the theory framework are applied to each case study to pick out design strategies that lead to actionable intervention tactics within each theoretical approach. At the end of each approach analysis, design strategies are summarized within each case study.

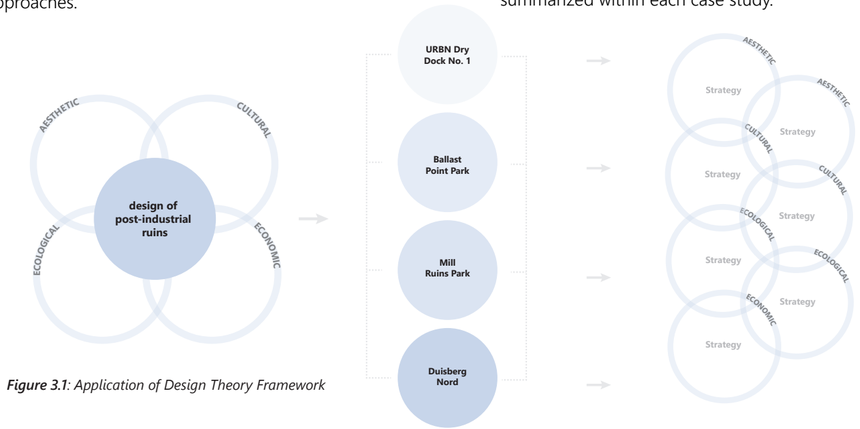


***Figure 3.1**: Application of Design Theory Framework*

3.2 URBN DRY DOCK NO. 1

Designer: Julie Bargmann, D.I.R.T.
Location: Philadelphia, PA
Client: URBN, Inc.
Date Completed: 2009
Size: 3 acres

SITE HISTORY

This site was formerly a decommissioned U.S. Naval Shipyard established during the 19th century on League Island in Philadelphia. With Philadelphia being the "birthplace of the U.S. Navy," (Navy Yard, 2021), League Island served an important role in the development of the naval fleet when it became the one of the government's main shipyards shortly after the Civil War. At its peak, the Philadelphia Naval Shipyard employed over 40,000 people and constructed 53 warships during World War II. It was also an important place for ship repair with 1,218 ships also repaired at League Island at that time. The last ship was built in 1970 and naval operations stopped in 1991. At the site, the dry dock was used for shipbuilding and rails were used for transporting materials. As shipbuilding technology changed, Dry Dock No. 1 was too small to support modern shipbuilding. Due to it size and its deteriorating timber piling structure, the dry dock was decommissioned well before the Navy Yard's closure. Today the former Navy Yard on League Island is a 1,200-acre business complex. The business at Dry Dock Number One is URBN, inc., who hired D.I.R.T. to design their waterfront headquarters.

AESTHETIC NARRATIVE

Julie Bargmann, the lead designer at D.I.R.T. (Dump It Right There) favors post-industrial design projects for the opportunity to let the existing conditions of a site speak to the past by challenging traditional ideals of landscape beauty. In a 2016 interview with *Landscape Australia* she says,

> The goal of my design approach with the good, bad and the ugly of post-industrial sites is to challenge the persistent pastoral ideal. That beauty emerges through empathy with how that landscape has come to be, what is latent within it and what potential has yet to be revealed. Sort of like the story of the ugly duckling that transforms into a swan. (*Landscape Australia*, 2016)

Her design of Dry Dock No. 1 re-frames the aesthetic value of the site's material remnants by keeping the materials on-site and in the landscape for new uses. She highlights their "ugly" or unconventional aesthetic appearance by adding contrasting elements typically found in contemporary landscape design. For example, the various rubble mixes that were created by crushing torn up concrete and asphalt from the site's ground are used as a sort of dry mulch around gridded tree plantings and within Corten steel planters found in the courtyard of the corporate offices. This contrast retains the unique texture of the site's original materials but adapts them to contemporary uses. She is at once challenging how contemporary landscape design looks by using these materials, but is also packaging her design in a way that is digestible with the typical elements that it does retain, like trees, planters lighting and pathways.

Aesthetic Design Strategy:
1. materials contrast old and new textures and uses

CULTURAL NARRATIVE

Bargmann is explicit in her commitment to honoring site history in her design at the Navy Yard. She sees the paving over of cultural landscapes as a great disrespect to the people who spent so many years of their lives at sites like this one. She says, "...respecting those histories means respecting their generations of work. Wiping out working traces condemns the next stage of that site to be generic" (*Landscape Australia*, 2016). Her design approach is determined to engage with these "working traces" as much as possible to connect the people using the site today with the thousands of men and women who also spent their days working here.

The main traces that she identified include the former rail lines and the former dry dock that is now filled with water. Both former infrastructure features are no longer functioning, but instead of removing them, she used them as the overall framework for planning site use.

The rail lines function to guide circulation throughout the site and its trail connection to the greater Navy Yard public landscape, as seen in Figure 3.2. To further develop the experience of using these paths, she flanks the edges of the rail lines with Corten steel planters, which reinforce the experience of moving through the pathways. When one is walking, they are forced to look down and notice the recognizable metal trace of a rail line.

The large U-shaped drydock, shown in Figure 3.3, is the centerpiece of the site, allowing people to walk up to the edge and have contact with the water that formerly supported decades of shipbuilding at this location. For its contemporary use, it offers the calming experience of gazing out at a body of water while taking a break from the office. These two uses, the historic and the contemporary, are made compatible by the light touch left on the cultural landscape. This exemplifies Bargmann's effort to tie the cultural narrative of the past together with the present to unify people through a sense of place.

Cultural Design Strategies:
1. rail traces guide circulation
2. drydock infrastructure used as water feature

ECOLOGICAL NARRATIVE

The ecological narrative expressed in Bargmann's design is evident in the "dump it right there" mantra that she is known for. By retaining and processing demolition materials from the site's decommissioned shipyard, the site retains traces of its cultural character, while also cutting down on waste produced through demolition that would typically be hauled off-site. As shown in Figure 3.4, the unconventional aesthetic of the rubble mulch and rough-edged pavers made of concrete aggregate used throughout draw attention to an unconventional design approach of adaptive reuse in the landscape.

Another design element that is perhaps less visible are the bioswales placed throughout the site that not only filter stormwater to prevent chemical runoff from entering the river, but also support irrigation of the long hedgerows that shade the west-facing walls of the business park's buildings. The rows line up with the historic brick buildings

that themselves have been adapted and updated to be more energy efficient for modern use. By adding this shading element, the overall goal for this historic site to be part of a more modern and sustainable future is supported through landscape design.

Ecological Design Strategies:
1. recycled site demolition material used as traditional landscape elements (pavers, mulch)
2. bioswales support shade plantings

ECONOMIC NARRATIVE

Post-industrial landscapes are inherently tied to their role in an industrialized, capitalist economy. In the case of this site, there is a narrative of wartime industry born out of necessity. The navy yard's production of war vessels can even be seen as a small part of the United States' role in shaping the global economy across the 19th and 20th centuries, resulting in what is now a global economy, where production is often outsourced. The new economic narrative that is perpetuated at URBN Dry Dock No. 1 is very much of that globalized economic structure, where consumer products are designed and conceived in the offices that this landscape supports, only to be assembled elsewhere. There are no longer men and women hauling materials or heavy machinery at this site - that has all moved overseas. The programming of the site design reflects the needs of the new, modern work force that interacts with the site every day. Bargmann included amenities for the office workers by programming the space that is still framed by its wartime history. The U-shaped upper edge of the dry dock is now equipped with an amenity lawn and amphitheater-like steps for gathering large groups for events. Pods of benches and tables are placed throughout the rubble-paved landscape. The site has a welcoming public space that invites office workers from throughout the League Island office spaces to reflect on the wartime history while taking breaks from their conference calls and computer screens.

Economic Design Strategies:
1. site programmed for corporate campus use: amenity grass, break tables, event space

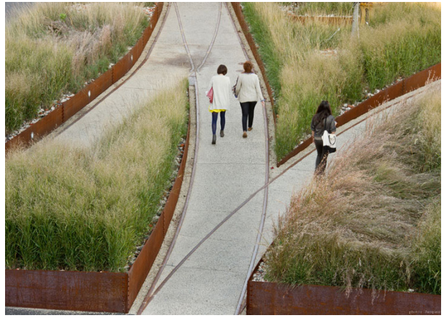


***Figure 3.2**: Railroad Remnant Guiding Site Circulation and Planting, from: D.I.R.T. Studio, http://dirtstudio.com/#urbndd, accessed May 1, 2021*

***Figure 3.3**: Recycled Pavement from Site Demolition in Planters, from: D.I.R.T. Studio, http://dirtstudio.com/#urbndd, accessed May 1, 2021*

***Figure 3.4**: People Gathered Around the U-shaped Drydock, from: D.I.R.T. Studio, http://dirtstudio.com/#urbndd, accessed May 1, 2021*

3.3 BALLAST POINT PARK

Designer: McGregor Coxall
Location: Sydney, Australia
Client: Sydney Harbor Foreshore Authority
Date Completed: 2009
Size: 6.2 acres

SITE HISTORY

Ballast Point Park's cultural history begins prior to the colonization of Australia when this waterfront site was used by aboriginal people for its access to marine resources. After the displacement of the indigenous people that lived here, a luxurious private marine villa called Menevia was built at the site in the 1860's. Eventually the sandstone that supported the villa's foundations was needed for ship ballast, and the site soon became a ballast quarry used by the European ships. Its final use was as a petroleum distillation plant owned by Caltex from 1928 until 2002. McGregor Coxall's design concept for this waterfront site is to evoke the multilayered history that has occurred at the site while implementing as many sustainable practices as possible in its construction.

AESTHETIC NARRATIVE

With the expression of a remnant industrial site history returning to a more natural form as one of the main concepts behind this design, an assemblage of materials from the past are left in place throughout the site's current infrastructure, creating a patchwork of textures alongside new, modern infrastructure that supports public access. Material remnants are effectively highlighted in this way, giving them a role in the space-making of the design. Cast-in-place concrete walkways and stairs lead visitors through a vast collection of ruins and rubbles, using the clean lines of modern design to signal what is old and what is new at the site. Natural features are also highlighted through this contrast of texture to show areas that have been reclaimed by native plantings or sandstone cliffs that have been revealed after the demolition of the Caltex facility.

Another example of this old versus new aesthetic intervention style is how the designers modified the original concrete seawall from the Caltex facility, which is tall and imposing. The thick brutalist slab puts a barrier between exterior harbor views and the interior sunken lawn spaces (Figure 3.5). Knowing what to retain from the industrial infrastructure and what to remove or modify played a major role in the creation of this space, especially in how the seawall was modified to frame harbor views. By cutting out sections of the seawall throughout the park, framed views of the surrounding waterfront are incorporated into the design. An intentional framing of views also occurs at an art installation at the water's edge, called "Delicate Balance" by artist Robyn Backen. This new concrete structure uses the same material language of the seawall ruins to show views, but they are created in a more confined space that draws upon naval architecture, pointing out specific landmarks in the surrounding horizon. Both of these concrete design elements show how McGregor Coxall considered what should be modified from the site's infrastructure and what could be expanded upon through the addition of contemporary sculpture.

Aesthetic Design Strategies:
1. framed views of surounding landscape
2. juxtaposed textures of old and new, man-made and naturalistic

CULTURAL NARRATIVE

Expressing the complex site history was another design goal for McGregor Coxall at Ballast Point Park (McGregor Coxall, 2021). Interventions for this approach allude to each time period that is significant to the site, from subtle references to Aboriginal history, the colonial villa, the ballast quarry and the site's final use as an oil terminal. Aside from the Aboriginal history, marks on the land or infrastructure ruins that signify each period are amplified through their distinct geometric or material forms to symbolize each layer of history.

Regarding the expression of Aboriginal history in the design, the main action taken by the designers to acknowledge the layer of pre-contact site history was to give the park a "second" name, which is "Walama." This word is from the aboriginal Dharug culture, who occupied the Sydney region prior to colonization. "Walama" means, "to return," referencing the site's return to nature with the planting of native plants around the various industrial ruins (McGregor Coxall, 2021). While the other historical periods are more visibly represented in the design by references to infrastructure left behind by building construction, quarrying and oil processing, these marks on the land speak to the nature of colonization's harmful and lasting impact on sites. Perhaps the designers' effort to "return" the wildlife at the site somewhat to its pre-colonial condition is the representation for this layer of history, but one may wonder if that is visible enough.

The next layer of history that is revealed at the site is the construction the luxurious villa, Menevia, built by British colonists in the 1860's. When portions of the Caltex infrastructure were being dismantled, many remnants of the former villa were uncovered, including the portions foundation of the villa revealing its footprint, as well as smaller artifacts like 19th century plates and cups. The designers maintained the geometry of the footprint in its trapezoidal form by adding terraces to the design that show the same shape. The small scale artifacts were encased in an interpretive display that shows photos and historical information, while also suspended in the rubble of the gabions (Figure 3.6). Visitors are able to pick out these small human-scale traces throughout their exploration of the site.

The sandstone quarrying that occurred in the later part of the 19th century is addressed in the design by displaying the parts of the sandstone cliffs that were carved out to provide ballast for ships. The sections that show the most scarring from excavation in quarrying are exposed and framed by walls of gabions. The gabions seem to almost replace and rebuild the stone wall parts that were removed through the act of quarrying the site over a century ago. Large slabs of sandstone are also strewn throughout to tie the ballast quarrying narrative into the entire design.

The site's most recent industrial use is the Caltex oil terminal, which left behind the most infrastructure ruins for the designers to work with in their design. At the site scale, the locations of each the former oil tanks were retained in the landscape through concrete footprints of their circular forms, turned into planters (Figure 3.7). This circular motif

recurs throughout the site to reference the oil processing history of the site. Upon entry there is an art installation created from one of the former rusty oil tanks, called Tank 101, with poetic text describing the harbor carved into the metal that shows on the ground when light passes through it. This is another example of an artifact found on site that was modified for a contemporary use that contributes to an understanding of site narrative. Poetic text about the site's unique history and surroundings is also used in other parts of the site, cast into concrete to carry the cultural experience consistently through the site.

Cultural Design Strategies:
1. interpretive installations (art installations, story text carved into infrastructure, human artifacts displayed)
2. infrastructure ruin forms used to symbolize different periods in site history

ECOLOGICAL NARRATIVE

In the concept of returning the site to its natural state, restoring native vegetation at this post-industrial site was key. A stormwater collection concept was developed using the circular tank footprint planters, which are placed within a flood-tolerant rain garden that captures the runoff from the upland areas of the site. This functions to filter stormwater before it enters the harbor, counteracting any ground pollution from the site's industrial past.

To enhance the metaphor for ecological progress, sustainable construction techniques and materials were also an integral part of this site design. A highly visible design element found throughout the park are the walls made of gabions filled with recycled demolition materials, very similar to D.I.R.T.'s approach to keeping materials onsite for repurposing through design, but also retaining the historical character of the materials. These "rubble walls" saved 19,450 cubic meters of virgin construction materials from being used on the site (Kilbane, 2017). The rubble within these gabion walls also resembles a similar color tone to the quarried sandstone cliffs that make up the large parts of the site. It seems as if the designers are showing a rebuilding of the land mass that was extracted in the quarrying, further developing the narrative of restoring the land.

Another way that the narrative of environmental progress away from extractive and fossil fuel-supporting landscapes is the wind turbines installed in the Tank 101 art installation. The wind turbines were designed to generate up to 8 kW of energy. While they are now defunct, their insertion into this former energy landscape makes a statement of ecological change.

Ecological Design Strategies:
1. recycled aesthetic
2. reassembled quarry
3. rain gardens in tank-shaped planters and stormwater wetland

ECONOMIC NARRATIVE

This site design's economic narrative is closely tied to its ecological narrative, with it being a former extraction site as well as a processing plan for fossil fuels. Its repurposing into a public park is the first and foremost program, with this portion of waterfront becoming accessible for the first time since before colonization. Now that goods like ballast and oil are no longer distributed from this site, local people can reclaim this site for their use. After this park was built, a 50% growth in home values occurred within a 500-meter radius now that the waterfront and its expansive views were made accessible (Kilbane, 2017). Programming for the local suburban community is evident in the play areas nestled into the infrastructure ruins. The various interpretive installations found throughout the design also helps families learn about their local history and how the economics of colonization and petrocapitalism have influenced their region.

Economic Design Strategy:
1. waterfront access and amenities for new suburban community of families

***Figure 3.5**: Views of the Sydney Harbor Cut from Historic Seawall, from: McGregor Coxall, https://mcgregorcoxall.com/project-detail/125, accessed May 1, 2021*

***Figure 3.6**: Historic Artifacts Found During Demolition Encased in Rubble Gabions, from: McGregor Coxall, https://mcgregorcoxall.com/project-detail/125, accessed May 1, 2021*

***Figure 3.7**: Planters in the Shape of Former Footprints of Oil Tanks, from: McGregor Coxall, https://mcgregorcoxall.com/project-detail/125, accessed May 1, 2021*

3.4 MILL RUINS PARK

Designer: Minneapolis Parks and Recreation Board
Location: Minneapolis, MN
Client: Minneapolis Parks and Recreation Board, National Park Service
Date Completed: 2005
Size: 11 acres

SITE HISTORY

During the 19th-century, grain mills were built along the Mississippi River to be powered by the water coming down St. Anthony Falls, which established an economy for wheat flour production in Minneapolis. These waterworks, "...made up the largest direct-drive, water-powered facilities in the world and greatly increased the production of flour" (National Park Service, 2020). The efficient output from these mills put the city of Minneapolis on the map as flour was exported across the United States and throughout the world. As milling technology changed, many of the riverfront milling facilities shut down and became abandoned. An archeological study of the mill ruins led to its nomination to the National Register of Historic Places in 1971 and was later considered for development by the St. Anthony Falls Heritage Board in 1988. To introduce access and interpretation of the mill ruins in a park setting, the site was partially excavated and opened to the public as part of the Mississippi National River and Recreation Area in 2005.

AESTHETIC NARRATIVE

With this park's straightforward program of offering up views and interpretation of the riverfront mill ruins, it is important to examine the way that the ruins are presented aesthetically to visitors. With the partial excavation that took place at the site, the ruins are revealed from the slope of the riverbank and a wide array of original masonry building techniques are revealed in the structure's ruins. By removing certain parts of the ruins, new views of the inner rooms containing historic machinery were created. While visitor access to these spaces is not allowed, this strategic excavation frames these revealed inner spaces from the designated pathway.

Lighting complements the texture and space created by the brick structure and unifies the ruins with the downtown city lights that serve as the backdrop behind the park. Dramatic lighting adds aesthetic contrast to the structure by further abstracting the darker, more mysterious voids with the faces of its more intact walls (Figure 3.8). This high-contrast lighting, combined with the reflection it casts on the historic mill canal, is able to spatially amplify feelings of the sublime inspired by the ruins. From the vantage point on the pathway, one is either looking up at the towering ruins or back at the canal reflecting the crumbling structure.

