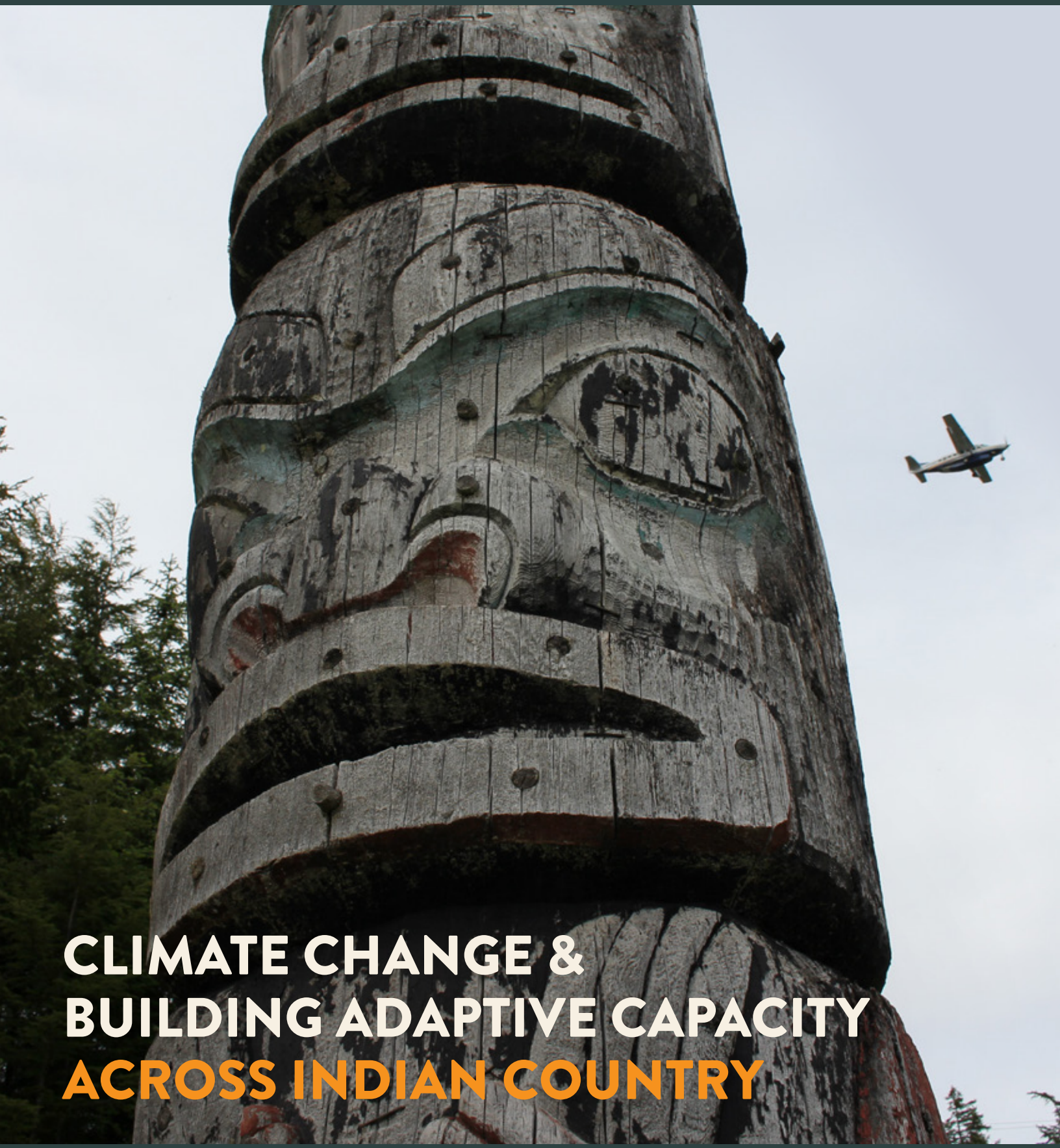


CLIMATE CHANGE & BUILDING ADAPTIVE CAPACITY ACROSS INDIAN COUNTRY

FIRST NATIONS DEVELOPMENT INSTITUTE

www.firstnations.org

ACKNOWLEDGEMENTS

This work is made possible in partnership with the Bezos Earth Fund. The contents in this report are those of the authors alone and do not reflect the views or opinions of the Bezos Earth Fund. This paper was written by Clarisa Diaz of Moskehtu Consulting, LLC, and Jacque Demko, Associate Director, Stewarding Native Lands, with valuable input from Mary Adelzadeh, Director, Stewarding Native Lands. Special thanks to Alicia Kovalcheck for report photographs and graphic design. We thank all Tribes, Native-led organizations, and allies of Native American communities whose hard work, values, and guidance inform this report. In particular, we express deep gratitude and appreciation to **Seeds of Harmony, Inc., of Round Rock, Arizona,** and the **Kake Tribal Heritage Foundation of Kake, Alaska,** for their work, expertise, and contributions informing the highlighted partners of this report.

First Nations Development Institute. (2023) "Climate Change & Building Adaptive Capacity Across Indian Country." Longmont, CO: First Nations Development Institute.

To download additional copies of this report, please go to **www.firstnations.org/knowledge-center**

TABLE OF CONTENTS

EXECUTIVE SUMMARY

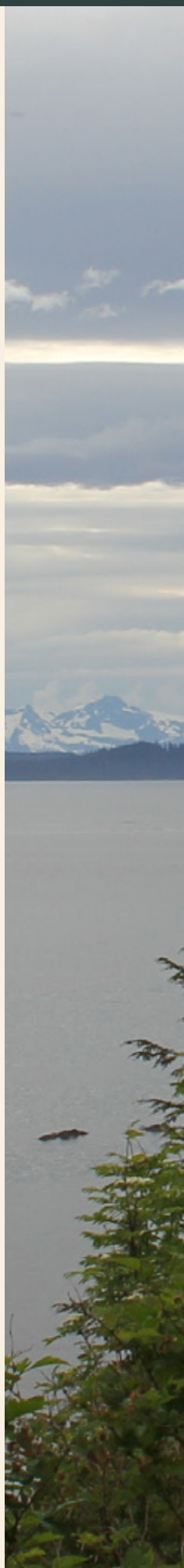
In January 2023, First Nations Development Institute (First Nations) announced the 25 Native community partners, including Native-led nonprofit organizations and Tribal governments, to receive $40,000 to $100,000 in grant support to create or advance workforce development, implement climate adaptation plans, or facilitate discussions on ways Native Nations are using Native knowledge and practices to prepare for and respond to climate change. The grants were part of First Nations' Climate Change and Environmental Justice project, created in partnership with the Bezos Earth Fund, which made it possible to implement the following grant programs to assist community partners in addressing climate change and promoting environmental justice:

- **Climate Resiliency in Indian Country** is catalyzing a critical mass of Tribes and Native-led nonprofit organizations to conduct and operationalize climate change plans and amplify the power of Native knowledge. First Nations awarded 11 grants of up to $100,000 each for projects related to the development or implementation of climate adaptation planning.

- **Regional Dialogues on Climate Resiliency** supports Native-led organizations to convene Native Nations to discuss Tribal climate adaptation and the U.S. Justice40 initiative in Native communities. First Nations awarded four grants of up to $100,000 each to projects related to the planning and hosting of regional-focused climate conversations.

- **Green Jobs in Indian Country** supports Tribes and Native-led nonprofit organizations that are in the early stages of developing and/or expanding programs that support green job development in response to climate change. First Nations awarded 10 grants averaging $100,000 each to organizations to develop a workforce that is ready to address the ongoing and increasing effects of climate change in Native communities.

