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“Historical Ecology Internship”: K. Holl and E. Howard
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Narrative History of Younger Lagoon Reserve

Overview

The goal of this paper is to discuss human and landscape changes and the interactions between these two factors on the original Younger Lagoon Reserve (YLR) property the adjacent terrace lands over time. I start with a review of the field of historical ecology. Then, I discuss the history of the people and landscape in the Santa Cruz area covering the period of the first people in Santa Cruz, the Spanish Mission period, the Mexican period and the early period of California statehood. Next, I present the historical narratives of the terrace lands and the original YLR property separately. Then, I describe the transfer of both pieces of property to the University of California and the transformation of the entire property to its present state. Finally, I analyze the goals for restoration of the sites.

Introduction: What Is Historical Ecology?

Historical ecology is an interdisciplinary approach to tracking human and environmental interaction. It involves researching the consequences of societal and environmental interactions and uses the concept of a landscape, instead of an ecosystem, to describe the medium of interaction between human beings and the environment (Crumley, 6 and Historical Ecology Orientation and Stakeholders Meeting). Throughout my research, I relied on the basic principle of historical ecology that the

property I was studying was a landscape and that its features were a culmination of human impacts on the environment and, simultaneously, environmental impacts on humans beings (Balée, 14).

According to Carole Crumley, a Professor of Anthropology at the University of North Carolina, the "...practice of globally relevant archaeology, ethnohistory, ethnography, and related disciplines can be termed *historical ecology*" (Crumley, 7). The discipline draws on many fields including: anthropology, environmental sciences, geography, biology and history (Crumley, 6). At the same time, Crumley, as well as others who have written on the subject of historical ecology, also make sure to differentiate it from other related disciplines such as environmental anthropology and landscape ecology (Crumley, 3). The differences between the overlapping disciplines can be minute, but, at its core, historical ecology asserts that: 1) human beings have affected almost every environment on the planet, 2) different societies affect landscapes in different ways, 3) human interactions with the environment are not inherently bad or good and 4) the relationship between people and the landscape can be comprehended holistically (Balée, 14).

The purpose of historical ecology is to understand the formation of contemporary and past cultures and landscapes (Historical Orientation and Stakeholders Meeting). Though there are many ways of breaking up the procedures involved with historical ecology, the process of historical ecology involves four basic steps: data collection, data compilation, synthesis and analysis and reports and graphics (Historical Orientation and Stakeholders Meeting). Some important resources to examine while doing research for a historical ecology project include soil maps, county surveys, aerial photos, landscape

photos, explorer's diaries, Government Land Office surveys and land grant case files (Historical Orientation and Stakeholders Meeting). I tried to follow the basic steps of historical ecology in my research and I used many of the sources listed above. However, I also drew on other sources, such as county museums and interviews with previous landowners and land managers.

In many cases, historical landscape reconstruction can be an essential tool for regional habitat conservation and restoration (Askevold et al., 103). Historical ecology is important for the restoration process because it helps recreate past landscapes that reflect the chosen period for restoration (Historical Orientation and Stakeholders Meeting). Specifically, understanding conditions before extensive modern disturbance helps scientists and managers set restoration references and targets, develop landscape-level conservation strategies, and evaluate the success of these endeavors (Askevold et al., 103). One example of applied historical ecology is the work being done by the United State Geological Survey at the Fort Collins Science Center. The description of their application of historical ecology says that, "Historical perspectives increase our understanding of the dynamic nature of landscapes and provide a frame of reference for assessing modern patterns and processes" (United States Geological Survey). The restoration work currently being done at the original Younger Lagoon property and the terrace lands demonstrates the importance of historical ecology in conservation and restoration.

For my restoration internship project with YLR, I was assigned to put together a narrative history of the landscape of the original YLR and the adjacent terrace lands using a diverse range of sources. In order to discuss the conservation and restoration of the site,

it is essential to begin with the history of land-use in the Santa Cruz area and narrow the historical narrative down to the characteristics of the specific site being examined.