The sublime and Enlightenment landscape that was often evoked in the 18th and 19th centuries by artists and landscape designers not only included crumbling ruins as an element in the landscape, but also vegetation taking over the ruins, signaling the power of nature to overcome human intervention. Mill Ruins Park allows urban plant species to colonize the ruins, adding to the forgotten quality of the structure's ruins. The plants also soften the edges of the crumbling bricks, bringing a narrative of natural beauty into the broken ruins, which is yet another concept that elicits ideas of the Enlightenment tradition.

Aesthetic Design Strategies:
1. lighting
2. plant maintenance
3. partial excavation

CULTURAL NARRATIVE

The historic narrative of Mill Ruins Park is primarily communicated through wayfinding and circulation alongside the mill ruins. Not only does this choreographed circulation design protect the ruins from erosion or other impacts from human use, it places visitors in an exploration of spaces that allow them to consider the different landscape elements that are connected to the former flour mill's development. Circulation brings visitors on a path between the various ruins and the canal that held water from the water-powered facility and eventually under the Stone Arch Bridge, which historically supported the railroad that distributed goods and resources from Minneapolis to other regions. As one walks along the riverside ruins and looks at the machinery, they also learn how water played a role in the regional economy. This trail is connected to the St. Anthony Falls Heritage trail, which further connects visitors to the greater industrial infrastructure that relied on the Mississippi River for its natural power. Discovery along this route is also enhanced by the accompanying Mill Ruins Quest Activity Guide, which uses clues and rhymes to help children and adults encounter unseen histories associated with the site.

By using a concrete walkway with modern metal fixtures, visitors also see a contrast in what is historic and what is contemporary and know that they are to stay on the pathway created by modern materials. This material contrast helps communicate what parts of the site are culturally significant and what is infrastructure for modern use.

Cultural Design Strategies:
1. concrete walkway choreographs experience
2. circulation planning part of the larger St. Anthony Falls Heritage Trail

ECOLOGICAL NARRATIVE

The ecological narrative told at this site is minimal. However, it is worth repeating that the ruins themselves are colonized with urban plant species. While this does add a certain softening aesthetic value to the ruins, it also allows for a narrative of novel urban ecosystems to be put on display in the public eye. By allowing these plants to take over the ruins, visitors are able to see specimens for the types of cosmopolitan species that continue to thrive in post-industrial environments. It would have been reasonable for the Minneapolis Parks and Recreation Board and the National Park Service to require more vigorous plant maintenance on the structures, but this relaxed approach speaks to the narrative of a changing urban environment.

Ecological Design Strategy:
1. plant maintenance style communicating recovery

ECONOMIC NARRATIVE

The trail system and interpretive signage along the route are connected to an adjacent museum, called the Mill City Museum. This is dedicated to educating the public about the grain milling operations that created economic growth for the city of Minneapolis. With the mill ruins outside of the museum, the site is framed by the museum as a symbol for development for historic development of the region. Therefore, the interpretive program of the museum bleeds into the site's interpretive information, telling the story of Minneapolis's early economy.

Economic Design Strategy:
1. interpretive information part of a museum describing economic history of region

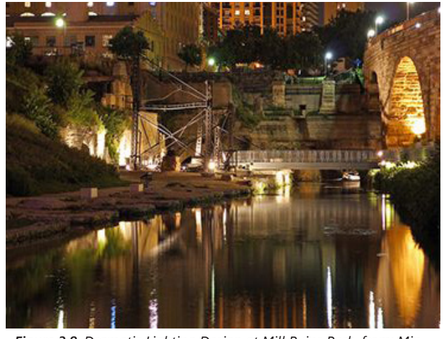


***Figure 3.8**: Dramatic Lighting Design at Mill Ruins Park, from: Minneapolis Park and Recreation Board, https://www.minneapolisparks.org/parks__destinations/parks__lakes/mill_ruins_park/, accessed May 1, 2021*

***Figure 3.9**: Concrete and Steel Walkway Providing Access to Ruins, from: Rant Lifestyle, http://www.rantlifestyle.com/2014/05/08/top-10-landmarks-in-minneapolis/, accessed May 1, 2021*

***Figure 3.10**: Urban Plant Species Colonizing Mill Ruins, from: Intrepid Life, https://www.intrepidlife.com/mill-ruins-park/, accessed May 1, 2021*

3.5 DUISBERG NORD

Designer: Peter Latz and Partners
Location: Duisberg, Germany
Client: Landesentwicklungsgesellschaft Nordrhein-Westfalen, Stadt Duisburg, Emschergenossen schaft Essen, Kommunalverband Ruhrgebiet
Date Completed: 2002
Size: 445 acres

SITE HISTORY

Thyssen Ironworks in Duisburg-Meiderich was built in 1901 to fulfill demand for pig iron in Europe and the US for shipbuilding. Pig iron, also known as crude iron, is produced for the eventual creation of steel by smelting iron ore in a blast furnace. Coal from the nearby landscape was also used to power the blast furnace. By 1912, five blast furnaces operated, producing different types of pig iron for use in mechanical engineering. By the 1970s, the European steel market was flooded and production was cut back, closing Blast Furnaces 1 and 2. Some blast furnaces were reconfigured to specialize in other types of pig iron production, but the demand was ultimately too low to sustain any business. The plant eventually closed in 1985. The ironworks produced 37 million tons of pig iron during its operation (Landscape Park Duisberg-Nord, 2021).

The large contaminated site and its massive infrastructural remnants led the local community to question what to do with the site. Ultimately the ironworks were decidedly an important part of the town's skyline and regional identity, so people organized efforts to rescue the structures from demolition. The formation of the German Industrial Heritage Association and the Nordpark Interest Group aided in the preservation effort.

AESTHETIC NARRATIVE

Duisberg Nord is often thought of as one of the first landscape projects to challenge ideas of landscape beauty by transforming a brownfield site littered with infrastructure ruins into a welcoming space for humans. According to landscape design critic Hugh Hardy, this design defies "...the traditional serene notion of 'park," and "...juxtaposes nature with industry by transforming massive industrial objects into places of culture and recreation" (Hardy, 2005: 34). This juxtaposition runs as an aesthetic theme throughout the large park, specifically through planting design around ruins, by offering visitors access to structures either through a viewing platform, or by drawing attention to the ruins as cultural artifacts through art installations.

While artful planting occurs throughout Duisberg Nord, ruins are most highly contrasted with planting in the Sinter Park, where the grid of a demolished building's footprint still exists in the landscape and is used to create various garden rooms filled with planting (Figure 3.11). The orderly plantings vary from room to room, but the frame of the building's crumbling grid that separates them brings to mind the dialectic between nature and industry.

Another important aesthetic design feature that Latz designed into Duisberg Nord is the tall viewing platform at the top of Blast Furnace 5. As visitors climb to the top of the steel staircase they are able to see the large site and its larger site context as views framed by openings in the blast furnace machinery. When they reach the top, a panoramic view shows the whole industrial site and the town that it supported for nearly a century. This vantage point also allows visitors to view the industrial ruins as individual sculptural elements in the landscape to guide their exploration of the site.

The aesthetic value of the site's industrial ruins is also highlighted by a massive tarpaulin frieze showing abstracted historic photos of industrial machinery (Figure 3.12). Created by artists Bernd and Hilla Becher, the frieze has been installed on the walls of the power plant building since 1999. By showing these curated images upon entry alongside the real-life, three dimensional encounters with the machinery, visitors understand that the ruins are meant to be seen as beautiful rather than utilitarian.

Aesthetic Design Strategies:
1. geometric planting design alongside ruins
2. viewing platform
3. art installation

CULTURAL NARRATIVE

The landscape park is programed to be experienced through exploration via the Industrial History Circular Trail, which leads visitors through the ruins of the ironworks to show them each section of production. However, this "history trail" does not lead visitors through a perfectly preserved museum-like circuit, but rather provides an exploration of mysterious ruins that stand among artistically planted meadows and tree grids, as well as reflecting pools and elevated walkways that reupurpose the ruins (Figure 3.13). The experience is designed to be immersive in the timeless space that it creates, but if visitors wish to dive deeper into the industrial history there are wayfinding columns that offer QR codes that can be scanned to learn more. This subtle introduction of technology to the site's history narrative makes room for new views of repurposed site use while retaining interpretive information for those who seek it. In its larger cultural context, this trail is connected the Ruhr district's larger Industrial Heritage Trail and the European Route of Industrial Heritage.

Another way that modern technology is employed throughout the site to reference the past is through a curated lighting installation by artist Jonathan Park. Different parts of the park are illuminated by three colors: red, green and blue. Red symbolizes the fire and heat used to produce the iron. Green symbolizes the gas and pollution produced by the ironworks during manufacturing. Blue symbolizes the water that was drawn from the local landscape to be used in production. Parts of machinery tied to these functions are illuminated with their respective colors at night for visitors to enjoy as they explore the park (Landscape Park Duisberg-Nord, 2021).

Cultural Design Strategies:
1. historic walking trail part of larger regional Heritage Trail program of industrial site access
2. lighting installation and technology used for interpretation

ECOLOGICAL NARRATIVE

Like many post-industrial designs, the ecological narrative is tied to revealing a story of remediation and the site's return to a more balanced, natural state. Latz and his team accomplished this through an artistic design of planting and storm water management on the site. Stormwater management was installed to ensure that no remaining chemicals get into the local river, the Old Emscher. This water system consists of several sections which are visible across the site, as they also function as aesthetic features in the landscape. These sections are the Clear Water Canal, the Dyke, the Channel, the Gorge and the Stream. All of these feed rain water from across the site into the Old Emscher, which was originally used in the production of iron at the plant and was contaminated in the process.

Planting also plays a major role in not only the beautification of contaminated zones, but to also represent an optimistic outlook on the site's revival as a place to support life. Rows of poplars and black locusts have been planted alongside industrial features to create a canopy across the site. Enclosed areas like the Ore Bunker and the Sinter Park (Figure 3.13) put plants in unexpected places alongside the main trail, revealing secret gardens in the ruins, transforming grey concrete rooms into green oases. Additionally, the massive scale of the site and its extensive planting program allows it to support a diverse population of bird, insect and mammal species. There is a "Biological Station" that visitors can access to learn about the biodiversity of the site as it undergoes the transformation from ironworks to public park

Ecological Design Strategies:
1. waste water features,
2. ornamental planting in contaminated zones
3. nature education

ECONOMIC NARRATIVE

As is common with large post-industrial sites like Duisberg Nord, its closing came as a result of an economic shift, therefore impacting the town and region where it supported workers. Local and federal governments associated with the state of North Rhine-Westphalia helped fund the construction of Duisberg Nord through the International Building Exhibition, with the goal of revitalizing the community through enhancing the industrial site as a destination for recreation and natural open space. The aim was to connect local residents with the industrial heritage of their region but also attract more people to the area through tourism by turning the site into a recreational destination. Recreational programming at the site now utilizes the industrial infrastructure for a range of activities. There is a diving training space which also doubles as an "underwater event space" in a former gas tank that is now safely filled with water. High concrete walls of the ruins now are used as climbing walls and a high ropes course is hung from infrastructure ruins (Figure 3.14). There are also several event spaces that are as big as concert halls and as small as conference rooms. These new site uses not only attract people to visit from all over the region, many of the recreation facilities charge a fee for use, as well as event rentals, making the landscape park itself a new economic driver in the community.

Economic Design Strategy:
1. recreational programming aimed to encourage tourism

***Figure 3.11**: Geometric Planting within the Ruins of the Sinter Park, from: Latz + Partner, https://www.latzundpartner.de/en/projekte/postindustrielle-landschaften/duisburg-nord-sinterpark/, accessed May 1, 2021*

***Figure 3.12**: Steel Walkway Built Over Remnant Railway Pilings, from: Latz + Partner, https://www.latzundpartner.de/en/projekte/postindustrielle-landschaften/duisburg-nord-bahnpark/, accessed May 1, 2021*

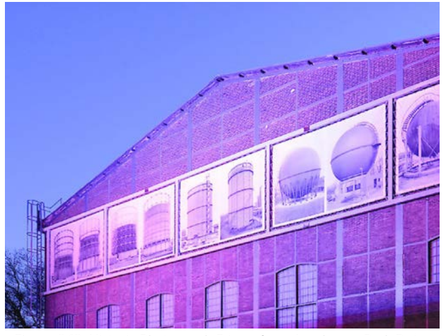


***Figure 3.13**: Historic Photograph Frieze, from: Landscape Park Duisberg Nord, https://www.landschaftspark.de/en/leisure-activities/frieze/, accessed May 1, 2021*

***Figure 3.14**: Concrete Remnants Repurposed for Climbing, from: Latz + Partner, https://www.latzundpartner.de/en/projekte/postindustrielle-landschaften/duisburg-nord-spielpunkte/, accessed May 1, 2021*

CASE STUDY	Aesthetic Approach	Cultural Approach	Ecological Approach	Economic Approach
URBN Dry Dock No. 1	• High contrast of old and new materials	• Historic infrastructure forms guide trail circulation and exploration	• Recycled demolition materials repurposed as landscape design elements • Improved stormwater management	• Amenities for contemporary corporate campus coexist with infrastructure symbolizing former industrial workforce
Ballast Point Park	• Framed views using infrastructure • High contrast of old and new materials • High contrast of natural and man-made materials	• Historic infrastructure forms guide trail circulation and exploration • Art installations as interpretive interventions	• Recycled demolition materials repurposed as landscape design elements • Improved stormwater management • Restoration narrative expressed through planting	• Amenities for suburban family recreation coexist with infrastructure symbolizing former industrial site use
Mill Ruins Park	• Lighting used to dramatize ruins • Excavation of ruins presents framed vignettes of infrastructure	• Historic infrastructure forms guide trail circulation and exploration • Connects to larger "heritage trail"	• Restoration narrative expressed through planting and plant maintenance practices	• Interpretive program closely tied to adjacent museum describing the industrial economic development of the region
Duisberg Nord	• Framed views using infrastructure • High contrast of natural and man-made materials	• Historic infrastructure forms guide trail circulation and exploration • Connects to larger "heritage trail" • Art installations as interpretive interventions	• Improved stormwater management • Restoration narrative expressed through planting	• Amenities for recreation and tourism utilize infrastructure

***Figure 3.15**: Key Design Strategy Takeaways*

3.6 DESIGN STRATEGY FRAMEWORK

Moving from a more theoretical framework of topics that post-industrial landscapes offer designers to a practical and applicable framework required a close look at how these four different case studies utilized the traces of physical history found at their sites and built their designs around them through interventions ranging in programmatic planning to re-purposing materials found on-site. Each Case Study's observed design strategies for each theoretical approach are listed out in Figure 3.15, which can be referred to throughout this section's discussion. Figure 3.16 shows a distilled version of the table in Figure 3.15, which moves the design strategies found in the Case Studies to a more general and transferrable format to be used at sites beyond the Case Studies.

For interventions that dealt with the theme of aesthetics in the design of post-industrial sites, there was a juxtaposition being used as an important design tool, whether it was the highlighting the contrast between old and new materials or natural and man-made. Textures of the ruins and traces were typically left as-is but amplified through lighting, framed views, or the excavation of certain elements to reveal more material.

Design interventions that expressed cultural narratives typically let the left-behind ruin elements guide the exploration of the site through circulation oriented toward a program of discovery in the landscape. Designers can use this approach to their advantage when developing an overarching design concept that will guide layout. In many cases, traces in the landscape that guided circulation were modified for a cultural expression, like an art installation that ties into the site's narrative to tell the history of the site beyond interpretive text.

Ecological design interventions at these sites always involved the recycling and re-purposing of historic site materials that would otherwise be hauled off-site, like ripped up pavement or other demolition materials. Planting palette and design was always oriented toward restoration of a native ecosystem, often with an added function of storm water management. By amplifying the textures and colors of the restoration planting, this narrative of landscape change is made more visible to people experiencing the site's story.

Economic considerations often came in the form of planning for programming related to contemporary site

Aesthetic	Cultural	Ecological	Economic
• High contrast of materials that juxtapose natural and man-made or old and new • Framed views of ruins or traces from trail	• Historic infrastructure or remnant forms guide circulation and exploration • Art installations that interpret cultural history beyond text or kiosks	• Recycled demolition materials or infrastructure repurposed as landscape design elements • Restoration narrative expressed through planting • Stormwater management using remnant infrastructure	• Programmatic uses for site aimed at economic changes in region, typically to support a new workforce or tourism

***Figure 3.16**: Design Strategy Framework*

uses that align with the economic and social changes that occur at a site over time. This may look like providing amenities for a new type of recreation to attract tourists or offering more passive recreation opportunities on the grounds of a site that used to see heavy industrial labor by its users.

These guidelines, when paired with the theoretical framework, give designers a sturdy foundation to approach the design of any post-industrial site. However, when designing with ruins and sites with traces of rich histories, the true variables are the richness of the site's existing conditions and the history found at that first site visit. The next phase of the design framework will describe how to apply these more general design approaches to specific traces found in the landscape in Chapter 5.

CHAPTER 4:
Site Background

4.1 INTRODUCTION

As stated earlier, dam removal sites have complex landscape histories that can be revealed through design. This project focuses on a specific site: Savage Rapids Dam on the Rogue River. This chapter provides historical context for the site at the regional scale, then discusses how the site was selected from other dam removal sites on the Rogue River. The site's complex history and existing conditions are then presented to foreground the design shown in the next chapter, which was done using the Design Intervention Framework.

4.2 DAM REMOVAL IN THE WESTERN U.S.

Building dam infrastructure in waterways has long been a tool for enabling Euro-American settlement of the United States landscape, starting in New England during the 17th century (Stevenson, 2017). Dams of all types began to dot the nation over time to aid in industry, irrigation, and power generation. With the expansion of homesteading in the American West at its height towards the end of the 19th century, a need for more systematic and widespread agricultural irrigation resulted in the establishment of the Bureau of Land Reclamation, which became responsible for organizing the West into irrigation districts connected to dammed waterways (McDermott, 2016). Once established, the Bureau of Land Reclamation constructed some of the largest dams in the Pacific Northwest during the New Deal Era, like the Bonneville Dam and the Grand Coulee Dam on the Columbia River. In contrast to other regions of the United Sates, this expansive policy-driven infrastructural armature placed on the waterways of the American West over the 19th and 20th centuries shows the rapid transformation of the landscape that Euro-American colonization demanded as agricultural economies developed in states like Oregon and Washington.

This association with an industrialized colonial westward expansion has long made dams a cultural symbol for mastering nature and harnessing its power (Jackson, 2013). The powerful industrial aesthetic of dams is often described as "monumental," and their concrete structures were purposefully designed to appear imposing and overbearing, so that the public would trust their structural stability (Jackson, 2013). This aesthetic can be attributed to Bureau of Land Reclamation engineer John R. Freeman, who was known to push this aesthetic on early 20th century dam projects in the West, using what dam scholar Donald Jackson calls the "'psychology' of dam design" to create dams that used monumentality to their advantage to express strength and fortitude (Jackson, 2013). Freeman was known to criticize dams with delicate or pastoral designs that could blend into the landscape, which is perhaps why the aesthetics of most concrete dams in the West show a stark contrast of grey concrete dominating riverine landscapes, making the monumentality of dams purposefully visible (Jackson, 2013). These monumental dams, as engineering spectacles in the landscape, became tourist attractions. Their monumentality is apparent in the imagery found in tourist postcards from the 20th century, showing that the dam infrastructure that became part of the Western landscape was celebrated by many (Figures 4.1 and 4.2).