This report elevates community stories and themes of adaptation in the face of environmental injustice and climate change for the Climate Resilience in Indian Country grant program. It aims to bring attention to policy, infrastructure, and adaptation challenges and opportunities in Indian Country and highlights examples of successful and sustainable climate adaptation strategies that may be useful to Native communities. To demonstrate a snapshot of community-focused climate adaptation planning efforts in Indian Country, this report outlines perspectives and projects from nine community partners and highlights the experiences of the Kake Tribal Heritage Foundation of Kake, Alaska, and Seeds of Harmony, Inc., of Round Rock, Arizona.



INTRODUCTION

Climate change is impacting people around the globe with more extreme and fluctuating weather events. Floods, heat waves, drought, erosion, wildfires, and rapid snowmelt are just some of the climate risks communities face globally.[1] Native communities are disproportionally impacted by changing environmental conditions and extreme weather events because of their connection to and reliance on the natural environment for cultural identity, ceremony, subsistence, and medicines.[2, 3, 4]

For Native communities, maintaining and preserving lifeways, ceremonial practices, and cultural traditions becomes even more challenging with the changing climate. The changing climate is causing planting and harvesting seasons to become less predictable. Many Native peoples rely on local or regional environmental cues, passed down from generation to generation, for when to plant and harvest. With extreme weather events and warming temperatures, these cues become less relevant. Furthermore, Native peoples pass down Native knowledge of medicinal plants, including where to find and how to harvest them. However, as a result of the changing climate and habitat fragmentation, these plants are likely to decrease in availability or disappear altogether.[5, 6] Food availability on Native reservations, many of which are food deserts, will continue to become even more strained. Before colonization, Native communities had thriving food systems. The disruption of those systems, due in large part to federal policies, removed people from their ancestral lands; severely or completely restricted their ability to gather, hunt, and fish; and led to their dependency on food commodities supplied by the U.S. Government. The legacy of these issues is ever present today as nearly 1 in 4 Native people experience food insecurity and are still largely dependent on outside resources.[7] In some cases, the land where Native people live is literally disappearing under them. Flooding and erosion rates threaten the livelihood of many coastal Native Alaskan and Tribal communities along the edge of the Gulf of Mexico, putting them at risk of climate displacement.[8]

Yet, despite these challenges Tribes and Native communities have, over thousands of years, worked to develop strategies and nature-based solutions rooted in Native knowledge to build adaptive capacity and respond to climate impacts. Adaptive capacity is the ability to change one's state or condition. Tribes and Native communities' adaptive capacity is directly impacted by their economic and ecological well-being, dependency on natural resources, infrastructure, and land access.[9] Despite their cultural and economic diversity across the United States, Tribes and Native communities are addressing climate impacts by integrating Native knowledge into their adaptation efforts. Some examples of Native-led strategies that build adaptive capacity include cultural burning to prevent catastrophic wildfires and sustain biodiversity, restoring clam beds to address flooding and beach erosion, and reintroducing ecocultural plant species to strengthen soil quality and increase local food security.

Given the current climate situation, many institutions and non-Native people are now looking to Native communities for solutions. As stated in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6), meaningful participation and planning efforts that are informed by cultural values and Indigenous knowledge can address adaptation gaps and lead to more sustainable outcomes and benefits.[10] Many Native people are also reconnecting with their cultural practices and addressing the intergenerational trauma resulting from the effects of colonization, including the dispossession of their lands. This rematriation will not only help address climate impacts, but also regenerate soils and waterways. Upholding relationships to the land reflect the cultural connection between identity and stewardship. Stewardship is an inherent responsibility to manage, protect, and restore resources through cultural practices and Native knowledge.

A BRIEF HISTORY OF ENVIRONMENTAL INJUSTICE ACROSS INDIAN COUNTRY

The history of injustice toward Native communities has perpetuated and fostered systems of institutional racism that create barriers in all aspects of society.[11] Native people in the United States have experienced centuries of injustices, including but not limited to, land dispossession, assimilation, resource extraction, exploitation, and contamination. The effects of territorializing the United States and colonization of Native communities must be laid out in order to begin to understand how environmental injustices affect them. Because Native ways of life are so closely tied to the environment, the forceful removal of Native peoples from and the reduction of their land largely contributes to intergenerational trauma. The dispossession of land, which predominantly occurred from 1830 to 1850, has contributed to language loss, disrupted the transfer of intergenerational knowledge, and overall negatively impacted the economic, cultural, and social health of Native peoples. When communities were removed from the environments they had been subsisting on for hundreds of years, they often had to fight for survival in unfamiliar climates and ecosystems.[12] Federal action discouraged collective and community-based farming practices in order to promote individual operations and "civilize" Native peoples.[13] Another challenge arose from the unfamiliarity of farming in entirely new climates and topographies. Environmental injustices impose toxic waste dumping, industrial polluting, and unequal enforcement of environmental laws on or adjacent to tribal lands. The struggles that stem from historical extraction, exploitation, and contamination of Native peoples' lands and resources are likely to continue due to intentional exclusion from environmental decision-making and removal from land. As the U.S. Government recognizes environmental justice of Native communities, it must also commit to legal solutions that redress past injustices. Native communities will not be able to find environmental justice solutions unless they are given meaningful access and decision-making power.

Redefining "Resilience"

In 2023 First Nations' Stewarding Native Lands (SNL) team reframed the work supported under the Climate Initiative, which is designed to address ongoing and anticipated impacts of climate change to preserve lands and cultural lifeways. It was decided that the term "resilience" would no longer be used in SNL programming. The term resilience is deficit-based. The projects supported under the Climate Initiative are community-driven, holistic, and strengths-based, which do not fit the scope of the word "resilience."

THE JUSTICE40 INITIATIVE

To revitalize the U.S. Government's commitment to environmental justice, President Biden signed Executive Order 14008 in January 2021 to place the climate crisis at the forefront of national security planning and foreign policy. Part of the Executive Order included the creation of the White House Environmental Justice Interagency Council to coordinate federal efforts for "disadvantaged communities." The definition of "disadvantaged communities" recognizes Tribes and Native communities as historically underrepresented, and represents an opportunity to correct past and ongoing environmental injustices. The Executive Order is based on the understanding that any action to solve the climate crisis must also direct society toward a just and better path forward.[14]

As part of Executive Order 14008, the Biden Administration also introduced the Justice40 initiative to direct 40% of climate and clean energy investments to disadvantaged communities. Enacted in 2021, Justice40 is landmark social justice legislation for those who have historically been impacted by systemic and structural racism, specifically through environmental contaminations from business and governmental activities. Polluted water, air, and chemicals have contributed to ongoing health problems like heart disease, asthma, diabetes, and cancer in communities of color. Through Justice40, novel frameworks of environmental justice engagement are being piloted. For Indian Country, this means developing Native practices designed to build community consensus and capacity, center Native knowledge, and provide a pathway for others to follow.[15]

GRANTEE OVERVIEW

Grantees are located in six states, and projects serve over 15 Tribal Nations, Alaska Natives, and Native Hawaiians. The 2022 Climate Resiliency in Indian Country grantees are:

ʻĀina Momona, Kaʻamola Community-Led Erosion Mitigation Project based on the island Molokaʻi in the Hawaiian Archipelago. The community served is Native Hawaiian on Molokaʻi.

Brave Heart Society, Bde Ihanke (End of Lake) Climate Resilience Research Campaign located near Lake Andes, South Dakota. The community served is the Yankton Sioux Tribe of South Dakota.

Chugach Regional Resources Commission, Managing Coastal Armoring, Seawater Availability and Climate Change Adaptation located in Seward, Alaska. The communities served include the Native Village of Eyak (Cordova), Qutekcak Native Tribe (Seward), Valdez Native Tribe, Port Graham Village Council, Chenega IRA Council, Nanwalek IRA Council (English Bay), and Tatitlek IRA Council.

Hopi Three Mesas, Inc., Youth for the Future: Educating Hopi 4H Healthy Living Ambassadors and Youth for a Sustainable Future located in Second Mesa, Arizona. The community served is the Hopi Tribe of Arizona.

