

Designing Towards a Regenerative Community Through Ecological Education and Indigenous Kinship

MARYAM ESKANDARI

MIIIM Designs llc | Principal

California State Polytechnic University- pomona

Keywords: Ecological Architecture, Biophilia Design, Climate Change, Urban Design, Planning and Infrastructure, Architecture Education, Anthropocene, The Nature Conservancy.

To gain a better understating of the roles that both architects and landscape architects play in creating an equitable resilient future, we have to rethink the foundation of ecological education and learn to design critically in the way that the original care-takers of our land, the indigenous tribes, have done by invoking and designing consciously for the next seven generations.¹ In theory, architecture should be designing, building and developing through landscape urbanism and developing the urban environment by shrinking city sprawls and suburbanization and cultivating stewardship through social-ecological transformations that reestablish human-ecosystem relationships. The case study presented here is a 5-year research project that investigates the Jack and Laura Dangermond Preserve, 24,000 acres with 8.5 miles of coastland at the confluence of fresh and sea water, as the last largely undeveloped, yet damaged by the foundational infrastructure of developers, in the state of California. The goal of the investigation has been to create a place at the preserve that would actively restore and remediate the land, returning it back to its original condition by implementing Chumash knowledge practices in ecological architecture, landscapes, craftsmanship through plants and properties, preservation of biodiversity, enhancement of migration patterns of fauna, and mitigation of climate changes etc.² which were in practice before the unpermitted occupation of the developers and investors, to ensure a resilient future for the state.

Soul and soil are not separate.

Neither are wind and spirit, nor water and tears.

We are eroding and evolving, at once, like the red rock landscape before me.

Our grief is our love.

Our love will be our undoing as we quietly disengage from the collective madness of the patriarchal mind that says aggression is the way forward.

— Terry Tempest Williams, *All We Can Save*

INTRODUCTION This generation is infuriated with what they have inherited from our generation in regard to the environment, ecology and the basic knowledge of landscape design. They want to know about urbanization beyond the footprints of the cities, and to learn about geology, geographies and infrastructure pertaining to renewable resources such as solar and wind power.³

There is no doubt that climate change is wreaking havoc upon the earth. Although earthquakes, volcanoes, fires, dust storms, and drought are natural phenomena, they have been exacerbated by climate change and air pollution. These ominous environmental and social catastrophes are the exact right combination of weather patterns threatening the frameworks used by designers and planners for urbanization and production of the built environment. There are the major changes going on in the urban process in the production of landscape and the built environment. In order to confront these new climate-related issues as well as the related problems of migration, super urbanization and overpopulation in Southern California, we need to adopt a new critical lens based on relationships (not currency), and widen the frameworks through which we theorize and undertake design and planning processes to incorporate



Figure 1. Site Analysis (Drawings done by Ida Li and Maryam Eskandari)

the value and knowledge systems of indigenous traditions about land stewardship in lieu of Euro-American ideas about land ownership.⁴

Children, elderly, the underserved and communities of color are less climate-resilient and more vulnerable to the negative health effects of climate change. Global migration patterns continue to diversify in areas most lacking in support resources and most exposed to environmental and economic risks. Climatic and anthropogenic forces threaten biodiversity and global ecosystem health; yet only 5% of the world's endangered lands remain protected. While western (European and American) conservation strategies have focused on safeguarding “pristine” landscapes from human influences, they tend to perpetuate an artificial divide between the Anthropocene⁵ and nature, whereas indigenous knowledge systems tend to erase such a divide. With the aid of Indigenous knowledge and practices reflected within ecological architecture and landscape design, we can implement a new ecological architecture for realism in the context of climate change,⁶ as indigenous knowledge practices toward the environment continue to prove a living model of sustainability. A five-year project with the Dangermond Preserve has allowed us to begin to implement an ecological architecture that has been rooted in an indigenous wisdom that has informed its practitioners how-to live-in balance with the Earth.

While architects have been building and developing through urban environments and landscape urbanism through the theory of both shrinking cities and suburbanization,

environmental theorists have recognized the need to cultivate stewardship through social-ecological transformations that reestablish human-ecosystem relationships. The practice of ecological architecture and biophilic design, through generative ideas, geospatial science, mapping, theory and research can address and generate ideas for many of the challenging design problems. The designs solutions integrated into the landscape have the ability and the capacity to mark time. They can initiate transformation mythology and biodiversity through an operative design agenda, such as material dynamics, and creating new types of environments that develop new terrains and landscapes. Design solutions can actively restore and remediate the land, returning it back to its original condition by implementing indigineous knowledge practices in ecological architecture, landscapes, craftsmanship through plants and properties by setting up the next 150 years⁷ through engaging our current geological period characterized by the epoch impact of the Anthropocene⁸—impact of humans on the environment at the Earth's scale.