In the 1990's, less than a century after most of the dams in the West were constructed, dam removal became

a topic of interest in the Pacific Northwest. Dwindling salmon populations because of inadequate fish passage at many structurally obsolete dams fueled the effort to remove dams to restore river ecologies. With the government purchase of the Elwha and Glines Canyon dams on the Elwha River in 1992 under the Elwha Act, planning for dam removal and researching its ecological benefits on a large scale became a reality (Blumm and Erickson, 2012). This massive policy decision led the way for several other dam removals in the Northwest, beginning in 2000's. Dams on tributaries of the Columbia River like the Condit Dam on the White Salmon River and dams on the Sandy River and Bull Run River were all removed between 2007 and 2011. At this same time, a series of dam removals also occurred on the Rogue River in Southern Oregon for many of the same reasons: obsolete infrastructure for fish passage and outdated industrial technology that had since been abandoned. The golden era of the dam in the Pacific Northwest had quickly peaked in the 20th century and began fading fast in the 21st century. Dam removals happen in stages, often with the construction of a temporary cofferdam to hold back water while the original dam structure can be dismantled with machinery and explosives, then debris is cleaned up and hauled away. Today, several large dam removals are currently being proposed on the Klamath and Snake Rivers, possibly opening even more Pacific Northwest rivers to migrating fish.

While the rapid and extensive damming of Pacific Northwest rivers during settlement disrupted many stream ecologies and their salmon populations, none was disrupted by damming quite like the Rogue River. The Rogue and its tributaries drain from the Cascade Mountains across a large portion of Southwestern Oregon and into the Pacific Ocean (Figure 1.1). This geographic location has made it a uniquely suitable salmon habitat, providing nearly 4,000 miles of river for salmon to migrate prior to Euro-American settlement, which sustained the diets of indigenous peoples for thousands of years (Blumm and Erickson, 2012). Once settlers arrived in the Rogue Basin, the region became famous across the nation as the river with the largest salmon population in Oregon (Blumm and Erickson, 2012). As settlement occurred, seemingly conflicting reputations of the Rogue arose around both its recreational fishing reputation as the best in Oregon and talk of its industrial potential for hydropower and irrigation. Imagery from printed ephemera throughout the 20th century portrays the Rogue River as a fisherman's paradise (Figure 4.3), but also a destination to witness the monumental power of dam infrastructure at Savage Rapids Dam (Figure 4.4). This conflicting cultural perception of the Rogue River as both an abundant fishing resource and an industrial asset makes the narrative of dam removal especially rich at the Rogue. The establishment of an ecotourism economy associated with fishing on the Rogue ironically overlapped with the construction of the Rogue Dams, which negatively impacted anadromous fish migration, and as a result, impacted fish populations on the Rogue River. Dam removal sites like Savage Rapids Dam represent the environmental conflict narrative surrounding all dam removals, however this river's historic reputation as Oregon's premier fishing destination makes the recovery of fish habitat through dam removal all the more meaningful.

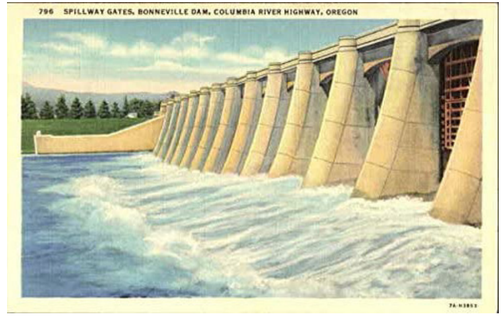


***Figure 4.1**: Postcard of Bonneville Dam Spillway, circa 1940s, from: https://www.ebay.com/itm/203046182563, accessed April 21, 2021*

***Figure 4.2**: Postcard of Owyhee Dam and Reservoir, circa 1940s, from: https://www.ebay.com/itm/324512249497, accessed April 21, 2021*

***Figure 4.3**: Postcard of Fisherman on the Rogue River, circa 1910, from:https://www.ebay.com/itm/174735184563, accessed April 21, 2021*

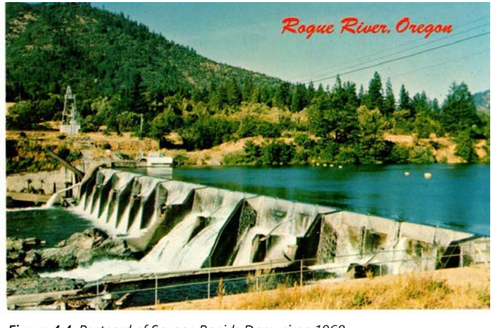


***Figure 4.4**: Postcard of Savage Rapids Dam, circa 1968, from:https://www.ebay.com/itm/172850456745, accessed April 21, 2021*

4.3 ROGUE RIVER ENVIRONMENTAL HISTORY

INDIGENOUS LIFE ON THE MIDDLE ROGUE RIVER

Along the Middle Rogue River, human occupation has been traced to two main cultural groups: the Penutian-speaking Upland and Lowland Takelma. The Lowland Takelma lived in closer contact with the river, while the Upland Takelma took advantage of mountain and forest resources. Based on archeological evidence, this section of the Rogue River has experienced human habitation by ancestral Takelma people as early as the Paleo-Indian period (9000 years ago) up until the contact with Euro-American settlers in the 1820's (Atwood, 1996). These people continued to occupy the Rogue as their way of life shifted from a highly mobile and nomadic lifestyle to a more sedentary one. In the Early Archaic (9000-7000 BP) small hunting and gathering groups were mostly mobile along the river corridor. In the Middle Archaic (7000-2000 BP), certain sites appear to have been used for a more stable routine of setting up seasonal hunting camps and food processing. Technologies for food storage and processing were becoming more sophisticated, based on the tools and food remnants found at sites along the river. In the Late Archaic (2000-200 BP) up until contact, there was a transition from foraging and seasonal subsistence to a more sedentary lifestyle due to a growing population that demanded more stability, new land management practices like burning, trade across territories, and continued adaptation of food processing and storage methods (Atwood and Gray, 1996).

Before contact, the Takelma depended on a wide range of food sources that all could be found within the corridor of the Upper and Middle Rogue River. Looking more closely at the river's terraces and diverse topography along the Upper and Middle Rogue River we can see several plant communities that were all important for people living in this environment. The parts of the Rogue that have more broad, gradual terracing are dominated by oak woodlands and savanna species like Pacific madrone and manzanita. Some of these woodlands also contain mixed conifer species like ponderosa pine, Douglas-fir and broadleaf deciduous trees like big leaf maple and black cottonwood. The lower terraces near the river contain dense riparian vegetation like willow and cottonwood. North-facing slopes along the Middle Rogue are typically dominated by conifers whereas south facing slopes have more drought-tolerant, oak savanna communities (Atwood and Gray, 1996).

Important tree nut sources were found in the acorns of oaks, with black oaks preferred, as well as western hazelnut and pine nuts from a variety of pine species like ponderosa and lodgepole pine. Acorns were processed by grinding them to a meal and removing the tannic acid by soaking them in water. Proximity to the Rogue River may have allowed people to soak the meal in basins dug directly into the riverbank. Pine trees were also used for food when the cambium layer of the tree was scraped out and mashed into cakes. Pine needles are also a good source of Vitamin C and were used to make tea. Thick pine logs were also used to make dugout canoes. Manzanita, which is still ubiquitous on the upland slopes of the Rogue today, has red berries that were used as an ingredient in pemmican, eaten raw or dried, or ground up with pine nuts to make a paste. The reddish bark and silvery green leaves were used to make medicinal teas (O'Neill and Tveskov, 2008).

Like many other Indigenous peoples' diets in Oregon, camas bulbs were an important source of nutrition. The bulbs are dug from seasonally wet prairies within the Rogue River Basin and baked in pits with hot stones (O'Neill and Tveskov, 2008). Cheno-ams like amaranth were a grain that was foraged. Another nutritious plant source came from the seeds of the tarweed plant, which was used for its fatty oils.

Aside from foraging for plant resources, hunting and fishing along the Rogue supported life as well. Salmon and other anadromous fish like trout and steelhead were fished at falls and rapids along the Rogue using dip-nets, traps, spears and fishing line (Atwood and Gray, 1996). Seasonal fishing camps were often sited at these parts of the river. The migration patterns of the various anadromous fish species living in the Rogue allowed for fish runs virtually year-round, making this food source abundantly available with the use of the right tools. Since the Lowland Takelma lived in closer proximity to the river, they would often trade salmon for deer meat with the Upland Takelma. Upland Takelma would hunt deer by disguising themselves as deer and stalking them or by driving them into fences with the help of hunting dogs (Atwood and Gray, 1996). Small mammals like rabbits and squirrels were also consumed.

EURO-AMERICAN COLONIZATION AND SETTLEMENT OF THE MIDDLE ROGUE RIVER

By the early 19th century, fur trappers and gold prospectors began to explore Oregon, looking for valuable land and resources. Contact and trade between the Takelma people and Euro-Americans occurred as early as the 1820's, since the fur trapper Peter Skene Ogden observed that the indigenous people he encountered on the Middle Rogue owned European-style iron axes and Chinese ceramics (O'Neill and Tveskov, 2008). By the middle of the 19th century Euro-American colonists coming to the Middle Rogue increased once gold was found in several of the Rogue's tributaries. The plentiful fisheries, fertile farmland and gold prospects further motivated colonists to settle there, which also increased conflict with the Takelma people. The Oregon-California wagon trail passed through a part of Lowland Takelma territory, between Table Rock and Grants Pass, a portion of the Rogue River where three dams would later be built. As conflict in this area of the river intensified, several peace negotiations between the colonists and Takelma were attempted, including the Table Rock Treaty in 1853, which established the Table Rock Indian Reservation. Table Rock overlooks the present-day site of the Gold Ray dam. This was the first reservation in the Pacific Northwest (O'Neill and Tveskov, 2008). Once they relocated to the reservation on the north banks of the Rogue, the Takelma watched as their camas fields quickly became destroyed by livestock and their salmon fisheries heavily impacted by gold mining. Their former territory was taken advantage of under Oregon Donation Land Claim Act of 1850, which allowed white men over 18 to take 320 acres of land each and 640 acres if they had wives (Cordes, 2020). Reservation life was horrifically disrupted in 1855, when the Lupton Massacre was carried out by a violent group of white miners and settlers from Jacksonville who called themselves "the Exterminators" (LaLande, 2020). This reignited tensions and sparked the last few years of the Rogue River War, which ended in 1856. This resulted

in the Takelma becoming detained and displaced to other reservations across Oregon, including the large Coast Reservation, far away from the Rogue River valley in a completely different environment. Once they were removed, the Table Rock Reservation was opened to white colonists for mining and settlement. Federal legislation like the Homestead Act of 1862 and the Forest Homestead Act of 1906 continued to incentivize colonization of Oregon's tribal lands along the Rogue (Lundgren, 2006). New infrastructure like the 1887 opening of the Southern Pacific Railroad in Jackson County also made the area more accessible to foreigners (McDermott, 2016).

THREE DAMS ON THE MIDDLE ROGUE: GOLD RAY DAM, SAVAGE RAPIDS DAM AND GOLD HILL DAM

As gold mining along the Rogue continued to attract people from across the West, some mining operations grew to include hydraulic mining, a mining technique that uses pressurized water to blast rock or sediment away. One mine along the Middle Rogue was owned by the Ray brothers, C.R. and Frank. In order to power their hydraulic mining operation using hydropower, they built the Gold Ray Dam. To build the dam they had to flood an entire riparian woodland located upstream adjacent to Table Rock. It was the first hydroelectric power in the Rogue Valley. The dam structure was built out of wood and had a barely functional fish ladder on its south side. Eventually the gold mining prospects at the site dried up and the brothers sold the dam in 1921 to the California Oregon Power Company, which later was called Pacific Power (Momsen, 2009). Gold Ray Dam's power generation eventually extended to the nearby towns of Ashland, Jacksonville and Central Point. Over the 1920's and 1930's the wooden dam sprang several leaks that were typically stopped using sandbags (McDermott, 2016). In 1941 the leaking and rotting wooden dam was replaced with a concrete dam and an improved fish ladder. A fish counter was installed as well. By 1972, the dam's turbine system became obsolete and the dam stopped producing power. It sat as a historic reminder of the Rogue's settler history until its removal in 2010.

The warm and dry climate of the Rogue River and its surrounding valley made agriculture somewhat of a challenge in the early days of settlement. Irrigation for farmland was in high demand in Josephine County, so the Grants Pass Irrigation District (GPID) was assembled in 1916 and was granted water rights to irrigate 18,000 acres (GPID, 2019). They tried numerous approaches to pumping water from the Rogue River into canals, but the pumps continuously washed away, begging for a more sturdy and permanent solution to irrigation. The construction of an irrigation dam at Savage Rapids, the outfall of Savage Creek (named after the adjacent Savage family homestead) began in 1920 under contract with a Los Angeles engineer (GPID, 2019). It was a hollow concrete dam that diverted water away from the river and into gravity canals that piped water across the valley (McDermott, 2016). The dedication ceremony drew over three thousand people and the keynote speaker was Dr. W.J. Kerr, then-president of Oregon State University. The large-scale irrigation system was a success, making virtually any crop suited to Southern Oregon's climate possible to grow (Momsen, 2009). As a result, 12,815 acres of farmland were now irrigable (GPID, 2019). There was only one issue: the design of the fish passage infrastructure did not function as well as it was meant to, and standards for fish passage were constantly changing. While there was a fish ladder installed on the north bank, there were no fish screens in place, which caused migrating anadromous fish to be sucked into the gravity canals and into the irrigation system. One farmer reportedly scooped hundreds of migrating salmon out of his irrigated fields (McDermott, 2016). Screens were finally installed by GPID in 1934. A major reconstruction in the 1950's also adapted the dam to new standards, but those too became quickly outdated. Environmental policy eventually targeted dams like Savage Rapids Dam and after many decades of political conflict, an alternative pumping system was built to irrigate crops so that the Savage Rapids Dam could be removed in 2009.

The town of Gold Hill is located several miles upstream from Savage Rapids Dam along the Rogue River. Colorado-based Ideal Cement Company decided to build a cement plant in Gold Hill because they were able to quarry gravel at an upland site and also use hydropower from the Rogue River. The dam powered the company's operations as well as some residents of Gold Hill. The dam also diverted water from the river to supply the town with water. The dam was small, at only 2 to 6 feet high, which was thought to be low enough for fish to jump but migrating salmon would get sucked into the diversion canal just as they did at Savage Rapids Dam. After Savage Rapids Dam, this was thought to be the second worst obstacle for migrating fish on the Rogue River (Water Watch, 2020). Ideal Cement stopped operations in 1969 when a new plant was opened in Seattle (McDermott, 2016). The town of Gold Hill replaced their water supply intake with a new pumping system in 2005, making the outdated dam obsolete. It was removed in 2008 and a wetland restoration project has been implemented at its former reservoir.

POLITICAL CONFLICT OVER DAM REMOVAL

Environmental policy and protection of rivers was becoming more popular in the 1960's and 1970's, first with the Wild and Scenic Rivers Act in 1968, which protected another section of the Rogue, and the National Environmental Policy Act in 1969. The formation of American Rivers Conservation Council also occurred in 1973, which eventually became a key group in dam removal activism. By this time, environmental groups were aware of the negative impact that dams had on anadromous fish. New England had witnessed its native salmon population completely disappear because of the hundreds of small dams built in the 19th century and conservationists did not want to see the same happen to Pacific salmon (Stevenson, 2017). The American Rivers Conservation Council was active in lobbying against federal funding for dam projects, holding their first National Dam Fighter's Conference in 1976. The first termination of major dam funding from Congress due to lobbying by the American Rivers Conservation Council happened in 1981. In a 1986 amendment to the Federal Power Act determined that the Federal Energy Regulation Commission must give "equal consideration" to environmental protection of fish and wildlife when considering funding for hydroelectric projects, which further slowed the building of new dams (Stevenson, 2017).

By the time the Rogue River dams were almost

completely obsolete in the later part of the 20th century, the people who cared about keeping them around were the local farmers and politicians who depended on them for irrigation, or in the case of Gold Ray Dam, historical regional identity. A group called the Friends of the Gold Ray dam argued that dam removal would only have more negative impacts to salmon habitat as sediment was released downstream. They were also pushing for the dam and its powerhouse to become protected under the National Historic Preservation Act. Two factions arose out of the conflict over preserving versus removing the three dams, the "save the dam" faction versus the "free the Rogue" faction (McDermott, 2016). Ultimately, when the Southern Oregon Coho Salmon became protected under the Endangered Species Act in 1997, the scales were tipped in favor of dam removal. Funding picked up for each removal project and it was clear that the cost of removal was far cheaper than cost of repair or preservation of the dams, each having a difference of several millions of dollars (McDermott, 2016).

REMOVAL OF THE MIDDLE ROGUE'S THREE DAMS

The first dam to be completely removed was Gold Hill Dam in 2008. The town got help from the Rogue Valley Council of Governments to line up funding (McDermott, 2016). A dam removal ceremony celebrated the commencement of the removal and a press release from NOAA quoted Gold Hill mayor Gus Wolf, who said, "...as stewards of the Rogue River, which flows through the heart of our city, we fully support removal of the dam. Dam removal and restoration of the site will provide benefits not only to the citizens of Gold Hill, but to citizens of the Rogue Valley, the state of Oregon and the Northwest" (McDermott, 2016).

Savage Rapids Dam followed in 2009, even though its removal had been in process for decades. The actual removal itself began in 2006. Compared to the small removal of Gold Hill Dam, which cost $1.2 million, Savage Rapids Dam ended up costing $27 million (McDermott, 2016). Because of this high cost, acquiring the funding for the project took almost a decade. The first major step towards funding the removal came when senators Ron Wyden and Gordon Smith proposed the Savage Rapids Dam Act in 2000 with $22.2 million to fund the dam removal (McDermott, 2016). The removal process consisted of damming half of the dam at a time while the hollow concrete structure was disassembled one piece at a time.

When Gold Ray Dam stopped operating in the 1970's, Pacific Power donated its run-down facilities to Jackson County, where some residents where enthusiastic about turning the powerhouse and dam into a historic museum and county park (McDermott, 2016). The reservoir that formed behind the dam was also popular with local people for recreation purposes. Formerly a riparian woodland, the flooded area created by Gold Ray's construction became a lively wetland habitat called Kelly Slough. Some even said that this area created valuable salmon habitat that would be negatively impacted in the case of Gold Ray's removal. As the conversation surrounding dam removal entered the picture in the 1980's, community members who enjoyed the historic dam structure and its wetland were opposed to removal. Eventually it was the historic dam's fish passage issues that made dam removal a liability for fines and therefore a priority. Jackson County couldn't afford to upgrade the nonfunctional dam's fish ladder for more cost than to remove it. After several environmental impact assessments were conducted, funding for the dam removal was gathered and the dam was removed in 2010 (McDermott, 2016).