Kake Tribal Heritage Foundation, Climate Proofing Food in Kake, Alaska Through Risk Governance and Capacity Building located in Kake, Alaska. The community served is the Organized Village of Kake.

Kul Wicasa Wopasi, Plans and Prototypes for Climate Resilient Food Systems located in Lower Brule, South Dakota. The community served is the Lower Brule Sioux Tribe of the Lower Brule Reservation, South Dakota.

Lac Vieux Desert Band of Lake Superior Chippewa Indians, Lac Vieux Desert Band Food Sovereignty located in Watersmeet, Michigan. The community served is the Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan.

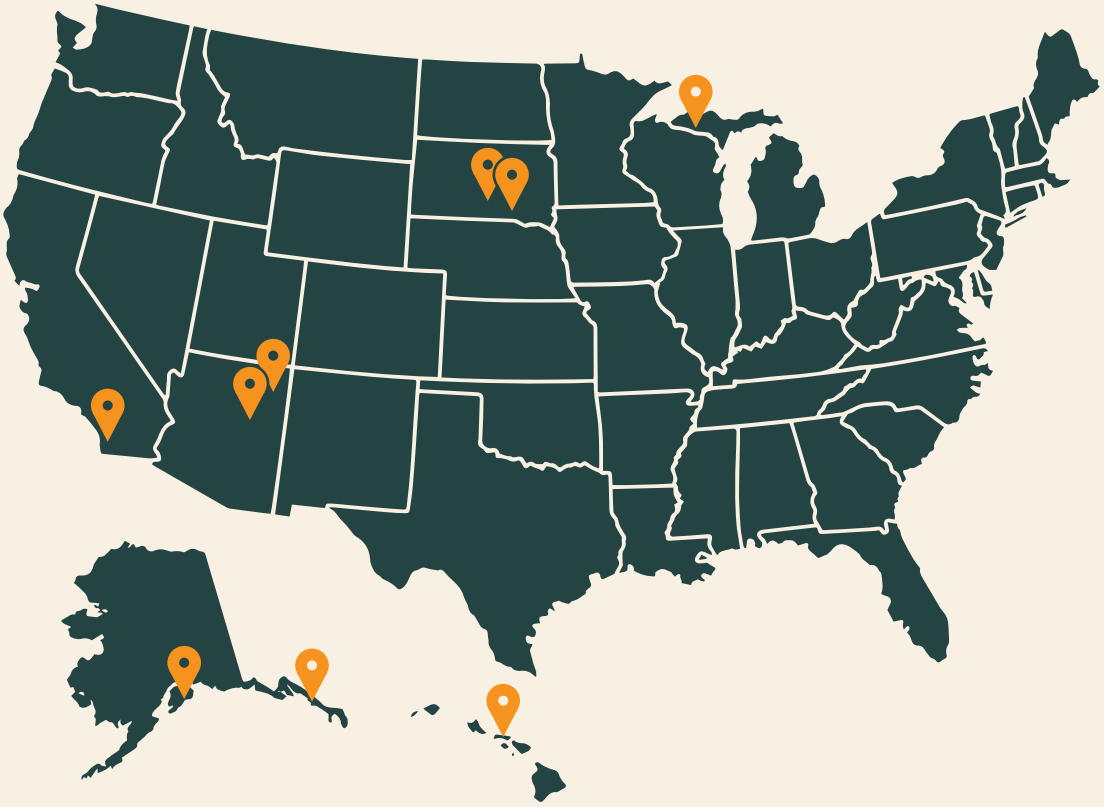
Mesa Grande Band of Mission Indians, Mesa Grande Indian Housing Authority (MGIHA) Climate/Fire Resiliency Project located in Ramona, California. The community served is the Mesa Grande Band of Diegueno Mission Indians of the Mesa Grande Reservation, California.

Native Public Media, Inc., Emergency Response & Preparedness Program in Flagstaff, Arizona. Native Public Media (NPM) serves as a national center for 59 Tribal radio stations and three television stations serving Indian Country.

Seeds of Harmony, Inc., Plant the Rain located near Round Rock, Arizona. The community served is the Navajo Nation in Arizona, New Mexico, and Utah.

Sustainable Molokaʻi, Molokaʻi Community Energy Resiliency Plan located in Molokaʻi, Hawaiʻi. The community served is Native Hawaiian.

Community Partners



CLIMATE GOALS AND STRATEGIES

Energy Sovereignty

In the past 15 years, renewable energy has been brought to the forefront of climate change dialogue as a potential path toward energy security that shifts reliance away from fossil fuels. Indian Country is seeing a proliferation of Tribal and Native community-led projects enhancing renewable energy development and efficiency. Sustainable Moloka'i's project focuses on a strategy aimed to strengthen Tribal energy sovereignty, lower energy costs, and increase energy security.

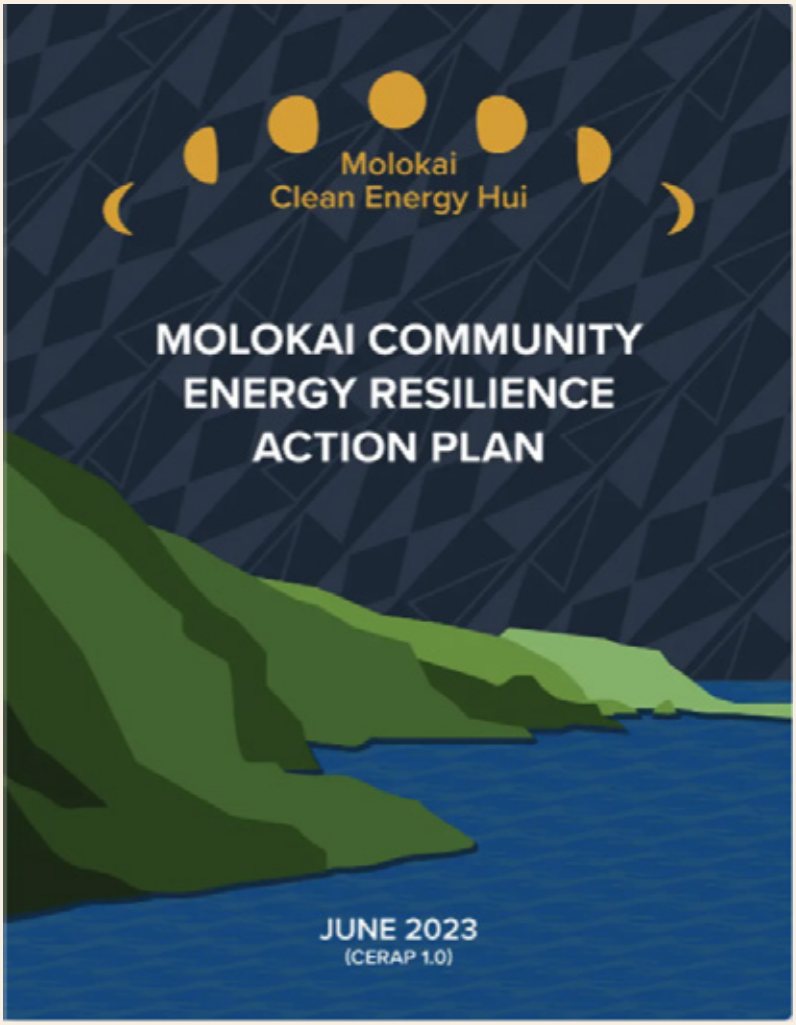
Sustainable Moloka'i

On the Hawaiian island of Moloka'i, sea level rise is causing the main road along the edge of the island to disappear. This is a problem not only for transportation but also for energy infrastructure, including the electrical poles that line the road that service the island and its 7,000 residents.