The First People in the Santa Cruz Area through the Spanish Mission Period

The record of people in the Santa Cruz area begins about 10,000 years ago (Santa Cruz Museum of Art and History - SCMAH). The earliest known people in the area lived on the shores of a large fresh-water lake that once filled parts of Scotts Valley (SCMAH). This site is one of the oldest known human sites in North America (SCMAH). However, not much is known about the early people's connection with and usage of the land (SCMAH).

About 3,000 years ago, the Ohlone, also known as Costanoan, Native American culture developed in the Santa Cruz region (SCMAH). Although the Ohlone lived in a region covering the San Francisco Bay Area to the Salinas Valley, the Ohlone who lived in the Santa Cruz area are more specifically identified as being speakers of the Awaswas dialect (Santa Cruz Museum of Natural History - SCMNH). Through excavations and preservation of culture that continue to the present day, we know that tule rush (*Scirpus* spp.) and acorns (*Quercus* spp.) were especially important crops for the Awaswas people living in Santa Cruz (SCMNH).

There is speculation, from stories passed down through generations, that the first people from another continent to visit the Santa Cruz area and interact with the Ohlone people were from Asia (Harrison, 18). However, the first recorded contact between the Ohlone people of the Santa Cruz region and people from another continent was Juan Rodriguez Cabrillo's expedition along the California coast (Harrison, 18). Cabrillo arrived at Monterey Bay in 1542 and claimed the land of California for Spain (Harrison,

18). Another famous expedition along the California coast was led by Don Sebastian Vizcaino, who visited the Monterey Bay in 1602 (SCMAH). Additionally, other recorded expeditions to the Santa Cruz area include the Pòrtola expedition of 1769, the La Pèrouse expedition of 1786 and the Malaspina expedition of 1791 (SCMAH).

Under Spain's rule, the mission system was constructed throughout California. The explorers and expedition teams that visited California often documented mission life. For example, the La Pèrouse expedition consisted of 10 days of studying plants, animals and mission life (SCMAH). On the Malaspina expedition, Jose Cardero made sketches of life at the mission and of people living in the Monterey Bay area (SCMAH). With the arrival of explorers and the implementation of the mission system, Mission Santa Cruz became important for the beginning of agriculture in the Santa Cruz region. At Mission Santa Cruz, which was established in 1791, laborers produced wheat, corn, beans, peas, fresh produce, and other goods for trade (SCMAH). The mission also had its own small garden to feed its inhabitants (SCMAH). Overall, the mission is described as having fertile soil and a temperate climate and, because of the good climate and agricultural system, Mission Santa Cruz became one of California's major suppliers of food and goods (SCMAH).

The Mexican Period

In 1821, Mexico achieved independence from Spain and California became a Mexican colony. The change in governance also brought about changes in land ownership in California; the Mexican government began issuing land grants called "ranchos." Ranchos were large landholdings granted to individuals during Spanish and later Mexican rule (Hart, 406). Ranchos were presented as a reward for loyal service or

as a way to attract settlers to developed areas (Hart, 406). The first ranchos in California were granted between 1775 and 1784 (SCMAH). However, Mexico issued the bulk of its land grants between 1834 and 1846 (SCMAH). In total, 813 grants, containing approximately one fourth of the land area of California, were authorized (SCMAH). Most grants were issued to *Californios*, people born in California to Spanish-speaking parents (SCMAH). Ranchos were, in general, used as cattle ranches or small-scale farms. *Californios* grew crops for their own use such as barley, corn, wheat, beans, garbanzos and potatoes (SCMAH). Additionally, they grew fruit trees, such as pears, apples and the mission grape (SCMAH).