Time is the primary force on a landscape. Over 4 billion years of Earth's dynamic history has brought us to where we are today and the only thing, we can be certain of is that it will continue to change. Human presence and the development of the cities of Santa Barbara and the nearby towns, such as Lompoc, have contributed to the most recent changes, having radically shifted the composition of the air, land, water, and vegetation. The Dangermond Preserve, 25,000 acres with 8.5 miles of coastal property, is nested in-between these cities at the “corner”

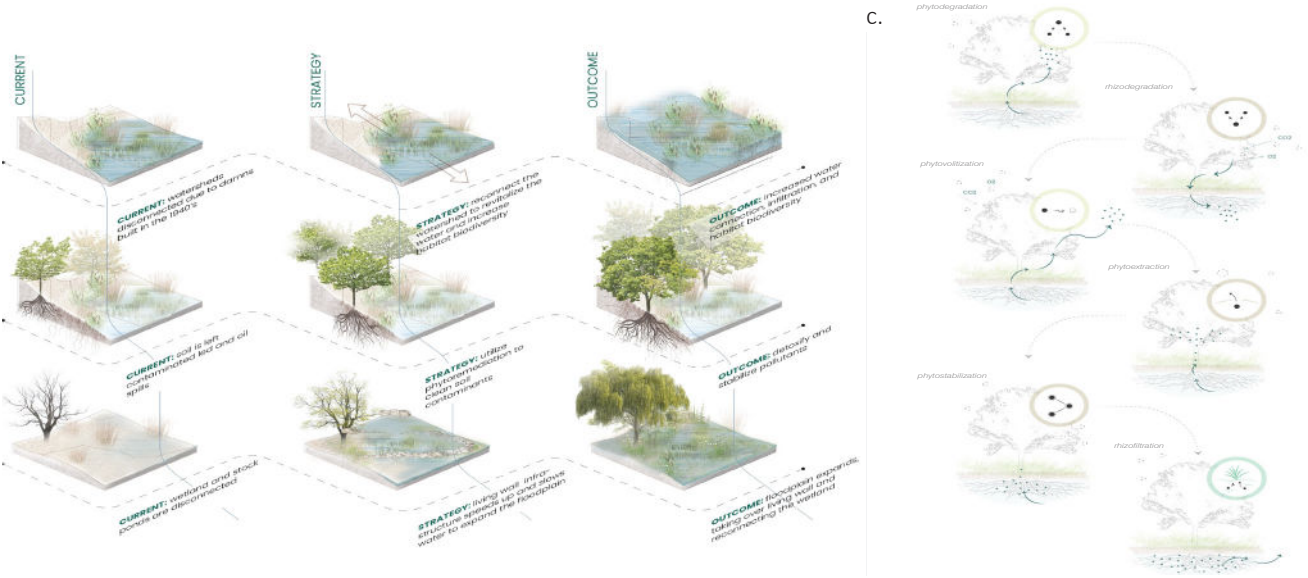


Figure 2. Macro Ecological Strategies and Phytoremediation (Drawings done by Lydia Oweiss and Maryam Eskandari)

of California. The site, originally intended to be developed, yet damaged by the foundational infrastructure of residential developers in the early 2000's, is now a complex nature preserve that addresses the questions of value to nature, science, and society relating to past, present, and future conservation efforts.

The project begins by asking critical questions about the Mediterranean biome, which is among the most imperiled globally⁹ and is recognized as a biodiversity hotspot, with high endemic species diversity and endangerment. This project focused answering two critical questions that would allow for the Preserve to develop a 5–10-year actionable plan for both infrastructure, focused strategies on rejuvenation, restoration, preservation, ecological education and indigenous kinship as well as the creation of community-oriented transformative experiences demonstrating the commitment to excellence in management and stewardship:

- 1/ What are the criteria for a better understanding, conservation, preservation and restoration needed in the face of climate change and ecological collapse?
- 2/ What is the essential infrastructure that is needed to implement a 5-10 year plan for conservation, preservation, restoration, and community-engagement:
 - a. execute restoration and preservation management,
 - b. establish a science agenda,

prepare for ecological education and indigenous kinship?