The Native Hawaiian organization Sustainable Moloka'i seeks to address sea level rise and energy sovereignty by working collaboratively to create community-driven environmental, economic, and culturally sustainable solutions. They plan to implement renewable solar energy projects as a primary source for powering the island and replace the majority power source, diesel-powered generators. Their energy initiative, Community Energy Resilience Action Plan (CERAP) is an independent, island-wide, community-led planning process that aims

to bring decision-making power back to the people and increase renewable energy on Molokaʻi. The initiative serves as a model for how energy planning can be done in rural communities, on islands, and across Hawaiʻi. Community-driven energy goals include critical infrastructure, fair renewable energy access for all, and disaster preparedness.

"We live a subsistence lifestyle that's culturally based in Molokaʻi. We do a lot of hunting, fishing, gathering, and farming. We're fortunate that we have all these additional resources from the land and the sea that help us supplement. Because of that, our community is very protective of our natural resources," said Leilani Chow, Energy Coordinator for Sustainable Molokaʻi. "We're known for our leadership in activism and community organizing around stopping development or anything that doesn't fit with our community values and cultural lifestyle." In order to develop and implement their energy plan, Sustainable Molokaʻi accomplished groundbreaking work to build capacity and mobilize community members. The group laid a foundation of knowledge and buy-in among their members for renewable energy, built consensus through one-on-one conversations and community meetings, and ultimately created a decision-making process that can apply to future projects.



"It's been a lot of connecting the dots. We have our community values, but we don't have to learn them, we just live them. We're taught them by our parents and grandparents and great grandparents." - LEILANI CHOW

Sustainable Moloka'i has, in collaboration with the island's Native Hawaiian communities, identified 40 critical infrastructures to be powered by renewable energy. The sites comprise a mix of county, state, and private ownership.

Years-long conversations and knowledge development about renewable energy across Moloka'i communities have resulted in a process for building consensus and decision-making on the island. "It's not just a renewable energy solution, but it is now a community solution that addresses water, agriculture, disaster preparedness, and pretty much everything," said Chow.

Food Sovereignty

Whether in a desert or temperate rainforest, Native communities are using local resources and Native knowledge to advance food sovereignty. Several projects focus on strategies to achieve food sovereignty amid climate impacts that are making growing and foraging foods more challenging. Kake Tribal Heritage Foundation, 'Āina Momona, Lac Vieux Desert Band of Lake Superior Chippewa Indians, and Kul Wicasa Wopasi's projects demonstrate different strategies that strengthen food sovereignty by reclaiming traditional food practices and utilizing different technologies or facilities.

Kake Tribal Heritage Foundation

The Village of Kake is on Kupreanot Island near the heart of the Tongass National Forest. The forest stretches 500 miles from Prince of Wales Island to the Hubbard Glacier just north of Yakutat. The Tongass National Forest is the largest national forest in America, as well as the largest intact temperate rainforest in the world. The dense wilderness of Tongass is home to protected species, including black bears and bald eagles, while the waters off Kake contain the highest concentration of humpback whales in Alaska. [16]

In the Village of Kake it is said that "when the tide is out, the table is set."

Village of Kake.

Photo credit: Clarisa Diaz

The dense wilderness of Tongass National Forest is home to protected species, including black bears and bald eagles.

Black bear in Kake, Alaska.

Around 500 Native Alaskans inhabit Kake and have historically subsisted through foraging, fishing, and hunting. Villagers collect clams, gumboots, seaweed, and shellfish on the shore. In the village it is said that "when the tide is out, the table is set." Families combine their resources to take fishing boats out to catch Sockeye salmon. Harvested food is shared with elders. For most Alaska Native communities, communal efforts are necessary for survival and central to cultural identity.

There are no roads that lead to Kake. The only way to get goods to the village is by barge and seaplane, and both are costly means of receiving resources. These modes of transportation are also often unreliable due to fluctuating weather conditions and inconsistent shipping schedules. Families frequently combine financial resources to order bulk goods from stores like Costco or services like Instacart to be delivered via seaplane. Unfortunately, these produce and other foods are not guaranteed to be fresh by the time they arrive on the island. The risk of no reimbursement for spoiled food causes the few convenience stores in Kake to be sparsely stocked with mainly non-perishable foods, leaving villagers with limited nutritious options to be purchased.

Due to their remote location, Kake's inhabitants rely on home gardening and foraging, but warmer winters and hotter summers are starting to threaten these ways of life. "The snow literally just turns to rain within the same day. You'll see it snowing, and then it will rain a few hours later and take away all the snow," said Ashley Padgett, Director of the Kake Tribal Heritage Foundation. Frost melts earlier and faster as compared to previous years, leading to runoff and less healthy soil. And, when combined with unexpected freezes, these effects result in decreased food yields from gardens and forests. Rising sea temperatures have made clams and other shellfish more prone to carrying biotoxins, which can be life threatening if ingested. At the same time, fish are not spawning in abundance as they once were. [17]

The community members of Kake are resourceful. The Kake Tribal Heritage Foundation and the Organized Village of Kake started a joint hydroponics program, a hatchery powered by a small hydrodam, and a monitored offshore sea garden. Youth in Kake are jumpstarting the village's hydroponic system. Currently in research phases, the enclosed hydroponic shelving system with lettuce seedlings and overhead lights sits inside the office of the Kake Tribal Heritage Foundation. "We're imagining getting to a point where we can put it in after-school programs so kids can learn about it and be motivated to want to grow their own vegetables," said Courtney James, Climate Proofing Food Project Intern of Kake Tribal Heritage Foundation.

The goal is to use hydroponics to ramp up faster growing times and provide reliable fresh food to community members year-round. Eventually, project leaders would like to build a facility where they can scale up vertical hydroponic farming indoors to the whole community. "Growing is extremely fast with hydroponics. We could get to a point where we're growing heads of lettuce, a whole batch within a week," said Padgett. "We want to continually put fresh produce on the shelves. Having the hydroponic system be a part of the economy and give back to the community is completely ideal."

By creating clam gardens, community members are returning to cultural practices to build sustainable food pathways. Offshore clam gardens restore habitat for clams and other shellfish by using natural methods. By building a rock wall to collect silt as the tide goes out, the beach begins to level out instead of eroding, which creates more surface for shellfish to thrive.

To expand this work, the Kake Tribal Heritage Foundation and Organized Village of Kake need to navigate a variety of challenges. One of which is identifying sustainable sources of funding for training and full-time staffing, as well as more research partnerships. While their ambition and ideas are scalable, finding resources to adapt in a

By creating clam gardens, community members are returning to cultural practices to build sustainable food pathways.

OVK staff host community events to maintain their clam garden.

Photo credit: Lee House

warming world is a race against time. Due to sightings of *Carcinus maenas*, the European Green Crab, an invasive species up shore from Kake, the community must now incorporate potential ecological impacts into their climate adaptation and food security planning. Another challenge is the issue of limited housing in the community. Job openings in the community often go unfilled because young community members leave for college and find jobs elsewhere knowing that if they return home to work they may not find a place to live. Nevertheless, the community of Kake is determined to address these challenges and endure through their collective innovation and action.

ʻĀina Momona

On the island of Molokaʻi sea level rise is impacting more than infrastructure and utilities. Inhabitants' ancestral land is disappearing into the ocean, making local food production a challenge.[18] ʻĀina Momona is a Native Hawaiian organization on the island of Molokaʻi working to restore and strengthen the quality of soil, prevent erosion, increase food security, and reclaim traditional food practices.