ECOLOGICAL AND CULTURAL IMPLICATIONS OF MIDDLE ROGUE DAM REMOVALS

While dam removal does come with some ecological risks, especially older dams with lots of sediment buildup, it only took a few years to witness the positive impact these dam removals have had on anadromous fish populations in the Rogue. Monitoring programs have effectively captured these results. One of the more striking changes that ecologists have witnessed is the recovery of gravel habitat on the river floor. Gravel is an important place for salmon to spawn and when dams are built, sediment piles up behind them, burying these important spawning environments. One way that ecologists monitor salmon spawning activity is by looking for "redds," which are ruts in the river gravel created by salmon burying and fertilizing eggs. An ecologist monitoring the former reservoir behind Gold Ray dam saw 45 redds within a few feet of Gold Ray's ruins the year after dam removal, compared to none when the dam was up (Freeman, 2013). Savage Rapids Dam's removal exposed nearly 200,000 cubic yards of sediment and its former reservoir underwent a transformation as well (Oregon State University, 2012). The number of redds monitored at Savage Rapids Dam also showed a positive improvement, with the amount of redds in 2018 nearly doubling the number counted in 2017 (Freeman, 2018). There were 186 redds counted where there were only 91 three years prior, when the dam removal was still recent (Freeman, 2018). These visible improvements to salmon habitat make this stretch of the Rogue River a unique place to witness landscape change.

4.4 SITE SELECTION

The Rogue River in Oregon was chosen for this project because of its reputation for salmon fishing and the unique occurrence of three subsequent dam removals within several years of each other, taking away over a century of infrastructural interference of the Rogue River's waters all at once. Now that over a decade has passed since these removals, we can look at what these sites have become: the state they are in, how and if they are accessed by people, and the opportunities they offer designers. This discussion outlines the design opportunities found at each dam removal site on the Middle Rogue and how they are applicable to the Design Theory Tramework of historic sites having aesthetic, cultural, ecological and economic values. Through this analysis, it was determined that the Savage Rapids Dam site ultimately will benefit the most from this project's design framework approach.

GOLD HILL DAM

CURRENT CONDITIONS AND SITE USE

Gold Hill Dam's remaining infrastructure is located on Jackson County Park lands adjacent to the Gold Hill Sports Park and along the Rogue River Greenway biking and walking trail. While formal circulation is lacking,

some desire lines connect the deteriorating powerhouse structure and fish passage infrastructure to the Greenway trail, allowing for some access. The site's main use by the public appears to be graffiti tagging, of which there is much of.

AESTHETIC VALUE

Of all three sites, this site retains the most infrastructure, with its powerhouse, fish ladder, fish screen (Figure 4.5) and plugged diversion canal all intact. The public's engagement with the infrastructure through tagging also adds a new aesthetic layer over the industrial sublime of the former powerhouse. It is worth considering how a site design would impact this space's use as a place for artistic expression through tagging.

CULTURAL VALUE

Before the dam was removed, a National Historic Preservation nomination was submitted for the powerhouse and fish passage, but was denied for reasons unknown to the author. Therefore, the infrastructure on this site was significant enough to members of the community to put forth a preservation effort, but this effort fell through even before the dam was removed. This shows that while it lacks some integrity, it is still an important cultural resource that is worth re-interpreting through design. The site is also just downriver from Ti'lomikh Falls and the "storytelling stone," an important cultural site for the Takelma people, where a ceremonial netting of the spring's first salmon is caught historically. Damming this section of the river no doubt impacted this ceremonial fishing spot and with the dam now removed, more salmon can be caught upstream from Gold Hill. For many white, settler-descendant local people, the rapids near Ti'lomikh Falls are popular for white water rafting.

ECOLOGICAL VALUE

The ecological transformation that has occurred due to dam removal is less apparent at this site. With the amount of litter from taggers and people using the space for drinking and smoking, a narrative of renewal does not come across, but has potential. The post-dam riparian restoration planting along the plugged canal has since been colonized by Himalayan blackberry and would require extensive mitigation measures.

ECONOMIC VALUE

Community members involved with the white water rafting community have discussed adapting the powerhouse structure into a climbing wall and whitewater event center, similar to recreational programming seen at Duisberg Nord. The Gold Hill Whitewater Club has also proposed a landscape design nearby to accommodate sports events at the Ti'lomikh Falls rapids, which has been scouted as a possible white water route for the summer Olympics in 2028, which will be held in Los Angeles. The site's location is also desirable to develop as it is located within the town of Gold Hill and is only a few minutes drive from Highway 99 and Interstate 5.

CONCLUSION

This site offers exciting recreational and economic opportunities that can be tied in with whitewater programming that are planned for adjacent areas. There is also a good amount of infrastructure to work with to engage the public with the dam removal narrative through design. However, this site is already quite accessible, albeit not designed, for the public. With its location right off of the Rogue River Greenway trail, and with its current following of street artists, this site already possesses a type of a recreational program and use that could certainly be enhanced through design, but is still serving the community in some way already.

GOLD RAY DAM

CURRENT CONDITIONS AND SITE USE

The Gold Ray Dam site is accessible to the public through loosely developed nature trails and a small interpretive installation displaying some of the historic powerhouse machinery uphill from the former dam. This land is owned by Jackson County and Oregon State Parks. The trails are not well-established and the trail leading to the interpretive display is not ADA accessible. The site is largely used by hikers who come to view wildlife in the large riparian wilderness area that was in part created by Gold Ray Dam.

AESTHETIC VALUE

Of the three Rogue River sites, this one retains the least amount of dam infrastructure. The actual dam structure is mostly gone, except for a small section of the abutment on the south bank of the river, which is in view from the park land on the north bank. This small section was left for two reasons: to maintain structural stability underneath the existing train tracks and roadway, but also to leave an artifact in the landscape for the community members who fought for historic preservation of the dam. Less obvious traces of the dam remnants that could be highlighted in design include aggregate concrete inlaid within the native white granite on the river bank (Figure 4.6), showing where the north bank abutment was secured to the rock through the pouring of a concrete foundation. There is also a field of buried granite and concrete rubble that has potential for repurposing in a park design, especially since this area is unable to sustain any plant life with this thick layer of rubble at its surface. The powerhouse machinery that was preserved and somewhat curated for public viewing also offers potential for inclusion in design to offer a contrast between the site's current use of outdoor recreation rooted in natural resources and the site's potential for cultural resource recreation.

CULTURAL VALUE

This site's cultural value was evident when community members protested the dam's removal and attempted to have it preserved by the National Historic Preservation Act. The main structure that was attempted to be

preserved was the dam's powerhouse, which had fallen into disrepair after decades of the dam not being used. The machinery from the powerhouse nods to the requests of the citizens who hoped to keep it around, but the site where the powerhouse once stood is completely blank. An anonymous source in the community expressed their and others' disappointment with the county's design of the park and its sparse acknowledgement of the historic dam landscape. A design that references the site's former uses in a more immersive recreational experience could really enhance this site's cultural value.

This site is also near Table Mountain, where the Table Mountain Reservation was situated during the Rogue River war years, with views of the mountain at various elevations that could become more accessible through more comprehensive trail design. Framed views of this landmark and its cultural significance to the local indigenous communities prior to and during colonization have the potential to be acknowledged here.

ECOLOGICAL VALUE

Of all three dam removal sites, this site has the most extensive and rich wilderness area, with a fascinating novel wetland ecosystem that was in part created by the flooding of a riparian forest during construction of the Gold Ray Dam. As the former river reservoir morphs back into a more natural form over the coming years, this area will be an exciting place to witness the transformation post-dam removal. A trail design concept that takes visitors through these changing conditions and the wildlife that thrive here would be a huge asset to the surrounding community, especially as tourism based in outdoor recreation continues to attract people to the Rogue River.

ECONOMIC VALUE

While outdoor recreation attracts tourists to the Rogue River landscape in this area, and this site has the potential for such a site use, accessing the site is not easy as it lies within a largely rural residential area and is located on the north bank of the Rogue, far away from the main road of Highway 99 and Interstate 5. There are no businesses in the vicinity to stimulate with the development of this area, except for maybe rafting guide companies if it could become a popular takeout or stop-off.

CONCLUSION

While this site offers great potential for a place-based design that references the dam and its ecological effects as well as the site's pre-contact history, the remote location makes it less of a priority for development. Another reason it is not the top priority out of the three sites is that its partially developed nature trails and interpretive signage around the dam's old machinery do offer some cultural and ecological orientation to this rich site. While they are not fully capturing the site's history in the way a narrative-driven design could, at least the site is accessible to the public for use in some way.

SAVAGE RAPIDS DAM

CURRENT CONDITIONS AND SITE USE

The site is still owned by the Grants Pass Irrigation District and while it was historically leased to Jackson County to create Savage Rapids County Park, it is now closed to the public as it undergoes riparian plant restoration under a lease with the Freshwater Trust. It is unclear what the future of this site will hold, aside from the habitat restoration that is attempting to provide more shade on the Rogue River through riparian vegetation to regulate the water temperature for migrating anadromous fish. Before the dam was removed, this reservoir park was located less than a ten minute drive from downtown Grants Pass and served as an important recreational hub for swimming, fishing and boating. The dam ruins, located a few hundred feet downstream from the former park, are frequently visited by people driving down Highway 99, although it is private property. Extensive social trails show evidence of this. Some graffiti occurs around the dam ruins and several informal shelters have been built from vegetation by individuals experiencing homelessness.

AESTHETIC VALUE

Of the three sites, this site has a medium amount of historic infrastructure from the dam left intact. Apart from pieces of the abutment (Figure 4.7) and fish ladder that are found at the dam site, traces that allude to the dam's impact on the site can be found throughout, dating as far back as the construction of the dam. Footings from the original cofferdam that was made to build the dam in the 1920's litter the site. Erosion lines from the former reservoir can be found within most viewsheds facing the north bank. A few recreational infrastructure traces of the former county park remain as well.

CULTURAL VALUE

Visible or not, this site's rich history can be traced back to pre-contact. This section of the Rogue was known by the Takelma as, "the rocks," a place where fish were easily caught by nets as they jumped over rocky rapids (West, 2021). This rocky riverbed gained a new significance when Euro-American settlers came and began mining some of the rocky riverbed for gold. As tensions between colonists and Takelma heightened, this site was eventually used as a detainment area for a group of Takelma people before they were forced to relocate to the Coast Reservation (West, 2021). This cultural history is currently invisible at the site and deserves recognition.

The site's visible history is tied to the dam in every way, whether it is the actual dam infrastructure parts or physical remnants from the reservoir park. The reservoir's recreational value was very important to the community and was one reason why community members opposed the dam removal (Bureau of Land Reclamation, 2006). The dam itself also represented significant history to some community members as well. Policy was introduced in 2000 to gain government funding for the removal effort, called the Savage Rapids Dam Act. This bill required future recreational development of the site to replace the public park area that would be altered by dam removal (Oregon Congressional Senate, 2000). This has not yet been set in motion, but now there is even more land to be

developed into a park due to lower water levels after dam and reservoir removal, offering an expansion of the former cultural uses for the site.

ECOLOGICAL VALUE

The Freshwater Trust's riparian vegetation restoration project that is already underway at the site can lend itself easily to public access that engages visitors with the narrative of restoration at this site post-dam removal. Using design to make these restoration interventions more visible can further show the transformation that this site is experiencing after nearly a century of being dammed. Narratives of anadromous fish habitat restoration that are associated with the river bank's riparian plant habitat can be expressed through trails and outdoor education opportunities at this site.

ECONOMIC VALUE

There is a clear opportunity to revitalize this former recreational site to attract tourism to both the dam removal cultural resource as well as park amenities that support river recreation, like boating and fishing. Surrounding fishing lodges and restaurants would benefit from the public usage of this site, just as they did when Savage Rapids County Park was so popular. While there is no longer a calm, deep reservoir to attract people, the narrative-driven site design and trail system will reframe the various historic traces as natural and cultural resources to engage with.

***Figure 4.5**: Gold Hill Dam Remnant, photo by author, January 2021*

***Figure 4.6**: Gold Ray Dam Remnant, photo by author, January 2021*

***Figure 4.7**: Savage Rapids Dam Remnant, photo by author, January 2021*

CONCLUSION

At Savage Rapids Dam, landscape design can be used to fill the void of a formerly valued recreation site that was affected by dam removal, and use the changes brought to the site from dam removal as assets to explore through narrative-driven design: the ruins, successful habitat restoration, new access to a healthier river and more robust fisheries. Bringing design narratives to this site also gives the opportunity to honor the cultural significance of this site for its indigenous uses pre-contact and to commemorate its more painful indigenous history during the Rogue River War. Overall, this site is most ideal out of the three to demonstrate how dam removal sites can be designed to balance recreation, restoration and cultural resource preservation to have a positive impact on the surrounding community.

Because of this site's rich history and amount of dam remnants, it also offers a wide variety of historic traces that can be explored using the design framework that this project will test. This makes it an ideal site for examining how a design framework for post-industrial landscape design can be used, while also establishing dam removal sites as compelling design opportunities.

4.5 SAVAGE RAPIDS DAM SITE CONDITIONS

LAND USE

The 15.5 acre site is located on the Rogue River's southern bank on the border of Josephine and Jackson Counties, with its western portion in Jackson County and eastern in Josephine County. The entire site is currently owned by the Grants Pass Irrigation District, but the former Savage Rapids County Park has historically been leased to Jackson County for a recreation site, which included a boat ramp, restrooms and day use amenities. With the dam removal, this park was closed to the public and the GPID land is now being leased by the Freshwater Trust, a conservation non-profit based in Portland. In 2010 the Freshwater Trust submitted a proposal for riparian restoration, which was implemented in 2016. The restoration project, which is largely occurring on the western half of the site due to the eastern half's rocky subbase, has served to stabilize stream banks from erosion post-dam removal, as well as create shadier shoreline conditions to regulate water temperature for anadromous fish habitat. The westernmost part of the site is used by GPID for an irrigation pumping facility that replaced the irrigation capabilities of Savage Rapids Dam. A small pumping platform takes water from the Rogue River and is pumped through canals and pipelines into various Josephine County agricultural lands. The ruins of Savage Rapids Dam stand alongside this new facility's infrastructure (Figure 4.9).

HYDROLOGY AND GEOLOGY

The mainstem of the Rogue River has its headwaters at a spring near former Mount Mazama, now Crater Lake, called Boundary Springs. The river descends into the Rogue River Valley from these higher elevations into a flatter, more gradually terraced landscape. At some portions of the river, dramatic canyons are carved through basaltic rock. At the Savage Rapids site, a gently sloped solid basaltic riverbank is makes up the western portion of the site near the dam ruins. Savage Creek also has its outfall at the eastern edge of the site. After passing through the former dam site, the Rogue River winds its way across the southwestern corner of Oregon before emptying into the Pacific Ocean at the town of Gold Beach.

SOILS

Soils located along the Rogue River terracing in the region and on the site are classified as Camas-Newberg-Evans complex. This soil provides ideal habitat for riparian species. The soil that is located upriver from the former Savage Rapids Dam has an eroded bank from the high water levels of the former reservoir receding.

CLIMATE

The climate in this region typically has mild, damp winters that range on average in temperature from 32 to 55 degrees Fahrenheit, with hot, dry summers that range on average in temperature from 55 to 85 degrees Fahrenheit. Winters have an annual rainfall of 30 inches,

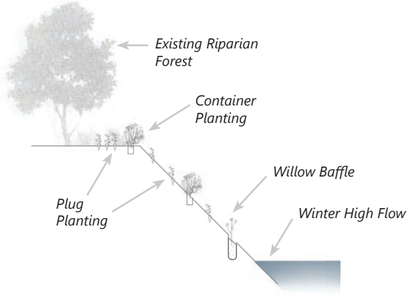


***Figure 4.8**: Willow Baffle Riparian Restoration Planting used by the Freshwater Trust at the banks of the former Savage Rapids County Park (not to scale), based on National Center for Conservation Science and Policy's 2010 assessment and recommendations*

with 80% of the rainfall occurring between October and April (Connolly, 1994).

VEGETATION

The parts of the Middle Rogue that have more broad, gradual terracing are dominated by oak woodlands and savanna species like Pacific madrone and manzanita. Some of these woodlands also contain mixed conifer species like ponderosa pine, Douglas-fir and broadleaf deciduous trees like big leaf maple and black cottonwood. North-facing slopes along the Rogue are typically dominated by conifers whereas south facing slopes have more drought-tolerant, oak savanna communities. The lower terraces

***Figure 4.9:** Savage Rapids Dam Site Infrastructure and Habitat Zones*

near the river contain dense riparian vegetation like willow and cottonwood, which is what we see at the Savage Rapids Dam site, especially at the former county park recreation site (Figure 4.9).

A 2010 vegetation assessment conducted by the National Center for Conservation Science and Policy showed a mix of native riparian species recolonizing the riverbank after dam removal, as well as several invasive plant species. Some key species in the upper riparian zone include Oregon white oak, California black oak, white alder and big leaf maple. In the lower riparian terrace of the newly exposed gravel and riverbank, species being restored include white alder, willow and cottonwood by planting willow baffles and rows of cottonwoods (Figure 4.8). The Freshwater Trust's restoration project combines planting natives that stabilize the river terrace's soils with the removal, maintenance and monitoring of invasive species. Invasive species removal techniques include mastication, hand pulling and spot herbicide application.

ANIMALS

With the dam removal narrative at the forefront of this site's history, anadromous fish species habitats are important to consider at Savage Rapids Dam and at the outfall of Savage Creek (see Figure 5.9). The most sensitive fish species include the Coho Salmon, Coastal Cutthroat Trout, Steelhead, Rainbow Trout and Redband Trout. Other strategy species that the Oregon Conservation Strategy lists for this ecoregion include amphibians, birds, reptiles and small mammals. Amphibians include the Clouded Salamander, Coastal Tailed Frog, Del Norte Salamander, Foothill Yellow-legged Frog and the Southern Torrent Salamander. Birds include the Common Nighthawk, Flammulated Owl, Great Gray Owl, Lewis's Woodpecker, Marbled Murrelet, Northern Spotted Owl, Purple Martin, White-headed Woodpecker and the Yellow-breasted Chat. Reptiles include the California Mountain Kingsnake and the Western Pond Turtle. Small mammals include the American Marten, California Myotis, Fisher, Fringed Myotis, Hoary Bat, Red Tree Vole, Silver-Haired Bat and Townsend's Big-eared Bat (Oregon Conservation Strategy, 2021).

URBAN CONTEXT

The closest city to Savage Rapids Dam is Grants Pass, with a population of 38,502. It is located six miles from the town center. The smaller town of Rogue River is located just 3.8 miles upstream and has a population of 2,742. Further upstream is the small town of Gold Hill, located 12 miles away, with a population of 1,300. Medford, the largest city in the Rogue Valley, is 24 miles away and has a population of 84,550 (Figure 4.10).