To address these questions, we began the project through open research investigations and ultimately proposed speculative site-specific projects for a number of sites throughout the Dangermond Preserve. We then focused in on the following critical design questions:

- 1/ For whom are we designing?
- 2/ How might site-specific projects in the short- and long-term engage a fuller range of ecological education and foster indigenous kinship?

Initial investigations examined the preserve in order to establish a baseline of understanding through the lens of ecological urbanism. From there, the project proposals focused on productive processes, and on landscape catalysts and activation initiatives for inaugurating environmental, social, cultural, urbanistic, and economic transformation. Incremental, tactical, and cumulative projects and processes were emphasized; a combination of the physical and the operative, of the pragmatic and the inventive, were at the heart of these investigations. The project embraced the idea that design ideas can emerge over time as a result of catalytic and transformational processes that continue to work at multiple timescales, ultimately resulting in a sequence of occupations and provisional projects that could each be complete and legitimate in its own right as not just shaping and restoring the landscape, but rather a productive landscape that is designed to have both a functional propose and

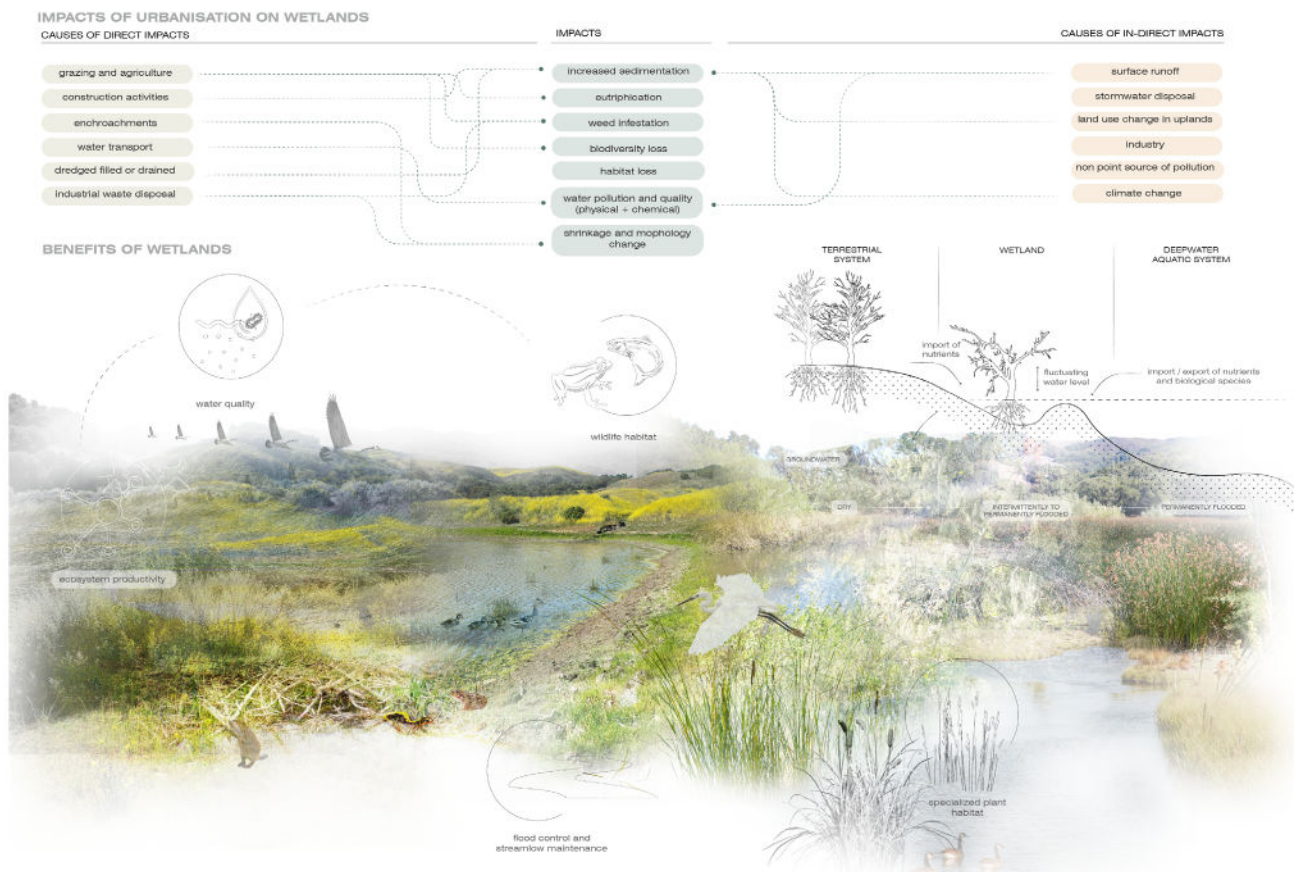


Figure 3. Significance of Wetlands (Drawings done by Ida Li and Lydia Oweiss)

is aesthetically, intuitively, ergonomically pleasing; and yet have the ability to curate the historical context of the site.

The design problem started by mapping and investigating the land over time through two different lenses, the macro and micro habitat of ecological urbanism; and explored themes of connectivity, resilience, and landscape infrastructure through the particular spectacles of the wildlife, amphibians, pollinators and microbes in both northern and southern California, as