In 1839, Rancho Refugio, the parcel of land containing what is now YLR and the adjacent terrace lands, was “apparently” granted to Maria de los Angeles Castro and her three sisters (Abeloe et al., 430). Two years later, Rancho Refugio was “definitely” granted by Governor Alvarado to Jose Antonio Bolcoff (Abeloe et al., 430). Jose Antonio Bolcoff was the husband of Maria de los Angeles Castro’s sister, Candida de los Angeles Castro. The Castro family was a large *Californio* family who owned thousands of acres of land in the Santa Cruz region during the Mexican period (SCMAH). Several of the Castro daughters married during the 1840s and 1850s and the vast family land holdings were, eventually, divided between them (SCMAH).

Jose Antonio Bolcoff was one of the earliest foreign settlers in Spanish California. He came to California in 1815, when he deserted a Russian sailing vessel (Abeloe et al., 430). In 1822, he married Candida de los Angeles Castro (Abeloe et al., 430). He became “*alcalde*” (mayor) of Santa Cruz three separate times during his life, including when California became a state in 1850 (Abeloe et al., 430). In 1839, Bolcoff was put in

charge of the buildings and properties of Mission Santa Cruz (Abeloe et al., 430). His duties at the mission included governing a few Spanish families and about seventy Native Americans (Abeloe et al., 430). In 1841 Bolcoff was granted Rancho Refugio (Juan B. Alvarado to Jose Bolcoff). While he was in possession of Rancho Refugio, Jose Antonio Bolcoff built an adobe house on the property (Abeloe et al., 430). The house was located at what is now Wilder Ranch on Meder Creek (Abeloe et al., 430). According to the Santa Cruz County Recorder's Office, Jose Antonio Bolcoff officially passed ownership of the Rancho Refugio land to his sons, Juan and Francisco, on October 8, 1851 (Jose Bolcoff to Francisco and Juan Bolcoff).

California Statehood

The California Gold Rush began in 1848 and the flood of foreigners looking for gold spurred a great increase in the population of California (Hart, 583). That same year, the treaty of Guadalupe Hidalgo ended the Mexican-American War and, consequently, marked the end of the Mexican land-grant era (Hart, 583).

Throughout the early years of California statehood, there were many changes in the types of crops grown in Santa Cruz County. In 1853, the potato crop market failed and, for the next 25 years, farmers grew wheat and barley because wheat and barley were safe crops with predictable markets (SCMAH). Another significant change occurred around 1870 when Chinese workers replaced the county's dwindling Native labor force (SCMAH). With the availability of a large workforce, new crop possibilities opened up such as hops, sugar beets, strawberries, apples and other labor-intensive crops (SCMAH).

On October 28, 1867, Juan and Francisco Bolcoff passed part of Rancho Refugio to Moses A. Meder by decree of the court (Abeloe et al., 430). Moses A. Meder was a

Mormon brought by Sam Brannan to San Francisco on the ship *Brooklyn* in 1846 (Abeloe et al., 430). The last information that I found concerning Meder's property is that the property was acquired by the Delos Wilder family who had a dairy. The Delos Wilder family possessed the land for six generations before it became Wilder Ranch State Park (Abeloe et al., 430).

In late March of 1852, Juan and Francisco Bolcoff sold the section of Rancho Refugio not previously passed to Moses Meder to Eli Moore (Jose Bolcoff Wife and Sons to Eli Moore). The official Santa Cruz County land deed says that Moore paid Juan, Francisco and Candida Bolcoff, the heirs of Jose Antonio Bolcoff's land, \$500.00 for the property (Jose Bolcoff Wife and Sons to Eli Moore). Although it is not certain that this specific land deed details the transfer of the property containing the lagoon, there is evidence that the lagoon property was part of the land transfer. The deed describes the boundaries of the property being sold as,

“...commencing at the point of the bank at the mouth of the creek whereon I now live and on the east side of a small lake or pond formed by the same creek and running one thousand five hundred and fifty yards to the opposite bank of the first above named branch where it enters into the ocean near a large rock standing in the ocean at the mouth of the first above named branch...” (Jose Bolcoff Wife and Sons to Eli Moore).