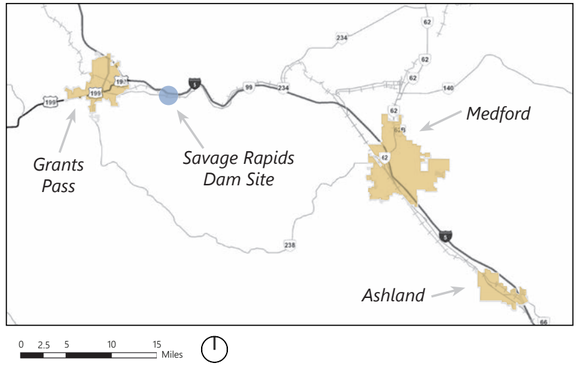


***Figure 4.10**: Urban and Transportation Context of Savage Rapids Dam*

RECREATIONAL OPPORTUNITIES

With the Rogue River at the center of outdoor recreation in this region, it is safe to say that each of these towns benefits economically from the recreation opportunities within their vicinity. Recreation activities along this section of the Rogue River include fishing, rafting, drift boating, kayaking, canoeing, hiking, hobbyist gold mining and wildlife viewing. Fishing lodges and motels have historically existed along this stretch of the Rogue, especially the Weasku Inn, which has been next to Savage Rapids Dam since 1924. Savage Rapids Dam is still in an ideal location to take advantage of the growing interest in outdoor recreation on the Rogue River, especially now that fishing and boating have become enhanced by dam removal. A 2012 online survey put out by Jackson County Parks in partnership with Oregon Department of Fish and Wildlife and Oregon State Parks collected data about the public's perception of river access on the Rogue River as well as the current recreational users. This survey showed that most Rogue River boaters on this stretch of river use drift boats and rafts far more than motorized boats (Jackson County Parks, 2013). The top three requested riverside amenities include: a need for sites to put in and take out non-motorized boats, ability to access hiking trails along the river and the availability of restrooms (Jackson County Parks, 2013). The top problem that people said they encounter on the Rogue River is a lack of sites to access the river (Jackson County Parks, 2013).

TRANSPORTATION

Urban and rural development in this area is connected by two major arteries, Interstate 5 and US 99. A freight rail line runs along the Rogue River on the north bank, which historically ran the Shasta Route on the Southern Pacific passenger train (Figure 4.10).

4.6 SAVAGE RAPIDS DAM SITE HISTORIC AERIAL ANALYSIS

With Savage Rapids Dam built in 1921, the landscape shown in Figure 4.11 has spent over 30 years adjusting to new water levels at the dam's reservoir. The area that would soon become Savage Rapids County Park appears mostly unvegetated and especially flooded at the outfall of Savage Creek. While Interstate 5 is not yet built, the railroad that carried Southern Pacific passenger trains starting in 1887 is visible along the north bank of the Rogue River. U.S. Highway 99, which served as the main route for crossing the state before I-5, is located along the southern bank. Fishing docks are seen downstream from the dam in front of the Weasku Inn fishing lodge, where salmon were known to linger in front of the dam due to the dam's poor fish passage infrastructure.

By 1976, the construction of Interstate 5 in 1957 made Highway 99 less traveled. In Figure 4.12, the lanes of I-5 are visible north of the river. By this time, it is clear that a swimming beach was developed at the Savage Rapids County Park site, as well as boat access and parking. To the west of the beach, a mature stand of cottonwoods has been grown in the park area, giving shade to picnic areas. By this time, the park had facilities for day use and overnight camping. Compared to the 1952 aerial, several motels and private residences began to surround the park area, as it was a popular recreation location. It is notable that with the damming of the Rogue that the reservoir's shoreline comes all the way up to the edge of Highway 99.

By 2001, the trees planted at Savage Rapids County park continued to mature alongside the swimming area and parking lot, shown in Figure 4.13. In this image it is possible to see where the water level drops off significantly just off the shore of the park. This resembles the river's natural shoreline, pre-dam, and it is apparent that the

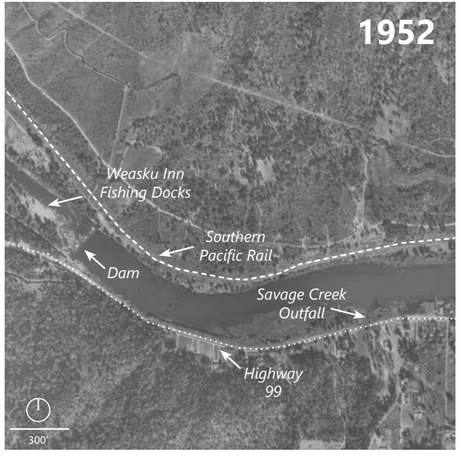


***Figure 4.11**: 1952 Aerial Photo of Savage Rapids Dam, from University of Oregon Library*

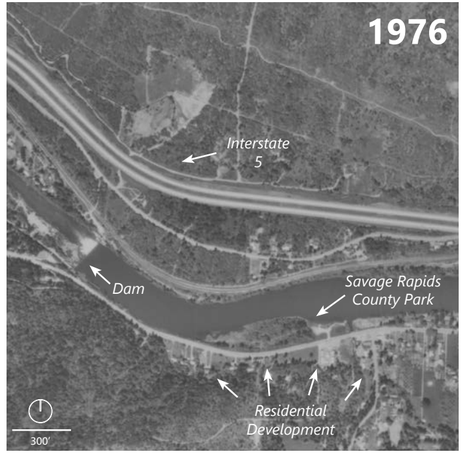


***Figure 4.12**: 1976 Aerial Photo of Savage Rapids Dam, from University of Oregon Library*

***Figure 4.13**: 2001 Aerial Photo of Savage Rapids Dam, from University of Oregon Library*

***Figure 4.14**: 2021 Aerial Photo of Savage Rapids Dam, from University of Oregon Library*

reservoir's high water line has eroded the soil in these areas, which would naturally be covered in riparian vegetation. While difficult to make out from this scale, the park's boat ramp went directly into the flooded outfall of Savage Creek, which certainly impacted the anadromous fish habitat of the creek, for any fish that made it past the dam. The lack of buffer between the parking area and the river also would have allowed untreated runoff directly into the Rogue and Savage Creek.

The dam was removed in 2009 and GPID's new irrigation pump facility is visible west of the dam ruins in Figure 4.14.There is now a very different landscape than what existed pre-removal. The dotted white outline shows the reservoir's former shoreline and we see the amount of riverbank that has been exposed and replanted in restoration or by volunteer recolonization of the riparian species, at times in perfect lines where the shoreline used to be. A staging area used for equipment during dam removal shows some compaction to the west of the parking lot, where leftover piles of rock and rubble exist. Savage Creek's outfall has re-vegetated, with the boat ramp remaining and leading to nowhere. The motel across the street has fallen into disrepair.

4.7 SAVAGE RAPIDS DAM SITE HISTORIC TRACES INVENTORY

Through intensive site background research that guided multiple site visits, an inventory of historic traces was assembled, which is mapped out in Figure 4.18. Each trace represents part of the site's historical narrative, so in order to include the whole narrative in the site design, each trace must be understood. The following list briefly describes the historical significance of each trace and photographs of each traces' existing conditions can be seen in Figure 4.20, with each number corresponding to the listed traces. Traces 14, 15 and 16 do not have photo documentation because they are not visible at the site, although we know that these narrative elements are important to site history through background research.

1. Fish Ladder Remnant

Several small concrete parts of the lower south bank fish ladder remain embedded in the native rock, which supported the entire fish ladder structure before dam removal. This fish ladder was especially difficult for anadromous fish to navigate, which is one of the main reasons the dam was removed. The remnants in relation to the entire former fish ladder plan can be seen in Figure 4.19.

2. Fish Ladder Viewing Area

This roadside parking and viewing area was once used by motorists on Highway 99 to view the dam and the fish jumping up the concrete fish ladder. Safety railings and the foundation of the viewing platform remain, as well as a large upper fish ladder basin directly in front of the platform.

3. South Bank Abutment Ruin

The long concrete abutment on the south side supported the dam's structure and spillway when the dam was intact. The dam removal cleared the spillway structure up to the edge of the south abutment's stepped buttress wall, giving the Rogue plenty of space to flow freely. Today it is surrounded by riparian vegetation (compare Figures 4.16 and 4.17), showing the resilience of this riparian site after dam removal.

4. Floodgate Hinges

All that remains of the dam's lateral floodgates are the rusted metal hinges that fastened the gates to the dam. Three of them remain (see Figures 4.18 and 4.19) on the buttresses supporting the abutment. The original functioning floodgates can be seen in Figure 4.15.

5. Stepped Buttress Wall

The stepped buttress on the west side of the abutment historically provided access for dam maintenance near the center of the dam (Figure 4.11). It now supports the edge of the abutment closest to the river.

***Figure 4.15**: Savage Rapids Dam circa 2006, from: Bureau of Reclamation, "Finding of No Significant Impact, Fish Passage Improvements, Savage Rapids Dam, Grants Pass Project, Oregon," 2006*

6. North Bank Abutment Ruin

The abutment remnant on the north bank shows a vivid section cut of the dam where it was bisected during dam removal, making the view of this structure an important visual element in establishing the dam removal narrative at this part of the site.

7. Concrete Encased Wood Stave Pipe Remnant

The historic wooden stave pipe encased in concrete is a remnant from when the dam was used to pipe irrigation water upstream. It is now decommissioned and terminates at a weathered opening exposing the wood-lined pipe from the 1920s. This is the only artifact on the site that

***Figure 4.16**: Savage Rapids Dam After Removal in 2009 from: https://1.bp.blogspot.com/-Am1waD_2yIM/VDrferjclml/AAAAAAAAn1g/iG42yolT2KU/s1600/800px-Savage_rapids_dam_remains.jpg. Accessed May 6, 2021*

has been determined to be eligible by the State Historic Preservation Office in 2005 (Bureau of Reclamation, 2006).

8. Cofferdam Footings from Dam Construction

These concrete pieces are remnants from one of the cofferdams built upstream of Savage Rapids Dam during one of its early periods of maintenance or construction (Wier, 2021). They are scattered throughout the site.

9. Cottonwood Allée

An allée of mature cottonwood trees dates to when this part of the site was used as a day use area at Savage

***Figure 4.17**: Revegetated Savage Rapids Dam Site, photograph by author, October 2020*

Rapids County Park. Alongside these older cottonwoods, younger stands of cottonwoods were planted during riparian restoration after dam removal.

10. Former County Park Parking Lot

The original parking lot at the former park site remains and is roughly 35,000 square feet. It used to support both day and overnight use at the park, which is why it is so large. Large parts of the pavement are cracked, especially on the western half where it was used for dam removal equipment staging.

11. County Park Boat Ramp

When the dam was removed, the water line from the reservoir moved away from the former boat ramp and left the boat ramp far away from the new water line. The concrete dock platform remains. The ramp tilts downhill, pointing perpendicularly to Savage Creek's outfall.

12. Reservoir Shoreline Erosion Lines

Looking across the Rogue from the site, erosion lines are apparent on the north bank. These lines are visible underfoot at the site on the South Bank as well if one looks closely, but they have been mostly covered in restoration planting.

13. Freshwater Trust Riparian Restoration

The successful riparian restoration project at this site is an important part of the river recovery narrative. Shading of the riverbank helps control the water temperature for spawning fish, which is why the willow and cottonwood baffle is used. It is evident by the orderly planted rows.

14. Colonial Era Gold Mining of River Rock *(Invisible Trace)*

Early Euro-American colonists originally came to the Rogue Valley for its gold prospects. The river rock along this part of the Rogue was picked and mined for decades, impacting the riparian ecosystems that indigenous peoples relied on for food sources. While these miners are gone, these very rocks were once likely impacted by mining.

1. Fish Ladder Remnant
2. Fish Ladder Viewing Area
3. South Bank Abutment Ruin
4. Floodgate Hinges
5. Stepped Buttress Wall
6. North Bank Abutment Ruin
7. Concrete Encased Wood Stave Pipe
8. Cofferdam Footings from Dam Construction
9. Cottonwood Allée
10. Former County Park Parking Lot
11. County Park Boat Ramp
12. Reservoir Shoreline Erosion Lines
13. Freshwater Trust Riparian Restoration
14. Colonial-Era Gold Mining of River Rock
15. Salmon Habitat Recovery
16. Takelma Fishing Hole and Rogue River War Detainment Area

***Figure 4.18**: Historic Traces Inventory of former Savage Rapids Dam and former Savage Rapids County Park*

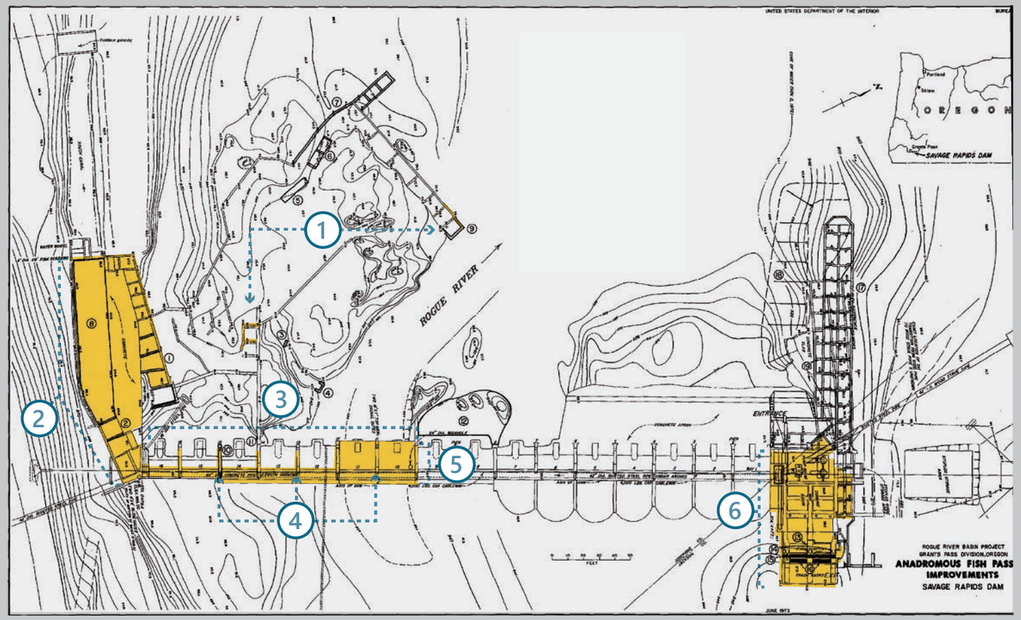


***Figure 4.19**: Historic Remnants of Savage Rapids Dam Structure Post-Dam Removal, shown in yellow over the Federal Bureau of Reclamation's 1974 construction plan for anadromous fish passage improvements. Numbers correspond to the numbered traces in Figure 4.18.*

Figure 4.20: *Corresponding Photographs to the Historic Traces Inventory of former Savage Rapids Dam and former Savage Rapids County Park. Circled numbers identify each trace as noted on Figure 4.18. Photographs by author, February and April 2021.*

Figure 4.20 continued: *Corresponding Photographs to the Historic Traces Inventory of former Savage Rapids Dam and former Savage Rapids County Park. Circled numbers identify each trace as noted on Figure 4.18. Photographs by author, February and April 2021.*

15. Salmon Habitat Recovery *(Invisible Trace)*

With the dam removal and the riparian restoration at the site being for the benefit of anadromous fish habitat restoration, it is important to include this element of the narrative. As was mentioned in the Environmental History, when the dam was removed and the sediment behind the dam washed away, the former reservoir's gravelly bottom quickly brought spawning salmon to the site as evidenced by salmon redds in the gravel, observed by the monitoring ecologists.

16. Takelma Fishing Hole and Rogue River War Detainment Area *(Invisible Trace)*

From David West's oral history, we know that this site was once an important fishing area for the Takelma tribe and was later used by white colonists as a detainment area for a group of Takelma people during the Rogue River War. This project sees this painful history as an important historic trace that should not be left out of communicating the historical narrative of the site, especially since it shows the brutal settler colonization of the Rogue Valley that led to the enormous disruption of the Rogue River ecosystem due to dam construction.

CHAPTER 5:
Design Intervention Framework

5.1 INTRODUCTION

As shown in Figure 5.1, the Design Intervention Framework's goal is to include each of the **values** derived from the literature review (aesthetic, cultural, ecological, economic) when designing each trace, guided by the demonstrated **design strategies** examined in case studies (Figure 3.16). All of the case studies relied heavily on a close reading of the historic traces found at their sites to guide design interventions. An additional component to be added to this design framework is a process for evaluating the existing traces found at a site to determine where and how these types of design strategies should take place, called **intervention tactics** (Figures 5.2-5.5).

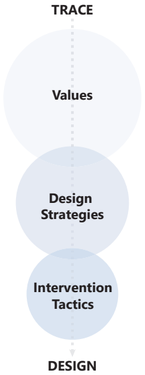


***Figure 5.1**: Framework Building Process, applied to historic traces through design*

5.2 TRACES, STRATEGIES AND TACTICS

This chapter outlines a procedure for designing interventions for individual historic objects at a post-industrial site, and then making the interventions compatible with an overall design concept. Using this framework can aid in explaining the design process to clients at post-industrial sites. To explain the process, some key terms need to be defined before proceeding:

Traces: An element of site history that expresses a moment in time related to a site's historical narrative. A trace can be a visible artifact found in the site's landscape or it can be an invisible memory documented by oral or written history. While the literature review focuses on the term "ruins," this project uses "traces" because it does not imply deterioration or decline of a history, but merely a neutral change over time.

Trace Visibility: The degree to which the narrative element for a part of site history is visible at the site. This is similar to the term "integrity" used in preservation, but this project aims to include traces that lack integrity to tell a more complete narrative. For example, at a dam removal site the dam's remnants are highly visible, while the salmon restoration is not, although we know it occurred at the site based on research and can express it through design.

Design Strategies: : General design guidelines derived from case studies that allow traces to support aesthetic, cultural, ecological and economic values (Figure 3.16).

Intervention Tactics: A spectrum of intervention that defines the level of modification of a given trace (Figures 5.2-5.5).

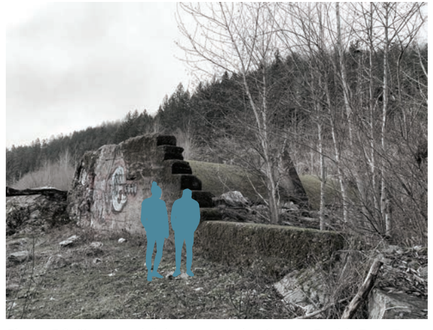


Figure 5.2: *"Leave-as is," demonstrated at Savage Rapids Dam Trace #5, the Stepped Buttress Wall*

TACTIC #1: LEAVE AS-IS

This tactic has the designer leave the trace untouched, if the existing condition of the trace itself can communicate the desired narrative element. An example of this tactic from the case studies is the vegetation at Mill Ruins Park (Figure 3.10), which tells the story of resilient urban plant species overtaking the infrastructure.