a sanctuary for our eco-system, against a backdrop of the twin challenges of climate change and biodiversity loss through Anthropocene activities. We then examined the effects of the biodiversity and ecological practices of the land to foster conversations around and projects that address our relationships to the non-human entities and environments around us; and the ways in which we might consider new and reciprocal relationships with the creatures that inhabit the fringes and wildlands of the places that live and occupy. These mappings allowed for further exploration, conceptualization and development of new hybrid assemblages, urban ecologies, urban imaginaries, that fosters new kinships between and among all earth's inhabitants. Importantly, this an attempt to re-establish lost connection.

By extension, we applied methods of retooling, both as a conceptual and operative mode for conservation and preservations. In order to initiate retooling, the first step is through data analysis and data mapping of the Chumash activities within the preserve. After the data analysis and mapping of the Chumash, the second step was then to investigate each site of the Preserve. We approached each site-design by invoking an imaginative rethinking that entails speculation about design intervention that can physically reshape a landscape as both a site or in this case as a preserve, and inhabitant/users of the space. The second step also embraces, through a productive and creative means, the concept of time, allowing for catalytic actions that then set and implement design standards and redirect the dynamic of the preservation landscape.

"[T]hey were always seen out by the dawn of day either examining their fish pots in the Bay or fishing in the middle of the Channel where they never failed to catch a plentiful supply of fish of different kinds particularly Boneto [Pacific bonito, *Sardachiliensis*] & a kind of Herring [yellowtail, *Seriola lalandi*]."



Figure 4. Dry vs. Wet Season in the Wetlands (Drawings done by Lydia Oweiss)