The description given of the property sounds similar to the lagoon and the area surrounding it. Specifically, the description of a large rock standing at the entrance to the ocean brings to mind the rock formation at the entrance to the ocean at the mouth of the lagoon sometimes referred to as “ship rock.” Additionally, the usage of the word

“branches” sounds like a description of the lagoon, which is “y-shaped” with two distinct branches. Moreover, an 1859 map depicts the “Moor’s House” located close to the possible location of the lagoon, indicating that the Moore family may have owned the lagoon property at that time (Plat of the Refugio Rancho).

There is significant evidence that the Moore family owned the property around the lagoon during the turn of the century. An 1895 map confirms that the Moores owned the property surrounding Meder Creek in 1895 (Part of Rancho Refugio Showing Lands of Henry Cowell). However, the map does not depict the coastline and it is difficult to tell exactly which parcel of land on the coast the Moores owned. It is also important to note that, on the same 1895 map, the Wilder family is shown to be in possession of the parcel of land in Rancho Refugio that Moses Meder previously owned (Part of Rancho Refugio Showing Lands of Henry Cowell). Further evidence of the presence of the Moore family in the area of the lagoon around the turn of the century is a map of the city of Santa Cruz from 1905, which depicts a place called “Moore Beach” in close proximity to the lagoon location (Street Map of Santa Cruz County California).

A 1906 map of Santa Cruz County shows the land adjacent to D.D. Wilder’s land, which is probably the lagoon property, as being divided up amongst many landowners. The landowners include many people in the Moore family, such as Charles and W.H. Moore (Map of the County of Santa Cruz). Other people who owned land around the area of the Moores are the Hihns, the Hoffmans, and the Younger family (C.B. and H. Younger) (Map of the County of Santa Cruz). This map is the first record that I found of the Younger family owning land close to the lagoon in Santa Cruz. One piece of evidence that reinforces the presence of the Younger family in the area in 1906 is a

footnote at the back of land deed documenting the transfer of the terrace land near the lagoon from Stella Tolle (formerly Stella Moore) to the Walti-Schilling Company (Stella Tolle (formerly Stella Moore) to Walti Schilling Company). In the document, there is a small section where the history of the ownership of the land is mentioned and the Younger family is cited as having a documented claim to the terrace lands in 1905.

As I have already described, when Rancho Refugio was transferred to Moses Meder and Eli Moore, in the mid-nineteenth century, the land was split up into different parcels. Therefore, from the turn of the century onwards, the history of the terrace lands, where the Long Marine Lab is located, takes a different course from the history of YLR.

Terrace Lands

During my research, I did not find any written descriptions of the terrace lands in the late 1800s and early 1900s. However, Steven Davenport, the current Managing Director of the Long Marine Lab, informed me that, prior to the 1920's, the land was pastoral, dairy land (Davenport Interview). While the Moore family still owned the property in the 1920s, it was converted into cropland and Brussels sprouts were the primary crop grown (Davenport Interview). A 1928 aerial photograph of the area confirms that the land was tilled at that time (Photo #1928-C).

In 1922, Stella Tolle (called Stella Moore prior to marriage) sold the terrace property to the Walti-Schilling Company (Stella Tolle (formerly Stella Moore) to Walti Schilling Company). Henry Schilling and Fred Walti had established the Walti-Schilling Company as a business to bring cattle from Canada to graze on the North Coast and sold the cattle to slaughterhouses in and around the Santa Cruz area (Wolfsen Interview). As early as 1928, aerial photographs of the property show that the Walti-Schilling Company

had built a slaughterhouse on property now owned by the Raytech Company located above what used to be the Ocean Shore Railroad Company tracks (Wolfsen Interview and Photo #1928-C). The Ocean Shore Railroad tracks border the terrace lands on the north side. While the slaughterhouse was in operation, there was a pipe connected to it that ran under the terrace property and came out at the East Sea Cave, which is a cave located at the southern end of the terrace property (Davenport Interview and Wolfsen Interview). The pipe carried effluent from the slaughterhouse and released it into the ocean (Davenport Interview and Wolfsen Interview). The slaughterhouse remained on the terrace lands property after the Walti-Schilling Company left the area. Landowner Larry Wolfsen, who acquired the land from the Walti-Schilling Company, remarked in an interview that, because of the amount of effluent being released into the ocean, the section of the coast around the slaughterhouse, “was some of the best fishing for miles around” (Wolfsen Interview).