There once was a time when communities across Molokaʻi grew and harvested kalo (taro), ʻuala (sweet potato), and ʻulu (breadfruit). The arrival of Captain Cook with non-Polynesians in the 1700s introduced diseases and led to the loss of agricultural knowledge with the passing of Hawaiian elders. After the arrival of Westerners, the landscape of Molokaʻi changed drastically, due in large part to the introduction of livestock. The native vegetation was not adapted to survive the impact of grazing animals. Now, centuries later, Molokaʻi communities rely on barge shipments, which supply 95% of food and goods for the island.[19] Native Hawaiians in Molokaʻi are pushing for self-sufficiency following the COVID-19 pandemic when stalled supply chains caused them to reflect about their food access and availability. "In recognizing how fragile our food security is, we can't let anything jeopardize the little bit of growing we are doing because it does provide a real need to community members on our island," said Jane Au, Program Director for ʻĀina Momona. "Not that long ago, these islands were able to feed everybody who lived here. That's more or less the place we're trying to get back to. We have what we need here, we just need to prioritize that balance and relationship."

"Kuleana is the responsibility and privilege someone has to be connected to a place. ʻĀina is commonly defined as "land" but means "that which feeds" in Hawaiian. "Our biggest kuleana as Hawaiian people is to take care of ʻĀina, to take care of the places that feed us," said Jane Au, Program Director for ʻĀina Momona.

Erosion, watershed depletion, and coastal runoff in nearshore areas are some of the most pervasive climate-related issues facing the island and residents of Moloka'i. 'Āina Momona trained 30 community members to restore 50 acres along the access road that leads to a mountain where most of the runoff and erosion is taking place. Their work is grounded in building Native Hawaiian capacity and elevating leadership skills in land management practices. Efforts and strategies encompass Western training combined with ancestral technologies, regenerative practices, and Native knowledge. These methods will serve as the foundation for community-led restoration efforts by planting traditional Hawaiian food crops in areas of Ka'amola that could not formerly support life due to the severity of erosion. During the past year, community members worked steadily in upland sections of the Ka'amola land base to prepare for the reintroduction of Native food crops. Overgrowths of invasive species were removed; walls, fascine bundles, dams, and swales were built to slow runoff and increase water retention; and native grasses, trees, and shrubs were planted to retain soil and groundwater. To date, their efforts have significantly improved runoff and flooding during rain events, and for the first time in decades they are seeing Native species grow in areas that have been arid for decades.

The ultimate goal is to learn from the past to create a healthy future for communities and the land. To this end, 'Āina Momona will continue training Native Hawaiian leaders in adaptive management techniques and traditional food production, and ultimately restore 400 acres of ancestral land in the area. The organization hopes to expand its workforce development program and revitalize Native knowledge and traditional food systems.

"The main knowledge that we're trying to integrate into this project is the ancestral approach we have to land management, which is that we didn't manage the ocean, nearshore areas, or mountains separately. All resources were managed holistically by community members."

– JANE AU

Lac Vieux Desert Band of Lake Superior Chippewa Indians

"Our original name means people of the old gardens. For centuries we've planted and harvested our own foods."
- PATRICK GARRISON

In the upper Midwest and Great Lakes region of the United States, freshwater lakes are rising.[20] Instead of gradual snowmelt, the area is seeing intense runoff from ice into the lakes. When the lakes rise, it can impact spawning habitat for wildlife, affecting culturally relevant fish species like Ogaa (Walleye). Spring is the season when community members harvest Anishinaabe-zhiiwaagamizigan (maple syrup), but they're noticing a shortening window of time when maple syrup can be tapped. "This year, in the beginning of April, we had a huge thaw. When the leaves start to bud, the sap is no longer palatable. It was so early that there was still a chance that it might freeze again," said Patrick Garrison, Lac Vieux Desert Band of Lake Superior Chippewa Indians Tribal Council member. Aside from rising lake levels, an increase in violent storms during fall is impacting their wild rice harvest. Ogaa (walleye), Anishinaabe-zhiiwaagamizigan (maple syrup), and Manoomin (wild rice) are integral to the Lac Vieux Desert Band of Lake Superior Chippewa Indians heritage, cultural and spiritual livelihood, food sovereignty, and local economy.

"Seasonal variability has impacted our food from a cultural perspective," said Patrick. "I'd say 80% of the food that we have at our ceremonies – coming of age ceremonies, funerals, and other gatherings – are a result of those three harvests. People are scrambling just to get those traditional foods sourced."

Because weather variation makes growing food outdoors less predictable, Garrison is working to develop indoor farming facilities that would eventually serve as a community center for growing food, and hosting workshops and classes. The idea of indoor food production formed after supply chain issues and food shortages impacted community food security during the COVID-19 pandemic. In the initial research stages, Garrison has experimented with proof-of-concept demonstrations for mushroom cultivation, which enrich soil through natural microbes. The community has also started a small composting program. The trials function as a starting point for developing methods to regenerate soil and produce food locally.

"Because of all the suffering during assimilation and the boarding school era, people got to a point where they learned not to share. But we can reestablish community. Without unification, we can't get as much accomplished. The legacy is going to take hold in the strengthening of our community and food systems," said Garrison.

Kul Wicasa Wopasi

The Lower Brule Sioux Tribe in South Dakota is located on the river bank of the mighty Missouri. Made up of just over 1,000 residents. Kul Wicasa Wopasi, a Native youth-led group, specializes in supporting youth innovators as they work to collaboratively develop climate solutions with community. For the past three years Kul Wicasa Wopasi has been active in building a better future by promoting food sovereignty and a sustainable way of living. "Our community struggles with diabetes. We drive 30 minutes to an hour to get to the nearest grocery store with fresh produce," said Madeline Ryan, student leader of Kul Wicasa Wopasi. One in two American Indian or Alaska Native children born in 2000 will have type 2 diabetes in their lifetime.[20] Madeline said, "Community organizing is at the heart of this work, and understanding who in the Lower Brule community has interest and passion around creating a strong and healthy local food system is essential. We want our food to be connected to the land and rooted in Lakota culture."

Ryan and a team of up to 10 youths with support from volunteer elders are exploring new ways that combine modern technology with Native knowledge to create a sustainable local food system. They are growing food for the community using hydroponics, raised beds, and an indoor Lettuce Grow, all while leveraging the knowledge and ambition of local community members. As group members work to understand which systems might best address local food production challenges and how they are exacerbated by climate change, they strive to identify next steps toward a sustainable food system. Kul Wicasa Wopasi's goal is to build a geothermal greenhouse to

Members of Kul Wicasa tending to tomato garden beds.

"Our main purpose is to make a positive impact and build a better future for our youth. We're connected to nature and we're connected to each other."

– MADELINE RYAN

supply fresh produce to community members year-round. As the earth continues to warm, longer dry seasons in the summer and heavier rainfalls and flooding events in the spring are expected. Based on this, the strategies Kul Wicasa Wopasi is developing will help the community continue to grow and harvest the food it needs despite climate challenges.

Disaster Preparedness

Economic disparities resulting from lack of reliable infrastructure limit Native communities' ability to plan for and respond to climate-related threats. This includes limited access to transportation, housing, sanitation, critical services, and disaster response. Several projects focus on creating management plans and communication systems to improve Tribal disaster preparedness. This section features work by Chugach Regional Resources Commission, Mesa Grande Band of Mission Indians, and Native Public Media, Inc.

Chugach Regional Resources Commission

Rapidly melting snow packs and flooding can be seen all over Alaska.21 The coastal Tribal lands near Seward, Alaska, have experienced increasing flooding from runoff that is channeled through Seward's Lowell Creek Diversion Tunnel and emptied into their waters, compounding flooding issues for communities that are already grappling with rising sea levels. The impacts of flooding are felt by seven communities working for and served by the Chugach Regional Resources Commission (CRRC): Chenega (Caniqaq), Cordova (IiyaaGdaad), Nanwalek, Port Graham (Paluwik), Seward (Qutalleq), Tatitlek (Taatiilaaq), and Valdez.

"Waterfront property comes at a cost. And that cost to us is climate change."

– WILLOW HETRICK-PRICE

The Southcentral coastal people of Alaska make up Tribes of the Chugach region.