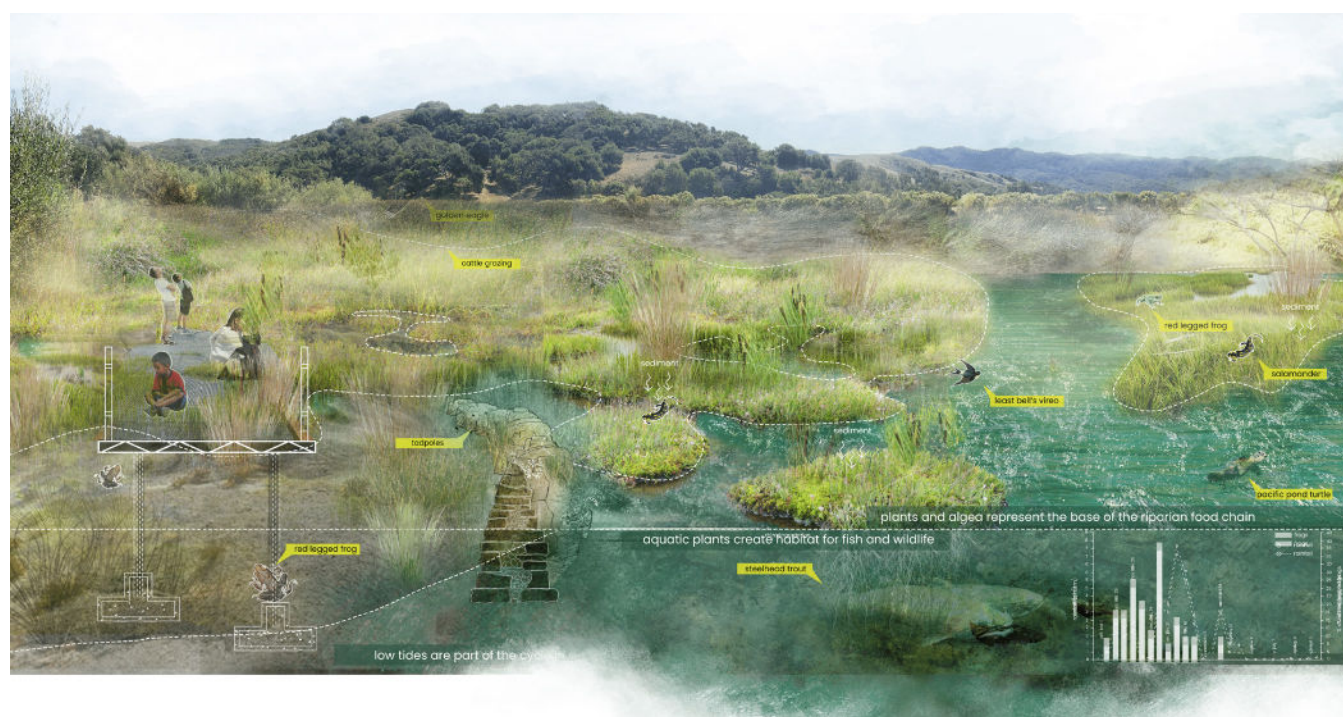


Figure 5. Design Concept of Jalachichi Basin in 5 years (Drawings done by Lydia Oweiss and Ida Li)

—Archibald Menzies wrote of the Chumash fishing off the coast of Santa Barbara in 1793¹⁰

DATA AND SITE ANALYSIS OF THE CHUMASH

The Preserve remains an important and direct link to Chumash culture and presents opportunities for the cooperation of modern science, traditional management plans, ecological education and indigenous kinship. First, we used methods of retooling as both a conceptual and operative mode through the data analysis and mapping of the Chumash. We learned that the preserve encompasses a biodiversity hotspot at the convergence of climatic regions and that for 9,500 years, the Chumash tribe lived, hunted, fished, and managed the land and ocean that comprise the Dangermond Preserve. The Chumash were the original land managers of the territory that extended across the Santa Barbara Channel area, extending from the Santa Monica Mountains up to San Luis Obispo. Population estimates are around 25,000 people at the time of European arrival, although 90% of the population died from violence, disease, and oppression for decades after the Missions were established. While much of Chumash history, culture, and language have been lost, what is known paints a picture of rich lifeways that facilitated remarkable biodiversity.

Through mapping exercises, we learned that at least two historic villages lined the shore and an unknown number of villages existed in the interior specifically at one of the sites, the Jalachichi Basin area at the start of Jalama Creek, where steelhead trout's passage barriers where initially incepted, contributing to a complex regional trade system for food, basketry, beads, and shells. Point Conception, another major site, demarcated the use of the *tomol*, a plank canoe that was widely used in the more protected waters of the Santa Barbara Channel. Point Conception was also an important landmark for Chumash cosmology, as it was believed to be a gateway on the soul's journey into the afterlife. The Chumash passed on their cosmology and stories through rock paintings that can be found across their territories. Cemeteries, shell middens, and lithic scatters also remain throughout the Preserve as cultural heritage sites for contemporary Chumash. Local indigenous villages, like the Jalachichi Basin and Point Conception, were forced into labor and re-education camps, and to convert to Christianity at the first contact with Spaniards in 1542 under the expedition of Juan Cabrillo.

Chumash lifeways were embedded in the local environment as they relied on it for food, resources, and housing. Each village's traditions and practices differed according to the elements and resources available to them. In the Jalachichi Basin region of the preserve, the Chumash knew the flora intimately and used

them for subtle distinction of their nature.¹¹ Jalachichi Basin demarcated more than 156¹² flowering plants, gymnosperms, ferns and fern allies¹³ native to the region. Unlike the Point Conception Chumash who were experts in boat building, the Jalachichi Basin Chumash were predominately basket weavers and had knowledge of how to utilize every part of a plant. For example, the bottom of the stems of streamside rushes, completely hidden under the leaf thatch shed by the overhanging sycamores and willows, was a deep brick red band of color, prized for basketry designs.¹⁴