In addition to showing that the terrace lands were tilled, 1928 aerial photographs of the area also depict the presence of wetlands (Photo #1928-C). The wetland “ponds” were located in center and on the south side of the property (Photo #1928-C). Larry Wolfsen, confirmed that, at that time, the land was leased to a farmer who grew Brussels sprouts and cauliflower (Wolfsen Interview). At some point in the mid-1960s, the terrace lands were transferred from Walti-Schilling Co. to Henry A. Wolfsen and family (Wolfsen Interview). Noticeable changes to the land, according to a 1967 aerial photograph, include defined wetlands (Photo #1967-M). In an interview, Larry Wolfsen recalled dredging the “ponds” (wetlands) located on the property twice a year. While the

Wolfsens owned the land, they leased it to the Comelli family who continued to farm Brussels sprouts and cauliflower (Wolfsen Interview).

In 1970, the State Water Resources Control Board for the State of California addressed a “Request by the Santa Cruz Youth Commission for Review of Waste Discharge Requirements Prescribed by Regional Board.” The Santa Cruz Youth Commission requested that the State Water Resources Control Board review the discharge running from the slaughterhouse located above the terrace property into the ocean (California: State Water Resources Control Board). The youth commission reported that the slaughterhouse was producing 80,000 gallons of waste per day due to plant processing operations and that the waste products were being treated in an oxidation pond (California: State Water Resources Control Board). The report also noted that, “effluent from the [oxidation] pond is discharged through a submerged ocean outfall, which terminates on the beach approximately 0.3 miles west of Natural Bridge State Park” (California: State Water Resources Control Board). Furthermore, the report states that the discharge, at times, causes “an unsightly bloody red color to the surrounding ocean area and interferes with the beneficial uses of the waters of the Pacific Ocean” (California: State Water Resources Control Board). Ultimately, the board required that the slaughterhouse cease disposing of effluent in the ocean by May 4, 1971 (California: State Water Resources Control Board).

The official corporation quitclaim deed between the Walti-Schilling Company and the Wolfsen family is dated January 2, 1979, meaning that the Wolfsens had complete ownership of the land during that time (Walti Schilling and Company to Henry A. Wolfsen and Others). On June 13th, 1986, the Wolfsen family sold the terrace

property to a holding company owned by Wells Fargo Bank (Wolfsen Interview and Transfer to “American Securities Company” and “Wells Fargo Bank, National Association”). The holding company did not farm or maintain the property and, as a result, the drainage “ponds” (wetlands) on the property were not drained (Wolfsen Interview). In 1987, Wells Fargo Bank tried to develop the terrace property by putting in 650 single-family homes (Davenport Interview). This proposal was met with resistance from local residents, the California Coastal Commission (CCC), and the University. One of the original conditions for the construction of the Long Marine Lab in 1972 was that the lagoon and surrounding areas would be protected. The University protected the lagoon and the surrounding areas and recognized the high value of its wildlife since 1972 (Environmental Assessment Team). Consequently, Wells Fargo Bank was unable to develop the property.

Younger Lagoon

The Younger family, who previously owned 25 acres of property now called Younger Lagoon Reserve, consisted of three generations of lawyers in Santa Cruz County: Charles B. Younger Sr., Charles B. Younger Jr. and Donald Younger (Clark, 407). The history of the Younger family in Santa Cruz begins in 1850, when Charles B. Younger Sr. came to California with his father. Charles B. Younger Sr. settled in San Jose, where he opened a law practice. In 1865, he opened a branch of his law practice in Santa Cruz (Clark, 407). In 1873, Charles B. Younger Sr. married Jeannie H. Waddell (Clark, 407). Their son, Charles B. Younger Jr. was active in Santa Cruz business, financial, mining and transportation affairs (Clark, 407). Charles B. Younger Jr. married Agnes Hihn, also a lawyer (Clark, 407). Their son, Donald Younger, inherited the

Younger Lagoon property and owned it until it was transferred to the University of California in 1972 (Clark, 407).