1. EYAK
2. NUCHEK
3. SHALLOW WATER
4. SHEEP BAY
5. PORT GRAVINA
6. TATITLEK
7. KINIKLIK
8. CHENEGA
9. MONTAGUE ISLAND
10. KENAI

The Alutiiq Pride Marine Institute ensures participation of Chugach Natives in decision-making processes regarding land and sea, which directly influence issues such as economic opportunities, climate change remediation, food sovereignty, and cultural identity.

Tamatum tuknigkuart'slaraakut
(this is what sustains us).

"Each community has their own beach that they frequent. Elders take us out clamming because they know where to go to get the brood stock," said Willow Hetrick-Price, Executive Director of Chugach Regional Resources Commission. "We always bring the brood stock back to them healthy and replant them. We put the babies back in a protected area that we call a shellfish sanctuary." CRRC's Alutiiq Pride Marine Institute is one of only two fish hatcheries in the state that are managed by tribes, and the only one that focuses specifically on shellfish. The Marine Institute ensures participation of Chugach Natives in decision-making processes regarding land and sea, which directly influence issues such as economic opportunities, climate change remediation, food sovereignty, and cultural identity.

The Alutiiq Pride Marine Institute is unique because the facility is located on the coast and is directly adjacent to the Lowell Creek Diversion Tunnel. Before Seward was established, Lowell Creek flowed straight down the mountains directly through what is now the heart of the city. In the 1940s the Army Corps of Engineers built the Lowell Creek Diversion Tunnel to divert the water through an outfall next to the Marine Institute. Although the tunnel was built well for the time, they didn't take climate change into consideration, said Willow. "And so, what's happening is we are getting inflow from all sides. When I was a kid, snow remained on the tops of the mountains year-round, and that doesn't happen anymore."

Through years of building relationships, the City of Seward is now working with the CRRC to modify a plan by the U.S. Army Corps of Engineers to divert floodwaters and co-develop an alternative plan that would have less impact on the waters where Native communities live. The plans will also address methods to adequately manage high-water events that risk infrastructure of the Alutiiq Pride Marine Institute. "We've hired a contractor to help us liaise with the Army Corps of Engineers and with the city. To keep track of everything, to go to all the

meetings, and to alert when there's an issue for Tribal consultation – that's almost a full-time job," said Willow. While collaborations between parties are evolving, CRRC is putting together its own team of engineers and experts on infrastructure development in order to strengthen food security efforts and protect the subsistence lifestyle of Chugach Natives. "We'll probably have to make some concessions, and we're ready for that. But at the very least, we've been present in the decision-making process and they're seriously considering our recommendations." The hope is their engineers can work with the Army Corps to collectively create a plan that everyone is happy with. "The questions that we answer are driven by and only by the people that we serve," says Willow.

Mesa Grande Band of Mission Indians

The Mesa Grande Band of Diegueno Mission Indians of the Mesa Grande Reservation in California live in the hills above Black Canyon, an area prone to dangerous wildfires due to high winds, extreme drought, and lack of fire management practices. To make matters worse, the 108-member community is so small and remote compared to towns in surrounding areas it is often overlooked when it comes to securing funding to address climate change impacts.

"The government is looking mainly at numbers and they're going to look at places like the Navajo Nation and help thousands of people instead of a couple hundred," said Danielle LaChusa, Housing Director of the Mesa Grande Indian Housing Authority, which manages community programs for residents. "HUD has some good opportunities, but they're very population oriented. Also, they require a lot of pre-planning, and we just do not have the staff capacity for that. The funding is few and far between."[22]

To mitigate the impact of extreme weather events, the Mesa Grande Indian Housing Authority is creating a climate and fire management plan, which focuses on identifying climate-related hazards and developing adaptation strategies. Staff at the Housing Authority have implemented preventative measures with Tribal members and California Department of Forestry and Fire Protection (Cal Fire), such as installing a 100-foot firebreak around all homes, removing excess brush that could be a fire hazard, and creating an evacuation plan with residents. "If a wildfire or other natural disaster

Affirming Tribal Sovereignty

In 2023 Chugach Regional Resources Commission (CRRC) secured dedicated land acquisition funding to purchase the Alutiiq Pride Marine Institute, affirming their Tribal sovereign jurisdiction. This purchase will make facility expansion possible and allow them to create a coastal response plan to protect the region, including the institute and its water supply, from flooding and coastal erosion caused by climate change. By addressing climate risks, CRRC is ensuring that shellfish can continue to be a part of Chugach Natives subsistence lifestyle forever.

"When we did controlled burns, we were able to manage the growth of native plants. We harvested acorns and made sure we had healthy yucca, sage, and buckwheat. Tribal members still go out and harvest these plants and prepare traditional dishes. But the lack of fire and drought are really affecting the native plant species."

– DANIELLE LACHUSA

occurs, we have outlined who gets alerted, how fast, how everyone is contacted, and where everyone is to meet up," said LaChusa. If there is a wildfire, the Tribe calls Cal Fire, the state's fire department. However, the closest dispatched fire station is in Warner Springs, which would take 25 to 30 minutes to arrive – a long time to wait for a wildfire to spread. "Some of the bigger reservations have their own fire departments, but for smaller Tribes like Mesa Grande, we can't afford it. We rely on state fire departments to assist us." In lieu of their own fire department, the community needs additional labor support to remove weeds, trim trees, and clear debris, along with conducting safe, controlled burns. With the creation of a climate and fire plan, community members are being proactive in stewarding the land as the climate and local environment change. This will allow the Housing Authority to expand housing for residents and adapt to future fire risk.

Native Public Media, Inc.

With minimal infrastructure, limited economic capacity, and remote geography, Native communities are particularly vulnerable to environmental disasters, extreme weather events, and everyday emergencies. Community leadership in emergency preparedness is critical to the survival and health of Tribal Nations. That is why Native Public Media (NPM), a Native-led nonprofit with the mission to promote the self-determination of Native peoples through media access, is working to develop a public disaster and climate adaptation plan. Radio is the most reliable communication method for reservation-based Tribal citizens to receive information about emergencies.[23] "We are a voice that hopefully amplifies the diverse intellectual thinking that comes out of Indian Country. We encourage our people to represent themselves. If we don't tell our own stories, somebody else will," said Loris Taylor, President and CEO of NPM. "Our job is to make sure that we build the capacity to reclaim our power, speak, and be heard."

In 2019 Native Public Media wrote their first curriculum to address emergencies and disasters on Tribal lands, *Emergency Communications for Broadcasters Serving Indian Country*. Last year, they published the *Emergency Operations Plan*, which is a community engagement lab series

that acknowledges that a one-size-fits-all plan for Indian Country cannot exist due to governance, jurisdictional, and cultural differences.

Native Public Media supports and connects 57 radio stations in Indian Country, many of which are in rural and wilderness areas. The organization is advocating for Tribes to become alerting authorities in the Integrated Public Alert and Warning System (IPAWS), a national system regulated by the Federal Emergency Management Agency (FEMA). Currently, only 11 out of the 574 Federally Recognized Tribes serve as alerting authorities, and their goal is for every Tribe to become one. Native radio and television broadcast facilities operate on their own dedicated towers, providing reliable communication channels during emergencies.

In addition to clearly communicating information during extreme weather and other emergencies, NPM also provides a platform for Native communities to share information. A new mobile app called Kinship facilitates video conferencing, chat functionality, incident reporting, access to emergency operations plans, and coordination of drills and alerts. "Kinship, at its core, emphasizes familial relationships and extends to encompass our relationships with all living things," explained Taylor. "It embodies values of respect, reciprocity, balance, and love. By recognizing our obligations and responsibilities to all our relations, we draw strength and guidance from these teachings."

Water Security

Conserving water is a common theme among several projects as community members work to address drought-related climate impacts. Integral to water conservation is the reclamation of cultural practices and stories that have been passed down through oral history for millennia. As water is part of ceremony, Native peoples can reclaim their identities and establish a strong foundation for future generations to carry land- and water-based cultural practices forward in communities that are working to achieve water security. Brave Heart Society; Hopi Three Mesas, Inc.; and Seeds of Harmony projects demonstrate strategies that address water security through co-management, conservation practices, and youth education and training.