Many plant species were multi-purpose. The California poppy, for example, alleviated toothaches, healed newborn babies' navels, and induced sleep. The corms of blue dicks were eaten wherever the plant grew. Plants were gathered from below sea level to above the timberline. Surf grass which grows below low-tide level in the waters of the Pacific Ocean, was harvested for Chumash skirts. Every plant community—from beach dune to evergreen forest and pinyon-juniper woodland was gathered. Every kind of plant part—underground bulbs, rhizomes, and roots; the oozing resin of trees; the sweet nectar of certain flowers; stems, bark, branches, shoots, leaves, thorns, flowers, seed pods, seeds, seed plumes, and cones—found a use.¹⁵ The Chumash in the Jalachichi Basin area even used nonvascular plants such as mosses, fungi, algae, and lichens.¹⁶ The mosses provided the bedding material for inside of the homes, and more specifically for babies bedding, as well as algae and fungi for baby diapers. The green algae, bulk kelp and sea lettuce were consumed. While an abundant variety of edible plants were harvested during the summer months, the fall and winter season were left with hardly any land-grown resources for animals, such as the deer to graze. Thus, we have come to discover that the Chumash were intensely marine-oriented; and for the winter season they relied upon stored food, including dried fish. During the spring season, several schooling fish—tuna, skipjack, yellowtail and albacore—presented themselves in the Jalachichi Basin channels in substantial numbers. Agave, Yucca, Manzanita, goosefoot, chia and a whole variety of other small seeds and rooted plant were also found in between crevasses and rocks in the Jalachichi Basin and were often harvested during the spring season.¹⁷

Meanwhile the Point Conception Chumash¹⁸ had re-innovated their basketweaving methods to a more macro level through the sophisticated technological transformation of the plank canoe, the *tomol*. Each *tomol* required 500 person-days¹⁹ of skilled labor to construct and they had to be of high-capacity water craft to carry the 66 species²⁰ of freshwater fish, made from dozens of planks of planed²¹ redwood logs that occasionally drifted on the beach carried by the powerful currents from Northern

California. These planks were then sewn together by hundred of fibers of milkweed strings and caulked with asphaltum that can still be found on the shores near Point Conception. Overall, Chumash plank canoes may have been the most sophisticated and most labor-intensive form of construction found amongst the indigenous communities in Americas.

Along with the exceptional engineering of the *tomol* canoes, the redwoods were also used to build houses. Chumash homes, known as the *aps*, were simple pole-and-thatch structures²²; and unlike the *tomol* which were principal labor investments of construction and maintenance in the form of architecture, were not as extensive or exceptional, but rather straightforward. Animal parts, such as bones²³, more specifically whale-ribs, were used alongside redwood poles for construction.²⁴

DESIGNING THROUGH INDIGENOUS KINSHIP

After the data analysis and mapping of the Chumash, the second step in our analysis and investigation was to map each site, starting with the Jalachichi Basin. We started mapping the land over time through two different lenses, the macros and micro habitat, landscape and resilience through the particular spectacles of the 66 species of freshwater fishes, 46 amphibians, 96 reptiles, 563 birds, and 190 mammals²⁵, and the loss of biodiversity through Anthropocene activities, in particular through the unlawful activities for residential parcel developments, gas stations, and golf courses. We learned that over 3,000 oak trees were illegally cut down causing a micro-shift in the Mediterranean climate and diurnal and seasonal fluctuation, and had to be replanted. More specifically, in 2006 and then again 2009, the developers built roads along the streams in the Jalachichi Basin, the main one being Jalama Road, bringing pollution and disconnection of the hydrological flow of the ponds from the wetlands causing drought and low water levels. This resulted in drying up all the numerous stream channels of both seasonal and permanent watercourses of riparian vegetations that resulted in the dissection of the coastal plains and marshlands²⁶. These illegal Anthropocene activities shifted the migration habits of the steelhead trout and endangering the red-legged frogs. In order to reawaken the passageways between the Anthropocene land gap, the road off of the Jalachichi Basin, and the ecological habitat, we concluded from this analysis the need for a re-establishment of the riparian corridor to build connection to historic wetlands and migration routes for the wildlife. This would have to be done by creating various habitat zones that would rewild, reconnect, rejuvenate and restore this area of the preserve.