The earliest record that I could find of the Younger family owning land around the lagoon area is a 1906 map and reference from Stella Tolle's 1922 land grant of the terrace lands to the Walti-Schilling Company. The 1906 map indicates that the Youngers (Charles B. and Helen) were, at least, partial landowners in the lagoon area along with the Moores, the Hihns and the Hoffmans (Map of the County of Santa Cruz). In addition, in the land deed from Stella Tolle to the Walti-Schilling Company, the history of the land mentions the Younger family owning part of the land, along with the other families in 1905 (Stella Tolle (formerly Stella Moore) to Walti Schilling Company).

Prior to the 1920's, the land surrounding Younger Lagoon was pastoral, dairy land like the terrace lands. Like the terrace lands, in the 1920s, the land surrounding Younger Lagoon was converted to cropland (Davenport Interview). However, the Younger family never farmed or lived on the land (Davenport Interview). Instead, they leased the land to the Rinaldi and the Rovetti families who farmed the land (Davenport Interview). The two prominent farmers from each family were Giulio Rinaldi and George Rovetti (Davenport Interview). Those two families farmed the land for as long as the Younger family owned it (Davenport Interview).

Transfer of Land to the University of California

The Younger Donation

In 1972, Donald and Marion Younger donated 39.5 acres of land to the University of California for both preservation and the study of marine life (Seymour Center at Long Marine Lab). The land that they donated encompassed the lagoon and a small amount of

land surrounding the lagoon and its arms (approximately 25 acres) as well as a portion (approximately 15 acres) of the terrace lands that became the original Long Marine Lab site (Transfer of the Younger Lagoon property from Donald and Marion S. Younger to The Regents of the University of California). At the time of their donation, it was the express wish of the Younger Family that the lagoon and beach be preserved in perpetuity as a bird sanctuary (Howard Interview). When the University inherited the property, all of the flat land around lagoon was being farmed; the land was all tilled and there was a drainage ditch dug on the terrace property running from each wetland pond towards the edge of the property (Photo #1975 and Davenport Interview). Also, the Walti-Schilling Company/Wolfsen slaughterhouse was still intact (Davenport Interview). In 1986 Younger Lagoon was incorporated into the University of California Natural Reserve System (NRS) (Seymour Center at Long Marine Lab). The construction for the Long Marine lab on the south side of the lagoon property began in 1976 and the Joseph M. Long Marine Laboratory was dedicated in 1978 to honor the substantial contributions to the university made by Joseph M. Long, founder of Longs Drugs (Seymour Center at Long Marine Lab). Additionally, the Seymour Marine Discovery Center opened on March 11, 2000 adjacent to the Long Marine Lab. The Seymour Marine Discovery Center describes itself as giving “school children and the public unique views into the workings of a world-class marine research lab” (Seymour Center at Long Marine Lab). In June 2001, UCSC completed the Center for Ocean Health next to the Seymour Center. In summary, the present-day Younger-donated property consists of a natural reserve and a variety of developments providing educational and research services.

The Terrace Lands Purchase

In 1999, 57 acres of terrace lands were purchased by the University from Wells Fargo Bank for the expansion of the Long Marine Lab into a Marine Sciences Campus (Howard Interview). In December 2007, the University's Coastal Long Range Development Plan (CLRDP) for the Marine Science Campus was approved by the CCC. The CLRDP includes plans for expanded teaching, research and public access opportunities on the terrace lands site. Approximately 10 acres of the terrace lands have been approved for facilities development. The remaining 47 acres will be restored over the next twenty years and protected in perpetuity. These 47 acres were incorporated into Younger Lagoon Reserve in the summer of 2008. Restoration of the YLR terrace lands will be guided by a Scientific Advisory Committee (SAC). Planning for phase 1 of the restoration (the first 7 years) is already underway and described in a Specific Resource Plan (SRP) developed by UCSC NRS staff and the SAC.