"I think if we all work together we can make the climate crisis less catastrophic. And if we work really hard, we can save Mother Earth so she can care for another seven generations. Let there be life. Let it be a good life. Let it be forever."

– LORIS TAYLOR

"Some people do not realize how ingrained Native knowledge is in our culture. We pattern our value systems based on the behavior of animals. For us, it's the buffalo. A buffalo will never stand in the water that it's drinking."

– FAITH SPOTTED EAGLE

Brave Heart Society

Extreme weather and flooding are exacerbated by poor resource management. The contamination of Lake Andes in South Dakota is an example of such a scenario impacting the cultural livelihood and public health of Native people.

For centuries, the Yankton Sioux Tribe of South Dakota have been excluded from critical management decisions about Lake Andes, known to the Ihanktowan people as Bde Ihanke. In recent years, as more frequent flooding contributes to a rise in waterborne illnesses, the community has become aware of pollution in the natural lake.[24] What they don't know is the severity of the contamination. Brave Heart Society, a grassroots Native-led organization, is dedicated to fulfilling the inherent Native right of the Ihanktonwan people to restore, conserve, and preserve the Missouri River Cultural Bioregion. Inspired by Standing Rock (the environmental justice movement that protested the Dakota Access Pipeline), Brave Heart Society started their pursuit in creating a Tribal co-management plan to assess the extent of contamination and inform a flood management plan for Lake Andes. For Brave Heart Society, Tribal data sovereignty is the utmost important issue, from analyzing water tests to using models for map creation.[25]

In 2019, the town of Lake Andes, on the Yankton Sioux Reservation, experienced a bomb cyclone, a fast-developing storm system that occurs when atmospheric pressure drops significantly, which caused massive flooding in the community. "One day it was below zero. The next day it hiked up to 70-some degrees. Everything melted and compromised a third of the community structures," said Faith Spotted Eagle, founding grandmother of Brave Heart Society. The event spread waterborne illnesses, including E-coli and MRSA, and sewage contaminated sacred land that requires remediation. High concentrations of total dissolved solids, sulfates, nitrogen, and the presence of arsenic and manganese have been found in the lake and need further monitoring to better understand health and environmental impacts. "We train our young people to do water testing, so that we have actual data. We proved that this lake contains a thousand times

more arsenic than the level recommended by the EPA," said Faith. Tests are costly for the Tribe to send out to labs, requiring additional funding.

Brave Heart Society seeks to create a Tribal co-management plan so Lake Andes (Bde Ihanke) can be managed by the U.S. Fish and Wildlife Service and the Yankton Sioux Tribe of South Dakota. This plan will determine the risk of flooding to the Tribal community and identify needs to mitigate future flooding events, which are likely to be exacerbated by climate change.

Seeds of Harmony, Inc.

Amidst the desert of Arizona, the headwaters of the Totsoh Creek in the Navajo Nation rest up in the mountains above Canyon de Chelly. The headwaters feed into the San Juan River about 40 miles away near the Four Corners. This is the only source of freshwater for miles for Navajo communities in nearby Chinle and Lukachukai. But, as in many places in Arizona, fresh water is scarce in the desert. Drought, heatwaves, and desertification in the Navajo Nation is exhausting water resources for agriculture and drinking water.[26]

In a land with little water, the Navajo are finding ways to conserve and recapture rainfall starting at the headwaters with the hopes of regenerating pastureland down the mountains. Melinda O'Daniel is the Executive Director of the Native-led nonprofit, Seeds of Harmony, which provides opportunities to learn about watershed conservation and to practice a sustainable way of life, of which Native knowledge is integral. "In regard to water harvesting and restoration, we are taught to start at the top of the watershed. It's already past due that we should be taking action on some of the negative impacts from roadways, grazing practices, and lack of management," said O'Daniel. O'Daniel and her family are on a mission not only to restore their immediate land near the headwaters but also to demonstrate the results to their neighbors, many of whom spend the summer season shepherding sheep and goats in the mountains.

Seeds of Harmony is working to conserve and recapture rainfall around Totsoh Creek, the headwaters of the San Juan River.

Photo credit: Linda Rambert

Seeds of Harmony staff take time to notice subtle flow patterns in the ground, and enhance a more distributed flow through the placement of rocks and fallen tree logs throughout the mountainsides.

Seeds of Harmony Wayne O'Daniel showing retention strategy.

Photo credit: Linda Rambert

For Seeds of Harmony, regenerative methods are created by observing nature itself. They take time to notice subtle flow patterns in the ground, and enhance a more distributed flow through the placement of rocks and fallen tree logs throughout the mountainsides. "We want to educate that strategies can be implemented that don't require hard core digging or building dams. To do something effectively, the first step is observation," said O'Daniel. "Some people see green, or we had some rain and they think 'everything is good here,' but they're not looking underneath the surface where it's dry or at the vegetation composed of weeds. Even if we have a lot of rain, two days later it will be dry."

Community members are installing roof gutters with rain barrels and greywater systems to capture as much water as possible. These catchment systems will allow them to water the surrounding land where they live and graze animals. The idea is that both efforts at the headwaters and around homes create a holistic solution to conserve the watershed. Returning nutrients to the soil leads to Native plant and tree growth that in turn holds more water and stabilizes the hydrological cycle with rain. "If we start at the home, you can create zones outwards, like a ripple effect. Moving from the homesite to grazing land, to the watershed," explained O'Daniel.

The Navajo traditionally migrate according to the seasons to graze livestock. Navajo families are increasingly being pressured by governmental organizations such as the Bureau of Indian Affairs to receive grazing permits that pend on having a conservation plan.[27, 28] But the hope is that families may be able to receive customized land use permits for all the locations they move to throughout the year. This would honor their heritage and values as land stewards, and conserve water in multiple locations. "Diné believe whenever we are within the four

sacred mountains, we're on our homeland. As long as we're here, we;re home," said Wayne O'Daniel.

Hopi Three Mesas, Inc.

In the Hopi creation story the Hopi people lived beneath the Earth. When they emerged into the world, they met Maasaw, creator of the Earth, and he presented them with ears of corn. The people promised him they would help take care of Mother Earth in exchange for staying. Hopi elders Bonnie Secakuku and George Mase are fulfilling this promise to Maasaw by teaching their language, stories, Native knowledge, and ways of life to youths and their families across the Hopi Reservation in Arizona.

The couple formed Hopi Three Mesas, Inc., a Native-led nonprofit, which gathers students from surrounding communities to learn about their shared traditions. Traditionally, Hopi ways of life were preserved in families through oral tradition. Schools in the area do not teach Hopi customs or history.

"Our vision is to create a ripple effect where we educate the hearts and minds of people to recognize this Native knowledge. Their ancestors used to do this; community members should feel empowered to change the future."

– WAYNE O'DANIEL

Melinda O'Daniel, Executive Director of Seeds of Harmony, points out water level and rainfall indicators.

Photo credit: Clarisa Diaz

Youth across the Hopi Reservation gather to participate in cross-cultural exchanges to learn about their shared traditions.

"Itam itah kuyi ah zhum zhum yan ni. *We need to use water sparingly. If we as Hopi farmers receive a great harvest and we do not preserve it for later use, the food will go to waste.* Itam it pew zhum zhum yah ni. *We must share or get help to preserve water for later use or we will not have food to eat."*

– BONNIE SECAKUKU

"Mother Earth is beginning to warm up and this is affecting our traditional Hopi ways of life. Our rains are not coming, causing our corn to not grow," said Secakuku. Corn is central to Hopi cultural lifeways and religion. "Sometimes I feel like there's not going to be any water and it scares me," said Secakuku. "The opportunity was there to help address this with our youth. I'm a grandmother now, and so I felt like we needed to work with our youth to sustain their future."