Through restoring indigenous practices in caring for land revitalization, design concepts were implemented for each site-specific projects concepts to rewild and reconnect the wildlife back to the basin. Re-establishment of the riparian corridor and migration routes to the historic wetlands started with design

methods to bridge the gap between habitat fragments through phytoremediation, upland (zone 1), followed by the restoration and rewilding of Oak trees, submergent (zone 2). Zone (1) one, upland migration barrier and phytoremediation zone, expands across a 96'-0" area. This zone will allow for filtration and removal of any sort of pollution caused by vehicular and road usage. The submergent zone, zone (2) two, would allow for a 100'-0" buffer for the amphibians, reptiles and birds to congregate.

Once zone one (1) and two (2) were established and through mapping and site analysis, zone three (3) was then designed. In the emergent zone (zone 3), methods and strategies for wetlands and living wall were designed, in order to allow for a healthy breeding habitat for various mammals, freshwater fish and reptiles. We were then able to design ponds and fish passages for breeding grounds and filling in the historic wetlands originally created by the Chumash. To implement the design in the emergent zone (zone 3), three phases over the course of five years had to be considered:

First, strategies were designed to open the waterways and remove fish passage barriers allowing for food-webs in the riparian zones. It was essential to remove current passage barriers: culverts, weirs, causeways and ripraps. Secondly, design methods were developed to transport high velocity of water through long distances and managing them through obstacles and low flow (ecological architecture through infrastructure) to diminish habitat fragmentation. Emulating the Chumash methods, we can slow down water through the use of planed redwoods – or unrefined “waste” pieces of splitting redwood logs that the Chumash used to build the *tomol* - to create natural terrace weirs. This alternative natural method is also done naturally by beavers and their creation of dams. By using the planed redwoods to create these breeding pockets and phytoremediation riparian buffers, we also allow for a creation of a new habitat for aquatic insects and provide protection from predators. Another method of naturally controlling the speed of water is through built infrastructure such as living walls. The forms generated through the landscape contours, allows for these living walls to both slow down the movement of water for phytoremediation and breeding grounds, and speed it up to restore original wetland footprints and help with Steelhead migration whose patterns have been adversely altered through climate change. By increasing the speed of the necessary direct water towards the wetland and into Jalama Creek, we allow for an easier 8-mile creek journey for the migration of the Steelhead Trout from the ocean up into the creek and breeding in the basin.

Lastly, through indigenous knowledge, strategies for wetlands and living walls were designed in order to allow for a healthy breeding habitat for various mammals, freshwater fish and reptiles. In the first year, methods to slow down water and allow

for soil levels to expand, creating a bigger floodplain area for wetlands, is necessary for both phytoremediation and breeding. This can be done through the porosity of the living walls. By the second year, infiltration of the soil will have expanded the floodplain and allowed for a bigger area of still-water and wetlands. In the meantime, ecological growth between the living walls will have taken place producing nonvascular plants such as mosses, fungi, algae, and lichens.²⁷ By the end of the fifth year of the living wall, the growth of various plants on and in-between the niches of the stones, regardless whether it is drought or flood season, will have been creating micro habitat zones and an ecosystem that has both the ability to change and adapt to the climate of the landscape. During flood season, the fine sediments deposited in-between the living wall will aggregate and shift over to the outer floodplains, decreasing the competency of the living wall. After flood season, when water movement has returned back to its original state, the natural levees build back up and restore themselves in and between the living wall, returning the natural habitat back to its original naturally productive form. The last step in the emergent zone (zone 3) is to create freestanding bridges to minimize impact and allow for higher water flow. The structural framework and materials of these bridges²⁸ are to emulate the Chumash *tomol* canoes.

The idea that landscape, as a mode of both systems ecology and thinking, in an ever-adapting and constant change of the environment can evolve to incorporate the ecological organisms and the ecosystems ability to both change and adapt to embody a particular idealized state and return the landscape back to its initial form through the mode of preservation. Through landscape application and ecological knowledge, we can then discover new starting points for investigation, instigation and intervention that would help to restore the land's ecology back to its original state. As we look at these landscapes and strive to restore them, we must keep in mind that the landscape evolved symbiotically with the Chumash communities that inhabited the area. The silent ghosts of their presence inhabit the landscape, not just in the archaeological remains, but in the distribution and growth patterns of plants and animals and their management of ecosystems. Land management came from a deep relationship to land, not dominion over it. The myth of terra nullius blinds the environmental movement to the reality that nature and "wilderness" without humans does not exist. The legacy of Chumash and other indigenous communities' relationships to the land provide hope for regaining a connection to land beyond designing consciously for the next seven generations and cultivating stewardship through social-ecological transformations that reestablish human-ecosystem relationships through indigenous kinship.