Prior to the University's purchase of the terrace lands, the federal government purchased approximately 2 acres of land on the terrace for a National Ocean and Atmospheric Administration research facility. In October 2000, the National Marine Fisheries Service dedicated a 19.4 million dollar research lab focusing primarily on salmon and rockfish on land next door to the California Department of Fish and Game research facility (Seymour Center at Long Marine Lab). This state-of-the-art laboratory houses the first National Science Center for Marine Protected Areas (Seymour Center at Long Marine Lab).

Current Description of the Property

Today, the original YLR contains habitats that include salt and freshwater marsh, coastal strand, backdune pickleweed flat, steep bluffs with dense coastal scrub, pocket

beach, grassland, and dense willow thickets (University of California Natural Reserve System). Additionally, the reserve provides protected habitat for 100 resident and migratory bird species (University of California Natural Reserve System). South-east of the lagoon, the University of California Santa Cruz's Long Marine Lab provides facilities for scientists who require running seawater, large marine mammal pools, and seawater labs to conduct their research. The close proximity of the lab permits ease of integration of activities with the campus' instructional and research activities. Additionally, the reserve supports coastal-related research and educational activities including guided public access.

YLR is part of the UC Natural Reserve System and is used for teaching and research purposes (CLRDP). Most of YLR qualifies as Environmentally Sensitive Habitat Area (ESHA) by Coastal Act standards and access to the Reserve has been limited during most of the time it has been under UCSC control (CLRDP). The lands to the north and west of YLR are in agricultural production. The lands immediately to the east are developed with the built facilities of the Marine Science Campus (CLRDP). The Long Marine Laboratory is located on the coastal bluff to the West of YLR. An earth berm or fence lies along much of the boundary between the two. The 30-year-old LML facility is situated above the seawater intake system that brings seawater up to the research complex. The 57-acre terrace land is home to the Seymour Marine Discovery Center and the NOAA Fisheries Laboratory, a federally owned 2.5-acre in-holding within this property. Both facilities are connected to the seawater intake system. Fresh water wetlands have been identified on the property, a portion of which drain to Younger Lagoon. The property is bounded on the north by the Union Pacific Railroad, and on the

east by Shaffer Road and the De Anza Mobile Home Park (south of Delaware Avenue). The terrace portion of the Marine Science Campus is the primary location for new development under the CLRDP.

Goals for Restoration

There are many possible goals for a habitat restoration project. Restoration practitioners may choose from a range of possible goals including: changes in wildlife usage, visual quality, ecosystem services, vegetation composition or coverage, etc. No matter what goal(s) a restoration practitioner chooses, the initial biotic condition of the site (including land use history), as well as the resources available for the restoration project must be taken into account. The restoration potential of a site depends in great part on these variables.

In comparison to the terrace lands, the original YLR has been relatively undisturbed. The lagoon and surrounding slopes were not subject to tilling, and it currently supports a variety of native species. However, YLR is not immune to disturbance, and is subject to weed seeds blowing into the site from the surrounding agricultural fields and agricultural runoff.

There are significant resources available for restoration at YLR – both for the original reserve and the terrace lands. In addition to the 1.5 full time staff members, the reserve has a myriad of student volunteers and interns available for weeding and planting. The reserve also has access to on campus facilities for plant propagation, as well as some funding from the University that can be used to support restoration activities.