Figure 5.3: *"Modify and Remain in Place," demonstrated at Savage Rapids Dam Trace #5, the Stepped Buttress Wall*

TACTIC #2: MODIFY AND REMAIN IN PLACE

In this case, the trace's structural quality is considered for how it can support programming that is tied to communicating the site narrative to visitors. An example of this tactic from the case studies is the walkway built over the remnant railway pilings that transported materials at Duisberg Nord (Figure 3.12), because it helps visitors explore the site by guiding them, while they also experience the artifact in situ, which alludes to its original industrial use.

Figure 5.4: *"Modify and Relocate," demonstrated at Savage Rapids Dam Trace #5, the Stepped Buttress Wall*

TACTIC #3: MODIFY AND RELOCATE

This tactic further explores the structural or material quality of a trace by modifying it and using it elsewhere on the site to support the site design. This may be a trace that is plentiful on the site and can be applied for a new use, like the crushed rubble used to unify the design and repurpose materials at Dry Dock No. 1 (Figure 3.3). For this tactic, the location of the trace is less significant than the act of repurposing it.

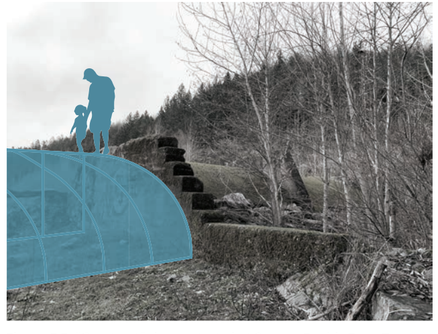


Figure 5.5: *"Construct," demonstrated at Savage Rapids Dam Trace #5, the Stepped Buttress Wall*

TACTIC #4: CONSTRUCT

Because some traces are less visible than others, design can add more context to the trace's narrative value by constructing a more complete physical representation for visitors to interact with. This tactic is used at Ballast Point Park, when round concrete planters in the shape of the now removed oil tanks are installed on the site to remind visitors of their former presence and impact on the site's history (Figure 3.7).

5.3 DESIGN INTERVENTION FRAMEWORK

Step 1: Perform historical research of the post-industrial site and conduct a site inventory to record all remnants of site history, which are referred to in this research as "traces."

Step 2: The Intervention Tactics introduced in 5.2 were combined into a decision-making matrix with the Design Strategies gleaned from the Case Studies and Literature Review. To use this matrix, list each trace for the site out in its own individual Design Intervention matrix (Figure 4.6 shows a blank example of the matrix) and fill in dots on matrix based on how the different Design Strategies (Figure 3.16) fit best into each Intervention Tactic. This decision-making is based on how the designer sees the trace's role in communicating site narrative. To demonstrate this procedure, we will use the trace from Figures 5.2-5.5, the Stepped Buttress Wall from former Savage Rapids Dam using the matrix in Figure 5.6.

For the "Leave As-Is" tactic, the four Design Strategies in Figure 3.16 were considered. The aesthetic value of leaving the structure as-is was determined because of the moss that has taken over the concrete surface, showing the age of the trace. Its weathered appearance as a concrete ruin of the dam also communicates the site's narrative of dam obsolescence and dam removal. Both reasons led to a dot being filled in for "Aesthetic" under "Leave As-Is." As for "Cultural," "Ecological" and "Economic," the leaving it as-is tactic did not fit with any of these strategies.

For the "Modify and Remain in Place" tactic, all four strategies seemed applicable. Aesthetically, because modifying the wall in place to be climbed on with contemporary metal fixtures creates a contrast with the old concrete of the dam. It also helps create a new view of the other dam ruins and site. Under "Cultural," this trace can be used to guide circulation and exploration because the steps on the buttresses are historically meant to be used for ascending this part of the dam to perform maintenance, allowing people to engage with the historic cultural use of the artifact. It meets the criteria for "Ecological" because it re-purposes a remnant leftover from demolition for a designed feature in the landscape. Its "Economic" value comes from the role it will play as a recreational element on the trail to engage visitors, which helps support the local tourism economy that is built around river-based recreation. The dots that were filled in for this tactic are shown in Figure 5.7.

The tactic of "Modify and Relocate" did not receive any dots because the trace's significance comes from its location as a structural element in the dam that should be preserved. The tactic of "Construct" did not apply either, because the main context that could be constructed around this trace would be to rebuild the section of dam that used to make up its other side, and this is a narrative that is based in dam removal, so rebuilding the dam seems illogical.

Based on which tactic gets the most dots, the designer is then guided to make a more site-specific design recommendation for the historic trace, also informed by site history research and programmatic needs. This is intentionally open-ended, allowing for the creativity of the designer to also guide interventions.

Step 3: If the designer's goal is to maximize the number of traces that can be incorporated into a design concept to express a site's history, the matrix can be used to aid in selecting a design concept. This can be done by plugging each trace and its chosen intervention from the matrix into a schematic design concept to see if it is compatible with the spatial and phenomenological experience envisioned for the concept. This procedure will be demonstrated in more detail in the Chapter 6.2, using a total of sixteen traces at one post-industrial site, Savage Rapids Dam.

The Outcome: The designer is left with a schematic site design that considers how to incorporate all of the elements of a post-industrial site's history at an individual, artifact-scale level, while also informing the overall design concept that thoughtfully connects each historic trace.

INTERVENTION TACTICS

DESIGN STRATEGIES	Trace Name	Leave as-is	Modify + remain in place	Modify + relocate	Construct
	Aesthetic				
	Cultural				
	Ecological				
	Economic				

Figure 5.6: *Blank Design Intervention Framework Matrix, ready to be used to aid in trace design*

INTERVENTION TACTICS

DESIGN STRATEGIES	**Stepped Buttress Wall**	Leave as-is	Modify + remain in place	Modify + relocate	Construct
	Aesthetic	●	●		
	Cultural		●		
	Ecological		●		
	Economic		●		

Figure 5.7: *Design Intervention Framework Matrix, filled out for Savage Rapids Dam Trace #5, the Stepped Buttress Wall*

CHAPTER 6:
Site Design

6.1 DESIGN GOALS

Similar to other post-industrial sites, traces at dam removal sites tell a story of the site before, during and after infrastructure severely altered the landscape. At Savage Rapids Dam, acknowledging this narrative of landscape change is a unique design opportunity that cannot be solved through restoration or preservation alone, and can also fill a programmatic gap for the recreational landscape that is associated with the dam's reservoir. This requires a delicate and detailed consideration of each trace to build the narrative, which is why the Design Intervention Framework matrix is useful for a project of this kind.

The following design goals for Savage Rapids Dam were compiled from research into the site's complex history, an understanding of the preservation and restoration opportunities that dam removal sites present and the recreational trends of the Rogue River area.

Goal 1: To honor the visible and invisible cultural histories of impact and recovery that have unfolded at this site over time
Goal 2: To enhance recreational opportunities created by dam removal and fill the outdoor recreation void left by the closing of Savage Rapids County Park through a discovery-based exploration of dam remnants along hiking trails, new fishing and boating access on a now undammed stream with enhanced fishery health
Goal 3: To educate the public about post-dam removal riparian plant restoration and the cultural significance of the plants and animals that it benefits

Figure 6.1: *Design Goals for Post-Dam Removal Sites*

6.2 DESIGNING WITH THE FRAMEWORK

The design process followed the Design Intervention Framework that was outlined in the previous chapter. This began with a thorough inventory of the site (Figure 4.11) to understand the traces that are visible on the site or those that are important to express through design so they are not lost. Each trace was considered for design using the matrix (Figure 5.6), with the next pages showing the completed matrix for traces 1-16 (Figure 6.2), with discussion of this process following. Then three overall design concepts were developed for the site that would have the potential to unify the traces into a cohesive spatial experience that also communicates the site's post-dam narrative. A description of the three design concepts follows, as well as a discussion of how the matrix was used to test each concept's ability to communicate the narrative.

① Fish Ladder Remnant

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●			●
Cultural				●
Ecological				●
Economic				●

② Fish Ladder Viewpoint

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural	●	●		
Ecological		●		
Economic		●		

③ South Bank Abutment Ruin

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural		●		
Ecological		●		
Economic		●		

④ Floodgate Hinges

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic		●		
Cultural		●		
Ecological		●		
Economic		●		

⑤ Stepped Buttress Wall

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural		●		
Ecological		●		
Economic		●		

⑥ North Bank Abutment Ruin

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●			
Cultural	●			
Ecological	●			
Economic	●			

⑦ Concrete Stave Pipe Remnant

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural	●	●		
Ecological		●		
Economic		●		

⑧ Old Cofferdam Footings

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●	●	
Cultural		●	●	
Ecological			●	
Economic			●	

⑨ Cottonwood Allée

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural	●	●		
Ecological	●			
Economic	●			

⑩ Former Parking Lot

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic			●	
Cultural		●	●	
Ecological			●	
Economic		●	●	

⑪ County Park Boat Ramp

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural		●		
Ecological		●		
Economic		●		

⑫ Reservoir Shoreline Erosion Line

	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural		●		
Ecological		●		
Economic		●		

Figure 6.2: *Design Intervention Matrix, filled out for sixteen different traces at Savage Rapids Dam. The blue dots indicate which Design Strategy aligned best with each Intervention Tactic, to decide which tactic to choose to move forward in design, which is highlighted in light blue.*

⑬

Riparian Restoration Project	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●	●		
Cultural	●	●		
Ecological	●			
Economic	●	●		

⑭

Gold-Mined Rock	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic	●			●
Cultural	●			●
Ecological				●
Economic				●

⑮

Salmon Habitat Recovery	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic				●
Cultural				●
Ecological				●
Economic				●

⑯

Takelma Cultural Landscape	Leave as-is	Modify + remain in place	Modify + relocate	Construct
Aesthetic				●
Cultural				●
Ecological				●
Economic				

Figure 6.2 continued: *Design Intervention Matrix, filled out for sixteen different traces at Savage Rapids Dam. The blue dots indicate which Design Strategy aligned best with each Intervention Tactic, to decide which tactic to choose to move forward in design, which is highlighted in light blue.*

TRACE MATRIX RESULTS

Some traces had more clear alignments with the Design Strategies and Intervention Tactics than others. For example, the Leave As-Is Tactic often supported the Aesthetic Design Strategies because many physical remnants hold their aesthetic value in their found appearance, so traces like the dam remnants (traces 2, 3, 4 and 5) could have been left As-Is to achieve Aesthetic Design Strategies. However, the design goal of providing recreational opportunities through exploration of the remnants required these traces to use the Modify and Remain in Place Tactic to support Design Strategies for visitor use, which always added more dots to that Tactic's column. The two traces that used the Tactic of Modify and Relocate (8 and 10) were chosen because of their material abundance that could be repurposed in new ways to support Design Strategies. The traces that used the Construct Tactic were the traces with the least amount of physical remnants, which allowed a representational construction to support each of the Design Strategies. If there were any traces with unclear results, ultimately the Strategies and Tactics chosen came down to how a visitor would best interpret history through that trace, according to the designer.

The site's traces and these tables reveal that the dominant narrative at this site is the dam infrastructure and its removal. However, this design is about connecting the dam infrastructure narrative to the less visible cultural narratives that resulted from dam construction and removal. This began with the decades of settlement that led up to demand for the dam's construction. This dam was then built to irrigate the farmland of Euro-American settlers who colonized the Rogue Valley, and while the dam itself left marks on the land, the displacement of indigenous peoples at this site only lives on through oral and written histories, which can be interpreted through design under consultation and guidance of descendents of the Takelma people, if they consent to this history being commemorated.

Another less visible narrative is that once the dam was created, people found new uses for the site through recreation at the dam's reservoir at Savage Rapids Park. This park left behind several traces that also allow it to be remembered through design that engages with the historic traces of Savage Rapids Dam. The design challange is combining all of these points in time into a unifying concept, which the Design Framework procedure will help with next.

6.3 DESIGN CONCEPTS AND SELECTION

Until now the Design Intervention Framework has been used to make design decisions for small-scale interventions of each trace. Next the framework will be tested on a larger scale, as an aid in selecting a design concept by seeing how well a single concept can accommodate and unify the sixteen traces, both spatially and through a compelling narrative. The following three concepts that were tested came out of the site research and analysis done in Chapter 4 and sketching done during site visits.

DESIGN CONCEPT #1: RIVER RECOVERY

Figure 6.3: *Design concept #1 parti diagram*

Inspired by the natural form of a dechannelized meandering river, this concept bases path circulation and site exploration on the configuration of a river's natural course as it traverses the landscape, unobstructed. The parti diagram in Figure 6.3 shows that beginning at the dam remnant site, the circulation is rigid, singular, and angular, much like a channelized stream that has been engineered by humans, or a stream that has its flow controlled by damming. As this singular, rigid axis path moves upstream toward the plant restoration project site, its path unfurls into multiple channels of pathways with more naturalistic curves and "eddies" that pause at various programmatic elements dedicated to recreation and experiencing the historic traces on the site. Metaphorically, this concept represents the narrative of recovery that this site is undergoing after dam removal, because after this engineered element that altered the river's shape and speed was removed, the river has been adjusting to its natural pre-dam shape at the former dam reservoir. This transformation narrative is told through the spatial layout of the design concept by showing that the further one walks from the dam ruins, the more the paths meander through the increasing biodiversity of the native vegetation restoration, just as the site will slowly recover over time. While the site will never be the same as it was before the dam was built and the ecology of the region was altered by Euro-American settlement, the effort to recover what was lost ecologically through dam removal is put on display through this concept.

DESIGN CONCEPT #2: SHIFTING SHORELINES

Figure 6.4: *Design concept #2 parti diagram*

Focused on the impacts that the dammed river's reservoir had on the landscape, this concept uses the former shoreline of the reservoir and erosion lines to guide circulation at the site, shown by the lines in the concept sketch in Figure 6.4. The circulation follows these linear traces left on the landscape and emphasizes their spatial quality through planting, which is also used to frame views of the stream bank erosion visible on the north bank of the river. The views and trail circulation take the visitor through a series of spatial experiences that trace the reservoir and dam's former presence on the site in contrast to what exists there now in the form of a riparian restoration project and dam removal site.

DESIGN CONCEPT #3: DAM RUIN VIEWS REVEALED

Figure 6.5: *Design concept #3 parti diagram*

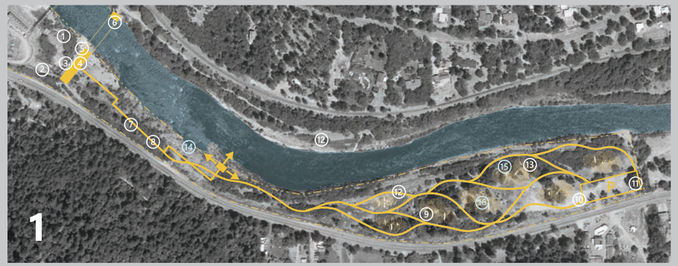
The rectilinear form of the dam that previously cut perpendicularly across the Rogue River is replicated across the site to emphasize the monumental presence that the dam had in the landscape prior to removal. This concept is expressed through columns of riparian planting that block views of the dam ruins unless the visitor is walking parallel to the river, as if they are the river's stream meeting the dam. This is sketched out in Figure 6.5. When the path meets these openings at the perpendicular meeting of the two directions, views of the dam ruins are revealed, to show where the Rogue flows freely through the dam abutment now that it is mostly removed. This concept creates a phenomenological experience to repeatedly emphasize the obstruction that dams create within rivers, which can be translated to the experience of the anadromous fish that were impacted by dams like Savage Rapids.

DESIGN CONCEPT SELECTION

By using the Design Intervention Framework outlined in Chapter 4, one concept can be selected based on certain objectives for achieving design goals. In this case, maximizing the inclusiveness of the historic narrative, which supports Goal 1, was tested for each concept.

Objective Supporting Design Goals 1, 2 and 3:
Maximize visitor understanding of the landscape's narrative by including as many traces as possible in a design

For the three concepts, each trace and its chosen intervention from the matrix was placed in each design concept to see if it would be compatible with the spatial and phenomenological experience envisioned for each concept (Figure 6.6). If a trace could be accommodated, its number is outlined in a white circle. If not, it is outlined in a dark blue circle. An answer of "yes" or "no" was associated with each trace intervention, with a dot representing "yes" (Figure 6.7). The design concept that was able to accommodate the 100% of the proposed trace interventions was Concept 1: River Recovery because its circulation layout matched up with the trace locations from dam ruins to riparian restoration. Concept 2: Shoreline Traces, only accommodated 69% of the trace interventions due to its emphasis on existing conditions, which didn't



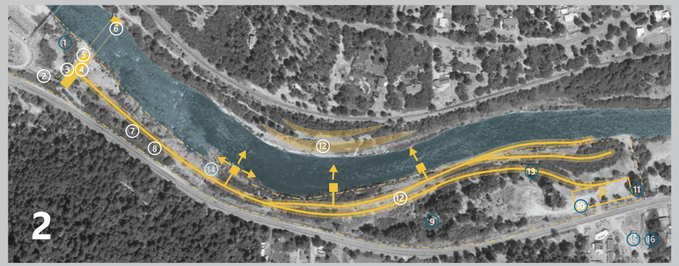


Figure 6.6: *Design concepts #1, #2, #3 with Traces Projected. If the trace doesn't fit into the concept's spatial layout, it is represented by a dark blue circle.*

CONCEPT

TRACE	1	2	3
1	●		
2	●	●	●
3	●	●	●
4	●	●	●
5	●	●	
6	●	●	●
7	●	●	●
8	●	●	●
9	●		
10	●		●
11	●		
12	●	●	
13	●		
14	●		
15	●		
16	●	●	

100%	69%	56%
(16/16)	(11/16)	(9/16)

Figure 6.7: *Table Showing which Concepts Accomodate the 16 Traces and their Interventions.*

allow much room for the less visible traces to come through. Concept 3: Dam Views, only accommodated 56% of the trace interventions, due to its sole focus on dam infrastructure. The rigid, rectilinear geometry also clashed with the site's scattered distribution of traces.

If we also use the more general values behind the framework: the aesthetic, cultural, ecological, and economic, we can also consider which concept matches up with all four values. Concepts 2 and 3 seem more closely tied to the aesthetic and cultural opportunities at this site, while Concept 1 can integrate the ecological change and recovery narrative that makes this site so compelling. All three concepts would be able to accommodate the regional recreational programming that supports the tourism economy, like a boat ramp and fishing area, but Concept 1's flexibility makes that programming for compatible with the exploration of the site's history.

Conclusion: If one of the main project goals is to incorporate as many traces as possible to wholly communicate the site's narrative while achieving the four main design strategies associated with designing at a post-industrial site, then Concept 1 should be employed to move forward with design for its flexibility and inclusivity.

6.4 SITE DESIGN

Once the River Recovery concept was selected using the Design Intervention Framework, and the Trace Intervention Tactics were determined for each of the traces, there was a general sense of what the interventions that integrated the traces into the overall concept would look like. Next, any additional programmatic elements that will help achieve the project goals needed to be considered in the site plan. These included combining the traces and their design interventions with the cultural, ecological and recreational needs for the site, all within the River Recovery concept with attention to Circulation, Planting, Views, Materials, and Programming.