The project's research and study are based on the foundation principles of using the best available science, practicing adaptive management and investigating ways of mitigating the effects of climate change. Through these case-studies and site-specific projects, we hope to protect, restore and set forth principles to manage natural and cultural resources that are key to implementing programmatic goals and implementing structural decision-making for the proposed activities to natural and cultural resources of the betterment of the Dangermond Preserve. The next 10-20 years are critical for the future of our planet and current human activities are radically reshaping the ecosystem. The actions that we take together are important for protecting the natural world and creating a sustainable future. Protecting, restoring and managing natural systems to be more resilient to change will ensure that the Earth will benefit from our presence as much as we benefit from the resources it provides.

ENDNOTES

1. Johnson, Ayana Elizabeth, and Katharine K. Wilkinson. 2020. *All We Can Save: Truth, Courage, and Solutions for the Climate Crisis*. First edition. New York: One World, 25.
2. The keepers of indigenous knowledge carry thousands of years of data on things such as medicinal plant properties, biodiversity, migration patterns, climate changes astronomical events and quantum physics (Johnson 2020, 17).
3. Howe, Cymene, and e-Duke books scholarly collection. 2019. *Ecologies: Wind and Power in the Anthropocene*. Durham: Duke University Press.
4. Johnson 2020, 17
5. Haraway, Donna Jeanne. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham: Duke University Press, 35
6. Through this Dangermond Preserve project, we took the notions of "realism" and the ideas of ecological architecture and landscapes through "abstraction" to be able to resolve a restoration method that would assist with the preserve in which it encompasses a biodiversity hotspot at the convergence of climatic regions. Through data analysis, mapping and retooling, realism for architecture in the context of climate change would be in its carefully calibrated degree of separation from the real, in order to achieve a much deeper engagement with the site and preserve through the limits and potential of architectural specificity and its speculative rigor.
7. Johnson 2020, 25
8. Haraway 2016, 102
9. Hoekstra, J.M., T.M. Boucher, T.H. Ricketts, C. Roberts. 2005. Confronting a biome crisis: Global disparities of habitat loss and protection. *Ecology Letters* 8:23-29. <https://doi.org/10.1111/j.1461-0248.2004.00686.x>.
10. Anderson, Kat. 2005. *Tending the Wild: Native American Knowledge and the Management of California's Natural Resources*. Berkeley: University of California Press, 46
11. Anderson 2005, 46-47
12. Timbrook, Janice, and Chris Chapman. 2007. *Chumash Ethnobotany: Plant Knowledge Among the Chumash People of Southern California*. Santa Barbara, Calif.: Berkeley, Calif.: Santa Barbara Museum of Natural History; Heyday Books.
13. Anderson 2005, 42
14. Ibid
15. Ibid
16. Haraway 2016, 102
17. The Conversion of the Chumash Indians: An Ecological Interpretation Author(s): Gary Coombs and Fred Plog Source: *Human Ecology*, Dec., 1977, Vol. 5, No. 4 (Dec., 1977), pp. 309-328
18. Anderson 2005, 45-47
19. Arnold, Jeanne E. 2007. "Credit Where Credit Is Due: The History of the Chumash Oceangoing Plank Canoe." *American Antiquity* 72 (2): 196-209. <https://doi.org/10.2307/40035811>.

20. Anderson 2005, 45
21. Arnold, "Credit," 196-198
22. Arnold, Jeanne E. 2001. *The Origins of a Pacific Coast Chiefdom : the Chumash of the Channel Islands*. Salt Lake City: University of Utah Press, 290
23. Anderson 2005, 45-47
24. More research is to be done on the means and methods of construction of the Chumash, on both the tomol and homes in future months in order to use the same techniques in creating new buildings, bridges and other infrastructure on the Preserve.
25. Arnold 2001. 10-19
26. Timbrook 2007
27. This is in preparation for another interdisciplinary studio between architecture, landscape architecture and the marine biology department to design ecological infrastructure and architecture of the Chumash by emulating the aps.
28. This is a studio cross interdisciplinary studio course between architecture, structural engineering and landscape architecture students in collaboration with the Nature's Conservancy.