According to Elizabeth Howard, the Manager of YLR, the goals of the current YLR restoration project in the original reserve are to remove ‘Priority 1’ weeds, and

increase the abundance and percent cover of native plants. Additionally, the restoration project strives to protect and preserve the lagoon as wetland habitat for birds and fish by limiting public access. Current restoration projects occurring at Younger Lagoon Reserve include poison hemlock (*Conium maculatum*) removal and native plant re-vegetation. I have had the opportunity to do hands-on work as an intern for the YLR restoration project, including while doing research for this historical ecology project.

Given the history of relatively little disturbance by humans through agriculture or any other means, I support the choice to restore the area by weeding out non-native species and promoting the growth of native plants. I also support the idea of limiting the number of people who can visit and the ways that those visitors may use the reserve so that the wetlands and resident wildlife can flourish. Based on my experience with the project, my only suggestion for improving the existing restoration program is to improve intern training by providing a restoration handbook because I think that it would be beneficial for interns, even interns who only work a few hours a week, to have a more in-depth understanding of the field of restoration ecology, in general.

On the other hand, the terrace portion of the site has undergone significant disturbance; it was subjected to agricultural tilling for approximately 70 years and then lay fallow for approximately 20 years. Currently, the terrace lands support wetlands, non-native grassland and coyote brush scrub-grassland. Initial survey work done in the area reveals that there are relatively few native plants on the site. A total of 101 species of vascular plants have been identified from the site (CLRDP, Appendix A). Of these 101 species, 37 are native or believed to be native (some may be escapees from adjacent

native plantings) and 62 are non-native (CLRDP, Appendix A). Therefore, according to Ms. Howard, the starting point for restoration is relatively low.

According to the CLRDP, restoration and enhancement efforts for the terrace lands are organized into two seven-year phases and one six-year phase—a total of twenty years for all three phases. Within each phase, approximately one-third of the area outside of development zones will be restored and enhanced. At the end of the last phase, all the natural areas will have been restored and enhanced and management of these areas will continue indefinitely (CLRDP, Appendix A). The CLRDP also requires that the original Younger Lagoon Reserve, seasonal wetlands, and associated buffers be permanently protected. Upland areas will be managed to increase the abundance and diversity of native plant species and to promote the movement of wildlife between Younger Lagoon and Moore Creek (including Antonelli Pond) and Wilder Creek systems (CLRDP, Appendix A).

According to Ms. Howard, initial terrace lands restoration projects under the CLRDP will include ‘Priority 1’ weed removal and plantings along the southern (bluff) end of the site. Ms. Howard acknowledged that the restoration goals for the project as outlined in the CLRDP are somewhat ‘plant-centric’, but she said that they act as a proxy for other goals. For example, she noted that native wildlife species are likely to benefit from increases in abundance in native plant species and percent cover. Therefore, while it may be practical to focus on vegetation, other goals are also likely to be achieved through restoration efforts.

The terrace lands site differs from other local coastal sites that were not tilled. For example, the State Parks owned grassland at the mouth of Whitehouse Canyon in San

Mateo County is similar to the terrace lands, but was never tilled. It has a relatively high number of native species. At first glance, restoring the terrace lands to something similar to the Whitehouse Canyon site appears to be an appropriate goal. However, I believe it would be difficult to restore the site to function similarly to undisturbed grassland, such as Whitehorse Canyon simply because of the significant human impacts on the site.

Larry Wolfsen recalled dredging the wetlands several times, altering their functions and there is overwhelming evidence from Mr. Wolfsen, as well as Steve Davenport, and aerial photographs of the area, that tillage occurred on the land for many years. It would be difficult to reverse the effects of farming, which removed all of the native plant and animal species from the area.

Therefore, I believe that the CLRDP's stated goal of increasing the abundance and percent cover of native plants is appropriate. Overall, I think that the goal should be to retain as much open grassland as possible, both to preserve foraging habitat for birds, and to emulate the character of more intact local coastal sites. Significant funding exists for this project and I hope that restoration can be carried out in a manner that continues to compliment the mission of providing an educational place for students, researchers and the general public that populate the Marine Science Campus.

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Summer 2009 Interns at Younger Lagoon

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