CIRCULATION

Incorporating discovery into the circulation not only supports the recreational programming goals for the site to attract tourism, but it puts the site's historic remnants at the forefront of the experience at Savage Rapids Dam. This was an important point made by Chan (2009), as discussed in Chapter 2. The design of trail circulation was guided by two main goals: to incorporate the experience of discovery alongside the site's historic traces and to create a linear narrative sequence along the trail that tells a story of ecological disruption and recovery resulting from dam construction and removal. The following text describes the system of trail circulation as experienced moving from west to east along the site, to show how discovery and narrative have been built into the trail design.

Starting at the dam ruins, trail access is introduced through a path with rigid geometry that runs orthogonally

along the dam's axis. The concrete mass of the south abutment is accessed via steps, and for the more adventurous, a ladder that runs down the edge of one of the concrete buttresses. People can walk on top of the dam and imagine what it was like when hundreds of cubic feet per second of Rogue River water was hurling through the radial floodgates. Exploring the top of the dam abutment also offers a unique vantage point to view the north bank's abutment remnants and the Savage Rapids. After descending the abutment, visitors are confronted by the dimensions of the void left between the two abutments through dam removal, marked by a concrete slab that intersects the path (Figure 6.15). From here, they can discover the original remnants of the historically controversial fish ladder, which is partially reconstructed to provide a unique obstacle course experience that mimics the route that migrating fish had to swim up to pass through the dam (Figure 6.13). The circulation brings them back over the dam abutment where they can continue upstream to the rest of the park and trails.

The middle portion of the park is accessed via a raised boardwalk that runs parallel to the river and the concrete pipeline that was once used for transporting water from the irrigation dam. Visitors discover the pipeline at the boardwalk entrance, where it is partially excavated to show its form. The serpentine pipeline is hidden and revealed through excavation alongside the straight boardwalk (Figure 6.19). At the boardwalk's terminus, the weathered opening to the pipeline marks its ending signifying the obsolescent irrigation technology once used at the site (Figure 6.9). Discovery of this part of the site is encouraged through two trail options: a more adventurous rocky path that traverses steps built into the bare rock of the riverbed, or a more level, curving trail that stays upland. Along the bare rock, cofferdam remnants lead hikers to the river (Figure 6.20) to discover traces of the gold mining that brought settler colonialism to the region, revealed through subtle art installations in the rock (Figure 6.26).

The rocky trail and the upland trail meet up again as the riparian tree canopy thickens. This moment in the trail circulation marks a transition toward witnessing the post-dam removal ecological recovery that has occurred naturally over time and through riparian planting restoration done by the Freshwater Trust. The main trail leads visitors to discover the park's former use as Savage Rapids County Park when the dam's reservoir provided recreational water access for the people of Grants Pass. The trail passes through an allée of mature cottonwood trees original to the former park that grow across from a row of densely planted cottonwoods as part of the riparian restoration efforts implemented in 2016 (Figure 6.21). The circulation then leads visitors to view the restored wetland and framed views of the river, eventually leading back to the main park area. This is where the salmon life cycle is represented in the pavement of the trail leading to the fishing platform (Figure 6.27). Here people can look at views of the recovered dam reservoir area, which now provides healthy anadromous fish habitat at its gravelly bottom. The site's ethnobotanical history can be discovered along the trail where plant markers point out specific plants and their traditional uses. These native plants are also found nearby at the garden commemorating the Takelma detainment at the site during the Rogue River War .

The trails lead to the main parking area, which is where many people would begin the trail, moving toward the dam. For those that start the trail at this side of the park, the process of discovery will move in an opposite direction, where the riparian environment slowly transitions to a landscape dominated by the infrastructure of the dam, signifying the landscape change that occurred before and after dam construction and eventual removal. The design's overall concept is to mimic the recovery of a formerly engineered river as it returns to its natural morphology, and the trail circulation forms follow this, transitioning from the rigid, orthogonal circulation near the dam to a more organic and meandering trail system at the park area, while the site's narrative unfolds to follow a similar story.

PLANTING

Based on the design strategies found in the case studies, planting is an important tool for communicating a narrative of recovery at a post-industrial site because it shows that life can persist even after a landscape is severely altered by human infrastructure. This design's planting concept aims to amplify the spatial and narrative elements of the site's existing conditions as a site undergoing restoration and recovery, while also referencing narratives from the site's past to enhance visitor experience.

With the in-progress riparian planting restoration already occurring at the site, there was an opportunity to incorporate the restoration plan into the park's planting design. This means that much of the planting at former Savage Rapids County Park would remain intact, especially at the river's edge, while enhancing the park's programmatic needs. The willow baffle at the riverbank will remain, as will the cottonwood stands, unless they are cleared for a trail or view, or where the canopy is thinned at the picnic area (Figure 6.8). Specimens of other native shrubs that are used throughout the restoration project are displayed with labels along the trail (Figure 6.25) leading to the proposed Rogue River War commemoration garden, to show which plants have historically thrived here and have ethnobotanical value for local indigenous peoples.

On the western half of the site, near the dam, the Freshwater Trust's planting restoration thins out significantly due to the rocky ground at the river's edge. Some upland riparian species thrive at the upper terraces of the bank, like cottonwood and oak. Screening trees of these species are planted to hide and reveal views of the river and dam ruins along the boardwalk so that visitors can contemplate the pipeline infrastructure they are walking along and its relationship to the dam and the larger context of irrigating the Rogue Valley.

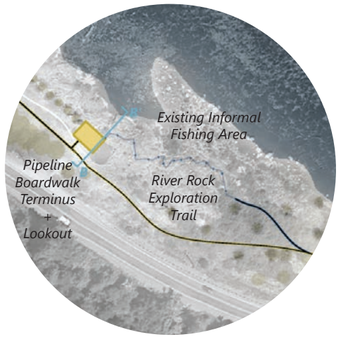
Screening trees are also planted along the stairway entrance to the dam site from the parking area and overlook. The purpose of this is to hide the dam ruins from view so that the sound of the river's rapids is the main sensory experience while descending into the site. The meadow that surrounds the east side of the dam ruins is planted with tall native grasses to mimic the flowing water that once pooled there when the dam was intact. Cottonwood and willow stands that have naturally grown around the dam ruins are left in place to again show the natural succession catalyzed by dam removal.

Figure 6.8: *Site Plan for Savage Rapids Site Design*

DAM RUIN AREA

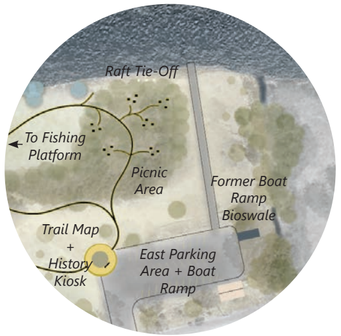
The west entrance to the park gives visitors an overlook view of the dam remnants, alongside a collection of historic postcard and dam removal images to enhance the interpretive kiosk at the trail's entrance. The trail descends to the dam for exploration of the remnants, or to the Pipeline Boardwalk to reach the east side of the park.

PIPELINE TERMINUS LOOKOUT



At the park's center is the rockiest part of the site, where the Pipeline Boardwalk and its lookout traverse the rock along the old irrigation pipeline. After the pipeline's end, the trail splits. For the more adventurous hikers there is a rocky adventure trail with steps installed at the steepest places leads to an informal fishing area. For other hikers, a more level trail stays upland.

DAY USE AMENITIES



The east entrance to the park has several day use amenities for recreational use of the river and the park. A raft tie-off area makes the park a picnic destination for boaters floating down the Rogue. Boaters can use the boat ramp to put in or take out here. Another interpretive kiosk greets hikers with the site's history before they encounter each trace on the hiking trails.

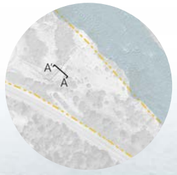


Figure 6.9: *Design Section A at the South Dam Abutment Access Point*

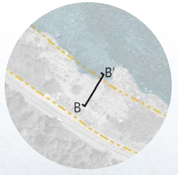


Figure 6.10: *Design Section B at the Pipeline Boardwalk Terminus Lookout, showing views of the river and north abutment dam remnant*

Figure 6.11: *Design Section C at Viewshed "e", showing a hiker observing the existing beaver den*

VIEWS

As seen in the case studies and the literature review, creating intentionally framed views throughout a landscape is an important tool for communicating a narrative. This design uses the framing of views along the trail to curate a spatial experience that emphasizes elements that symbolize different parts of the site's historical narrative. These will be discussed in three parts: views of the dam ruins, views of the dam's lasting effects on the landscape, and views of the river's recovery.

Views of the dam ruins present the remnants as cultural artifacts marking the Rogue River's settler-colonial agricultural history and the eventual obsolescence of the irrigation dam. The large concrete structures on either riverbank exemplify early 20th century concrete dam design, while the river-sized void between the north and south abutments signify the 2009 dam removal. Views of the dam are presented first at the roadside parking area with a viewing platform, where motorists historically pulled over to watch salmon jumping up the dam's treacherous fish ladder. Now the dam ruins are presented as framing the free-flowing river alongside the fish-friendly irrigation pumping infrastructure that replaced the irrigation dam. The dam's obsolescence is meant to be contemplated as one walks along the pipeline boardwalk and the dam ruins are hidden and revealed by vegetation (View a, Figure 6.8), ending at the weathered, empty opening of the historic irrigation pipeline (View b, Figure 6.8). As the trail moves further from the dam, several viewpoints bring visitors out to the river to see the dam ruins of the north bank abutment, but soon the dam vanishes from view as the visitor becomes more enveloped by the vegetation of the riparian restoration of the dam's former reservoir area.

The last view seen of the dam (or the first, if the visitor is heading downstream) occurs at a view sequence created through three openings in the willow baffle halfway along the trail. View "c" facing west shows the north dam abutment ruin. View "d" facing north shows the layers of streambank erosion carved into the riverbank from the former reservoir, showing the lasting effects of the dam on the landscape. View "e", facing east, looks toward a massive beaver den, where juvenile fish can be seen taking refuge from the natural river flow (Figure 6.11). This view symbolizes the wildlife's positive response to dam removal. Without the restored riparian vegetation at this location, which was formerly under water, the beaver would not be able to build its den and live here.

On the east side of the site, three more views are framed along the river at varying distances from the trail to allow the riparian vegetation to frame the river in different ways. View "f" nestles visitors inside of the willow baffle to view the flowing river. View "g" sets the viewshed far back into the riparian forest but is left open to be viewed over low-growing ground cover vegetation as the landscape gently slopes down to the river. Opened views from the picnic area trail are meant to be glimpses of the flowing river as the water moves parallel to the hiker.

MATERIALS

Creating contrast between the materials of the proposed landscape design elements and the existing conditions of the site is an important design strategy seen in the case studies. This contrast can be achieved by placing old and new materials side by side to emphasize

the age of the historic remnants, so they do not blend in with the contemporary design elements. The narrative of post-industrial ecological recovery can also be expressed by contrasting textures of natural and man-made materials to emphasize the relationship between the infrastructure and its effect on the site's ecology. Both of these approaches are important to the dam removal narrative in this design because it aims to provide an exploratory experience of the dam's traces by adding structured access like stairs and boardwalks, while also presenting the ecological recovery that the site has undergone after dam removal by highlighting the riparian restoration.

The contrast between old and new can be seen most evidently at the dam ruins, where corten steel stairs on black steel stringers, and stainless steel ladders and safety railings have been added to the south abutment to provide access during exploration (Figure 6.9). The rust finish on the steps was chosen for its color contrast to the dam's grey concrete and to match the color and material of the new irrigation pipeline that extends over the river, which replaced the obsolete dam irrigation canal system. This rust-finish metal is also employed at the pipeline boardwalk, which contrasts with the grey aggregate pipeline that snakes alongside the boardwalk (Figure 6.19).

The poured concrete pad that offers a gathering space between the dam abutments will be made of a lighter-toned concrete than the dark grey aggregate of the dam, so that as native rock and remnant concrete chunks poke out of the flat surface of the concrete there is a clear contrast of what is old and what is new (Figure 6.15). Because traditional concrete is one of the highest producers of carbon emissions due to cement production, any new concrete will be made of concrete that uses local

Figure 6.12: *Steel Steps Referencing Color of Site's New Steel Irrigation Pipeline that Replaced the Dam's Irrigation. Left: Photo by author, April 2021. Right: From https://www.buymetalonline.co.uk/product/corten-steel-weathered-stairs/, accessed April 21, 2021*

pumice as a cement replacement, which will also give it a contrasting texture to the historic dam's traditional concrete composition (Figure 6.12).

This old and new concrete contrast also appears at the rocky path, where new pumice concrete steps have been poured into natural depressions in the solid rock along the river. As the path meanders, the concrete cofferdam footings that are littered throughout the site are placed near the steps to lead the hiker through the rocky traverse (Figure 6.20). This also provides an interesting material contrast between the old concrete footings, the new concrete steps and the natural grey rock, showing the juxtaposition between natural and man-made, alluding to the site's infrastructure history.

In another effort to create a sustainable solution to

Figure 6.13: *Contrast Between Original Dam Aggregate Concrete and Pumice-based. Left: Photo by author, March 2021. Right: From https://www.nemotile.com/verve-cement-pumice-12x24.html, accessed April 21, 2021*

providing paved surfaces in the design, the large former parking lot at the county park is planned to be kept as-is at its eastern half, but ripped up and crushed into rubble to provide a material for trail substrate throughout the site, similar to D.I.R.T.'s approach at URBN Dry Dock No. 1 (Figure 3.3). The texture of the crushed, faded asphalt will provide a material contrast between natural and man-made as the rubble-based trail leads through the many sections of the riparian restoration planting (Figure 6.22).

The contrast between remnant paving and planting will also be seen at each parking lot, where stormwater planters are designed to repurpose both the upper fish ladder remnants at the west lot and the county park boat ramp at the east lot (Figures 6.14 and 6.23). At these installations, the geometric patterns of the stormwater plants will contrast with both the lifeless concrete that they are alongside and also the more sporadically placed natural succession plants found nearby in the landscape.

PROGRAMMING

The programmatic goal for this design is to balance recreation with preservation and interpretation of the site's history. Programming the space of the former park and the dam area with recreational opportunities that meet the needs of different users at a dam removal site make this goal achievable. At the former county park, before dam removal, the site provided reservoir access to boaters, swimmers, fishers, and picnickers. The new design accommodates these needs by folding them into the larger spatial concept of telling the story of recovery after dam removal occurs. The extensive trail network that winds through the former county park now includes the dam site and its traces as part of the park's programming, creating a new recreational opportunity for exploration and interpretation at the site. The site's day use programs are supported by amenities that include hiking trails that are guided by site history, a fishing platform, a boat ramp, a raft tie-off area, picnic area, environmental interpretation of native plants and the salmon life cycle, and the commemoration of the Rogue River War events that occurred at the site. Each of these programs play an important role in meeting the needs for the different users of the site, whether they are environmental enthusiasts who want to visit the dam removal site and access the ruins, or local community members who opposed dam removal for either the loss of recreation opportunities at the county park or the loss

of the dam as a cultural artifact. As rafting and fishing continues to be a popular tourism attraction to the Rogue River, this site can now support those activities to help the local economy continue to develop its identity as an ecotourism destination. What makes this park unique is that it is not just a redesign of the former Savage Rapids County Park, but now it tells the story of how dam removal impacted the Rogue River in a way that allowed for better fishing and better boating opportunities because the unobstructed river now allows for healthier anadromous fish migrations and no barriers to boats that float through this stretch of the Rogue. The educational interpretation components related to native plant restoration and salmon habitat also orient the recreational exploration of the trails in the site's narrative of ecological recovery after dam removal.

6.5 TRACE INTERVENTIONS

The overall schematic design of the site articulates the site's dam removal narrative while cohering separate historic traces found throughout the site. To understand how the design intervention framework functions at a more detailed scale, the following section presents each trace according to its proposed tactic and design strategies, shown in Figures 6.14-6.28. To refer to each trace's intervention matrix that was used to aid in design, see Figure 6.2.

1. Fish Ladder Remnant

Intervention Tactic: Construct

Description: Some of the shallow concrete walls of the dam's original fish ladder are reconstructed along the trail to lead visitors up and over the obstacles that the fish once swam to get past the dam. Using differently toned pumice-based concrete, a contrast is shown between the new concrete and the old concrete fish ladder remnants embedded within the river rock.

Aesthetic Design Strategy: The material contrast between concrete and native rock textures is emphasized.

Cultural Design Strategy: Historic infrastructure forms are preserved to guide trail circulation and exploration of fish ladder area.

Ecological Design Strategy: The historically obsolete fish passage conditions are interpreted through an installation showing narrative of ecological progress.

Economic Design Strategy: The installation is part of recreational programming attracting tourism.

Figure 6.14: *Fish Ladder Remnant Intervention*

2. Fish Ladder Viewing Area

Intervention Tactic: Modify + Remain in place

Description: The former roadside parking and viewing area for the dam is repurposed to create a more expansive view of the dam removal site by extending it across the hillside, where stainless steel and concrete stairs lead down to the dam ruins. Cultural context to the dam ruins is provided through an installation that replicates historic postcard images of the dam when it was once its own roadside attraction in this very location.

Aesthetic Design Strategy: The redesign of this area offers an ADA accessible view to observe dam ruins.

Cultural Design Strategy: Art installations showing former dam postcard imagery and dam removal photos along railing show past cultural framings of the dam.

Ecological Design Strategy: The concrete upper fish ladder remnant is converted into a stormwater planter to filter stormwater from the parking lot.

Economic Design Strategy: The roadside attraction supports the ecotourism identity of region.

Figure 6.15: *Fish Ladder Viewing Area Intervention*

3. South Bank Abutment Ruin

Intervention Tactic: Modify + Remain in place

Description: The largest historic remnant on the site is made accessible to safe exploration by providing stairs and ladders onto the structure. A paved gathering area adjacent to the abutment frames some of the removed portion of the abutment's concrete remnants found in the river bank's rock.

Aesthetic Design Strategy: The intervention emphasizes the material contrast between the old concrete abutment and stainless steel access structures, while also creating view opportunities of the site.

Cultural Design Strategy: The historic infrastructure forms are preserved to guide trail circulation and exploration of dam structure and dam removal remnants.

Ecological Design Strategy: The concrete infrastructure is repurposed for recreation.

Economic Design Strategy: The installation is part of a recreational trail hiking programming attracting tourism.

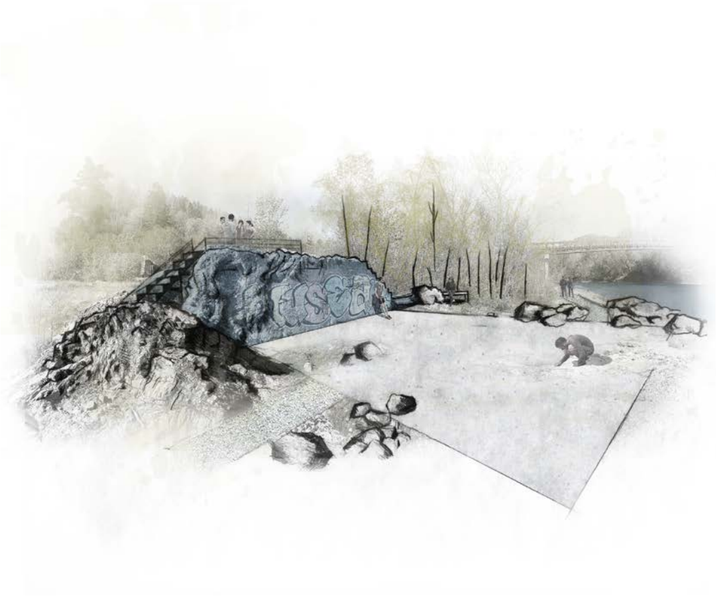


Figure 6.16: *South Bank Abutment Ruin Intervention*

4. Floodgate Hinges

Intervention Tactic: Modify + Remain in place

Description: The remaining metal hardware of the hinges provides a cadenced spatial arrangement for installing contemporary stainless steel access infrastructure to the abutment. By using these areas to fasten new hardware to the structure, access will seem more aligned and seamless with the existing layout of the abutment remnant.

Aesthetic Design Strategy: The new railing emphasizes the material contrast between the old metal fixtures and contemporary metal safety railing.

Cultural Design Strategy: The historic infrastructure is used to provide safety for access during visitor exploration of historic remnants.

Ecological Design Strategy: It repurposes existing metal infrastructure for safety during recreation.

Economic Design Strategy: It supports a recreational trail hiking programming attracting tourism.

Figure 6.17: *Floodgate Hinges Intervention*

5. Stepped Buttress Wall

Intervention Tactic: Modify + Remain in place

Description: The stepped buttress on the west side of the abutment historically provided access to the dam for dam maintenance. These original concrete steps are left untouched on the west side of the dam, but the stepped geometry is mirrored on the east side of the abutment with corten steel steps on a black steel stringer that provide access up and down from the highest point on the abutment.

Aesthetic Design Strategy: The material contrast between old concrete abutment and contemporary steel access structures is emphasized, while creating view opportunities of the site.

Cultural Design Strategy: The historic infrastructure forms are preserved to guide trail circulation and exploration of dam structure and dam removal remnants.

Ecological Design Strategy: Concrete infrastructure is repurposed for recreation.

Economic Design Strategy: It supports recreational trail programming, attracting tourism.

Figure 6.18: *Stepped Buttress Wall Intervention*

6. North Bank Abutment Ruin

Intervention Tactic: Leave As-Is

Description: The abutment remnant on the north bank shows a vivid section cut of the dam where it was bisected during dam removal, making the view of this structure an important visual element in establishing the dam removal narrative at this part of the site. Providing views of this preserved as-is trace from different viewpoints along the trail symbolizes the dam's lasting impact on the site's ecology.

Aesthetic Design Strategy: Direct views are created toward the north abutment from south abutment with trail circulation.

Cultural Design Strategy: The historic infrastructure forms are preserved to guide trail circulation and exploration of dam structure and dam removal remnants.

Ecological Design Strategy: Leaving the ruin in place continues to stabilize the riverbank.

Economic Design Strategy: It is part of recreational trail programming attracting tourism.

Figure 6.19: *North Bank Abutment Ruin Intervention*

7. Concrete-Encased Wood Stave Pipe Remnant

Intervention Tactic: Modify + Remain in place

Description: The historic wooden stave pipe encased in concrete is a remnant from when the dam was used to pipe irrigation water upstream. It is now decommissioned and terminates at a withered opening exposing the wood-lined pipe from the 1920s. This is the only artifact on the site that has been determined to be eligible by the State Historic Preservation Office in 2005. By partially excavating the pipe without harming its structural integrity, it becomes more visible alongside the boardwalk, which crosses over it several times. The pipeline's presence on the site symbolizes the demand for irrigation as settler colonialism overtook the Rogue Valley in the late 19th and early 20th centuries, which is why the dam was eventually built.

Aesthetic Design Strategy: The material contrast between old concrete abutment and contemporary steel boardwalk is emphasized by partially excavating the pipeline.

Cultural Design Strategy: The historic infrastructure is preserved to guide boardwalk circulation and exploration of dam-related infrastructure.

Ecological Design Strategy: Concrete infrastructure is repurposed for recreation.

Economic Design Strategy: It is part of recreational trail programming attracting tourism.

Figure 6.20: *Concrete Encased Wood Stave Pipe Remnant*

8. Cofferdam Footings from Dam Construction

Intervention Tactic: Modify + Relocate

Description: These concrete pieces are remnants from one of the cofferdams built upstream of Savage Rapids dam during one of its periods of maintenance or construction. They litter the site, so there are about thirty of them in all. Along the portion of the trail that is closer to the dam site leading into the restoration area, these objects are moved and placed along the trail to serve as wayfinding, with some of them supporting signage.

Aesthetic Design Strategy: The material contrast between old concrete abutment and new concrete trail access is emphasized, as well as the material contrast between the old concrete and native rock.

Cultural Design Strategy: The historic infrastructure artifacts preserved to guide trail circulation through wayfinding.

Ecological Design Strategy: Concrete objects are repurposed for wayfinding.

Economic Design Strategy: The installation is part of recreational trail programming attracting tourism.

Figure 6.21: *Cofferdam Footings Intervention*

9. Cottonwood Allée

Intervention Tactic: Leave As-is

Description: The main trail follows an allée of mature cottonwood trees, which are a remnant of the day use area at Savage Rapids County Park. Alongside these older cottonwoods, younger stands of cottonwoods were planted during riparian restoration. The trail cuts between these two generations of cottonwoods, showing the contrast between the different periods of recreation and restoration that occurred here.

Aesthetic Design Strategy: The trail provides a spatial juxtaposition between the taller and older park-era cottonwood trees and the smaller, denser riparian restoration cottonwood trees.

Cultural Design Strategy: The historic vegetation is preserved to guide trail circulation and exploration of the site's changes over time.

Ecological Design Strategy: The existing tree canopy is maintained.

Economic Design Strategy: It is part of recreational trail programming attracting tourism.

Figure 6.22: *Cottonwood Allée Intervention*

10. Former County Park Parking Lot

Intervention Tactic: Modify + Relocate

Description: The original parking lot takes up a large portion of the site at the former park and to reduce the amount of paved surface at the park, only half of the parking lot will be needed to support visitor access, since it now longer will support both day and overnight use as it once did. The western half can be ripped up and crushed to create a rubble that preserves a texture from the former park and can also be embedded in the 4' wide fine compacted gravel trail designed for universal access throughout the park.

Aesthetic Design Strategy: There is a material contrast created between the site's natural vegetation and man-made pavement rubble.

Cultural Design Strategy: Historic infrastructure materials are preserved to guide trail circulation.

Ecological Design Strategy: Pavement is repurposed and the area is depaved and restored into a meadow.

Economic Design Strategy: It supports recreational tourism programming through trail creation and parking.

Figure 6.23: *Former County Park Parking Lot Intervention*

11. County Park Boat Ramp

Intervention Tactic: Modify + Remain in place

Description: When the dam was removed, the water line from the reservoir moved away from the former boat ramp and left the boat ramp far from the water. It now tilts downhill, pointing perpendicular to Savage Creek. When the parking lot is resurfaced, it can be gently graded to run stormwater toward the boat ramp, which will be de-paved and built into a stormwater planter that cleans the water entering Savage Creek. The concrete platform that served as a dock can now provide a viewing area to see the planting patterns from above and learn about stormwater management.

Aesthetic Design Strategy: The intervention provides a material contrast between the stormwater vegetation and concrete infrastructure.

Cultural Design Strategy: An historic infrastructure artifact is preserved.

Ecological Design Strategy: Concrete infrastructure is converted into a stormwater planter to filter stormwater from the main parking lot.

Economic Design Strategy: It supports recreational use of site.

Figure 6.24: *County Park Boat Ramp Intervention*

12. Reservoir Shoreline Erosion Lines

Intervention Tactic: Modify + Remain in place

Description: By aligning the trail with the erosion lines marking the former reservoir, hikers are oriented to the areas of the site that were formerly underwater. Wherever the trail aligns with the former waterline, linear planting of riparian native species occurs parallel to the trail.

Aesthetic Design Strategy: Views of north bank erosion are framed through restoration planting.

Cultural Design Strategy: The evidence of historic impact of infrastructure is preserved to guide trail circulation.

Ecological Design Strategy: The planting follows an established riparian restoration approach.

Economic Design Strategy: It is part of recreational trail programming attracting tourism.

Figure 6.25: *Reservoir Shoreline Erosion Lines Intervention*

13. Freshwater Trust Riparian Restoration

Intervention Tactic: Leave As-is

Description: The successful riparian restoration project at this site is an important part of the river recovery narrative and is shown to visitors by orienting them with the native plants used in the restoration project. Both entry trails are planted with these species specimens marked with labels, so that as people explore the site they know what was planted to restore the riparian plant community.

Aesthetic Design Strategy: The established willow baffle frames views of the river.

Cultural Design Strategy: The evidence of ecological restoration is displayed to guide trail circulation.

Ecological Design Strategy: The intention maintains restoration plan and educates visitors about it.

Economic Design Strategy: It is part of a recreational trail programming attracting tourism.

Figure 6.26: *Freshwater Trust Riparian Restoration Intervention*

14. Colonial-Era Gold Mining of River Rock

Intervention Tactic: Construct

Description: Early Euro-American colonists originally came to the Rogue Valley for its gold prospects. The river rock along this part of the Rogue was picked and mined for decades, impacting the riparian ecosystems that indigenous peoples relied on for food sources. Subtle, life-size bronze sculptures of 19th century gold mining tools can be found around the bare rock to remind visitors of the human impacts on the site the years leading up to the construction of the dam, where gold mining and then farming were drawing people to colonize the area.

Aesthetic Design Strategy: The installation draws attention to texture of river rock through the material contrast used in the installation.

Cultural Design Strategy: Evidence of the historic impact of settler colonialism is shown in interpretive art installation.

Ecological Design Strategy: It communicates the early ecological impacts of settler colonialism.

Economic Design Strategy: The installation is part of recreational programming attracting tourism.

Figure 6.27: *Colonial-Era Gold Mining of River Rock Intervention*

15. Salmon Habitat Restoration

Intervention Tactic: Construct

Description: With the dam removal and the riparian restoration at the site focused on anadromous fish habitat restoration, but it is important to include this element of the narrative but is challenging to show since it is underwater. In lieu of this, the trail leading to the fishing platform communicates the importance of a salmon's stream environment throughout its life cycle by embedding figures of salmon throughout their life cycle in the paved path, along with art installations of the natural shapes and textures of the underwater river structure embedded in the path as well, such as course gravel or woody debris. When people arrive at the fishing platform to view the river, they can then imagine the environment of the fish under the surface that has been recovered after years of sediment buildup.

Aesthetic Design Strategy: The trail provides views of th restored reservoir.

Cultural Design Strategy: Art installations embedded in trail paving are used to communicate the importance of salmon migration to its life cycle and the life cycle is used to guide circulation on the trail.

Ecological Design Strategy: It communicates the ecological impacts of dams and the ecological results c their removal.

Economic Design Strategy: The trail leads to the fishing platform, making it part of the recreational fishing access programming attracting tourism.

Figure 6.28: *Salmon Habitat Restoration Intervention*

16. Takelma Fishing Hole and Rogue River War Detainment Area

Intervention Tactic: Construct

Description: From David West's oral history, we know that this site was once an important fishing area for the Takelma tribe and was later used by white colonists as a detainment area for a group of Takelma people during the Rogue River War before they were forced to migrate to the Coast Reservation in 1856. This project sees this painful history as an important historic trace that should remain visible, especially since it represents the brutal settler colonization of the Rogue Valley that ultimately led to the enormous disruption of the Rogue River ecosystem through dam construction. However, this design framework cannot account for a representation of an indigenous narrative without consulting with the tribal communities that it represents. This project acknowledges that at this stage, this design element is simply a placeholder for a proposed idea that should only be further developed through collaboration and consultation with the tribe, if they chose to do so.

Aesthetic Design Strategy: N/A

Cultural Design Strategy: N/A

Ecological Design Strategy: N/A

Economic Design Strategy: N/A

CHAPTER 7:
Discussion

7.1 EVALUATION

Overall, the site design and trace interventions applied to Savage Rapids Dam exemplify a first attempt at using the Design Intervention Framework to guide a narrative-based design at a dam removal site. The methods for creating the framework included a literature review of design theory relating to the design of historic traces and a series of case studies analyzed using that design theory. Guidelines from the literature and observations from the case studies informed the creation of the Design Intervention Framework, which can be used by designers to determine how to incorporate the design of individual historic traces into a design, and select a design concept that connects the traces together.

For Savage Rapids Dam, the framework tested and determined a strong design concept, which also aligned with all three design goals for dam removal sites (Figure 6.1). Using the framework helped select the River Recovery concept because it accommodated the maximum number of traces that could be incorporated into the design to preserve and communicate the site's historical narrative through design. This means that Goal 1 of honoring and preserving the site's history is accomplished through each trace expressing historical meaning throughout the site. Goal 2 of providing recreational access to an improved river habitat was accomplished because the flexibility of the meandering river concept allowed for incorporating the exploration of historic traces alongside the recreational programming tied to Rogue River tourism activities like fishing and boating. The meandering river concept supports Goal 3 of expressing the recovery narrative of a landscape that has undergone post-industrial change because it guides visitors to see both the dam's lingering impacts on the landscape on the west side of the site, then as the paths meander more organically to the east, the riparian restoration process is revealed. The project's main limitation for using this approach to decide on a design concept was the lack of community or client involvement. While the framework can theoretically be used by a designer to justify a design concept proposal to a community or client, this project was not able to include that type of public engagement and deserves further exploration.

The framework was also used to determine design interventions for each historic trace to achieve the three design goals for dam removal sites. For Goal 1 of honoring the site's cultural history, the framework was a helpful tool because it helped me consider the cultural intervention strategies observed in the case studies. This was helpful for considering how exploration of the traces can create an encounter with physical history, except for the design of the invisible traces left behind by the Takelma tribe before and during contact with colonists. The case studies fell short in presenting design strategies for including indigenous narratives, which unfortunately led the framework to fall short in this way. While research into archeology and oral history showed that the site has a complex indigenous history, a single designer should not control this narrative. This research does not present a solution for how to handle traces tied to indigenous narratives, other than by advising that the historic research is done in the most unbiased way possible and that consulting tribal members should be done to understand if and how the cultural narrative can be expressed at the site. For this project, this type of

consultation and collaboration did not occur, which meant that only a placeholder in the schematic site plan refers to the Takelma history. Goal 2 of enhancing recreational opportunities created by dam removal was successfully supported by using the framework because it guided me to consider how each trace can be used to enhance the aesthetic, cultural, ecological and economic values of the site for human use. This helped push the design beyond a park a with a trail and a boat ramp by creating recreational programming that is rooted in the site's history, while also supporting the Rogue River's local tourism economy tied to hiking, fishing and boating. However, the results of how economically supportive these recreational design interventions would be is only theoretical, showing another limitation to the framework. Goal 3 of communicating a narrative of ecological recovery was achieved through using the framework because its cultural and ecological design strategies for traces provided ideas for creating an experience of discovering the recovery narrative while also helping me make design decisions that were ecologically beneficial to the site, like taking advantage of materials found on-site to repurpose in design or using the existing riparian restoration planting as a design element.

This project was originally inspired by creating an immersive experience that pushes beyond text and image-based interpretive panels that are typically found at historic sites. While the trace interventions and site design do create physical representations of Savage Rapids Dam's history, some historical context is still required to frame the visitor experience. Therefore, there are interpretive kiosks at each entrance to the park, so that visitors who want to learn more about the site history can easily do so. While there is no way to test how effective these interventions are at communicating site history, the design created using the framework invites visitors to experience a place with historical significance where they otherwise would not have, which is already more engaging than standing at an overlook reading a sign.

An overall limitation for using the framework matrix to design historic traces may include the open-endedness of the Design Strategies and Intervention Tactics, since the framework is meant to guide design, not prescribe it. A fair amount of creativity is required from the designer using it, as well as an in-depth understanding of site history and inventory. These variables are left up to the designer and will influence how useful the framework will be for them. Specifically for site history and inventory, the availability of historic information for a site and the time it takes to perform research and conduct site visits could pose obstacles for many designers. For Savage Rapids Dam, no up-to-date survey documentation, specifically contour line data, was available for the site that did not include the pre-dam removal conditions. This limited the scope of how in-depth the project's site design could be since understanding of the topography was based on sketching at site visits and aerial photos.

7.2 FUTURE APPLICATIONS

As was stated at the beginning of this project, dam removal sites are a type of post-industrial landscape that are increasing in numbers and offer unique landscape architecture design opportunities for recreation, preservation, and restoration. The Design Intervention Framework can be applied to other dam removal sites in the same way it was applied to Savage Rapids Dam, by researching and inventorying site history and using the framework to proceed with design. The Rogue River's other dam sites would benefit from the use of this framework and would give the opportunity to understand how well the framework functions across a spectrum of integrity, since each site contains more or less remnants of the dammed landscape. Savage Rapids Dam had more remnants than Gold Ray dam and less than Gold Hill Dam. By comparing how more invisible traces at Gold Ray Dam are expressed using the framework, we could get a better sense of how well the framework functions to fill in the narrative gaps created by dam removal.

Dam removals that are planned for the near future also present opportunities to use the framework, since the designer may have the advantage of choosing which materials or remnants could remain on-site to use in creating a design narrative. Some of the ecological design intervention strategies of repurposing old materials or creating restoration planting designs could be used to bring design into the initial phase of recovery after dam removal. Two contested dam removal projects in the Pacific Northwest that are tentatively planned for the next few years are on the Klamath River in 2023 (Burns, 2020) and Snake River in 2030 (Weaver, 2021). Much like with other dam removals, the goal for these removals is to restore river health and remove obsolete infrastructure harming salmon runs. When these dams are removed, it will be because of many decades of political maneuvering and environmental activism by tribal groups, scientists, farmers, and congressmen. These stories of activism, recovery and change deserve to be told at each site and experienced by commemorating the dam removal narrative through design. This research sets a theoretical precedent that can be used to discuss future design interventions at dam removal sites like these.

7.3 CONCLUSION

This research set out to accomplish two main goals. The first goal was to establish dam removal sites as a type of post-industrial cultural landscape that can benefit from design by landscape architects for the sake of recreation, preservation and restoration. The second goal was to create a design framework that can be used at sites with complex post-industrial landscape histories to guide how design interventions shape the narratives expressed through design. Accomplishing both of these goals together involved building the framework based on other complex post-industrial design projects and testing it out at Savage Rapids Dam, an historic dam removal site on the Rogue River. By showing how the various narrative elements associated with dams in the West, from colonization to dam construction, to dam removal and recovery, can be expressed by designing with historic traces using the framework, dam removal sites are proven to be a compelling post-industrial landscape to design. This demonstration of the framework can also be applied to any post-industrial landscape to aid in design and as more 20th century infrastructure becomes obsolete, there will be many opportunities to use it in the future.

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