Secakuku and Mase are certain that their Native knowledge, which has allowed them to survive for thousands of years, will allow them to respond to climate impacts. They hope to renew Hopi knowledge for the 10,000 members who live on the reservation, as a return to traditional customs and values will ensure their survival. "The goal is to have every Hopi family learn and understand how climate change is affecting our way of life. We cannot function without our corn in the ceremonies. And of course, we cannot eat if we don't have our corn," said Secakuku.

CONCLUSION

As demonstrated by the 11 entities in this report, Tribes and Native communities are working toward a common vision for climate adaptation. This requires pathways to build adaptive capacity and rematriation of land for stewardship access. Overall, the adaptive measures demonstrate the strength and endurance that Tribes and Native communities carry in the face of a climate crisis.

One common theme throughout Indian Country is the existence of innovative projects that build adaptive capacity through Native knowledge and ingenuity. It should be noted that not every climate risk and not every Native community in Indian Country is represented in this report. As climate change progresses, risks become multiplied, convergent, and harder to define throughout society.

Many Tribes and Native communities continue building pathways that address local infrastructure, leadership training, food security, access to and management of resources, and other strategies to accomplish longer-term social, economic, environmental, and cultural goals. The road to success for Tribes and Native communities involves consistent prioritization of Tribal leadership and respect for sovereignty by local, state, and federal partners, and long-term investments that center Tribal needs. The legacy of this work is to reach a point in time when Native knowledge is incorporated and valued across all academic institutions to address and respond to climate impacts, and the cultural and subsistence rights of Native peoples are prioritized and honored.

ENDNOTES

1. Jantarasami, L.C., et. al. Tribes and Indigenous Peoples. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. 2018.
2. Buhner, Stephen. Sacred Plant Medicine: The Wisdom in Native American Herbalism. Inner Traditions/ Bear, 2006. https://books.google.com/books/about/Sacred_Plant_Medicine.html?id=iDgI53C6xTIC
3. M Sahu, et. al. Measuring Impact of Climate Change on Indigenous Health in the Background of Multiple Disadvantages: A Scoping Review for Equitable Public Health. Journal of Prevention. 2023.
4. Richards, Gabrielle, et. al. Commentary the climate change and health adaptation program: Indigenous climate leaders' championing adaptation efforts. Health promotion and chronic disease prevention in Canada: research, policy, and practice. 2019.
5. Lynn, Kathy, et. al. The impacts of climate change on tribal traditional foods. Climate change and Indigenous peoples in the United States: Impacts, experiences and actions. 2014.
6. Applequist, Wendy, Brinckmann, Josef, et. al. Scientists' Warning on Climate Change and Medicinal Plants. Planta Med. November 15, 2019. https://www.google.com/url?q=https://www.thieme-connect.com/products/ejournals/pdf/10.1055/a-1041-3406.pdf&sa=D&source=docs&ust=1691086612976046&usg=AOvVaw0bS0Hjhav_GMoqcwUXzjuD
7. Maillacheruvu, Sara. The Historical Determinants of Food Insecurity in Native Communities. Center on Budget and Policy Priorities. October 4, 2022. https://www.cbpp.org/research/food-assistance/the-historical-determinants-of-food-insecurity-in-native-communities#:~:text=The%20reservation%20system%20diminished%20Tribes,that%20were%20less%20agriculturally%20productive
8. Climate Migration and Equity. Natural Resources Defense Council. 2022https://www.nrdc.org/stories/climate-migration-equity
9. Benedict Colombi and Courtland Smith. Adaptive Capacity as Cultural Practice. Ecology & Society. 2012.
10. IPCC, 2023: Sections. In: Climate Change 2023: Synthesis Report. Contributions f Working Groups I, II, and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf
11. First Nations Development Institute. Community Building Through Funding: Philanthropy in Indian Country. 2023. https://www.firstnations.org/knowledge-center/philanthropy-in-indian-country/
12. Farrell, Justin, et. al. Effects of land dispossession and forced migration on Indigenous peoples of North America. Science. October 29, 2021. https://www.science.org/doi/10.1126/science.abe4943?adobe_mc=MCMID%3D52621804443163435930220740683740162363%7CMCORGID%3D242B6472541199F70A4C98A6%2540AdobeOrg%7CTS%3D1692212479
13. Shannon McNeeley. Ways of Knowing: Traditional Knowledge as Key Insight for Addressing Environmental Change. Weather, Climate, and Society. 2017.
14. The Solutions Project. All Roads Lead to Climate Justice. 2020. https://thesolutionsproject.org/what-we-do/our-impact/2020-impact-report/

15. Alaska Department of Fish and Game, State of Alaska. Marine Mammal Viewing. 2023. https://www.adfg.alaska.gov/index.cfm?adfg=viewing.marinemammals&species=humpbackwhale#:~:text=Perhaps%20the%20highest%20concentration%20of,chambers%20of%20commerce%20for%20information.
16. Oke, K.B., Cunningham, C.J., Westley, P.A.H. et al. Recent declines in salmon body size impact ecosystems and fisheries. Nature Communications. August 19, 2020. https://www.nature.com/articles/s41467-020-17726-z
17. Ngu, Ash, Cocke, Sophie. Hawaii's Beaches Are Disappearing. ProPublica. December 29, 2020. https://projects.propublica.org/hawaii-beach-loss/
18. Cho, John, Yamakawa, Roy, et. al. Hawaiian Kalo, Past and Future. University of Hawai'i at Mānoa Cooperative Extension Office. February 2007. https://www.ctahr.hawaii.edu/oc/freepubs/pdf/sa-1.pdf
19. Chhoun, Dymanh et. al. Inundated: Flooding and vulnerable communities in the Great Lakes region. Sahan Journal. 2023. https://sahanjournal.com/flooding-great-lakes-region-upper-midwest-wild-rice-manoomin-minnesota/
20. McLaughlin, Sue. Traditions and Diabetes Prevention: A Healthy Path for Native Americans. American Diabetes Association. 2010. https://diabetesjournals.org/spectrum/article/23/4/272/31851/Traditions-and-Diabetes-Prevention-A-Healthy-Path
21. Alaska Division of Geological & Geophysical Surveys. Glacier Change. 2023. https://dggs.alaska.gov/hazards/climate/glacier-change.html#:~:text=Much%20of%20Alaska%20has%20been,most%20places%20on%20the%20planet.
22. U.S. Commission on Civil Rights. A Quiet Crisis: Federal Funding and Unmet Needs in Indian Country. July, 2003. https://www.usccr.gov/files/pubs/na0703/na0204.pdf
23. Blackwell, Geoffrey. Tribal Radio Priority. Federal Communications Commission. March 1, 2013. https://www.fcc.gov/news-events/blog/2013/03/01/tribal-radio-priority#:~:text=We%20have%20visited%20many%20parts,important%20information%20to%20Tribal%20members.
24. Keeler, Jacqueline.Yankton Sioux: 'Our community is literally drowning'. Indian Country Today. October 1, 2019. https://indianz.com/News/2019/10/01/yankton-sioux-our-community-is-literally.asp
25. U.S. Fish and Wildlife Service, Interior. Lake Andes National Wildlife Refuge Complex, Lake Andes, SD; Final Comprehensive Conservation Plan. April, 24, 2013. https://www.federalregister.gov/documents/2013/04/24/2013-09657/lake-andes-national-wildlife-refuge-complex-lake-andes-sd-final-comprehensive-conservation-plan
26. U.S. Environmental Protection Agency. Providing Safe Drinking Water in Areas with Abandoned Uranium Mines. 2020. https://www.epa.gov/navajo-nation-uranium-cleanup/providing-safe-drinking-water-areas-abandoned-uranium-mines
27. U.S. Department of Interior, Bureau of Indian Affairs. Navajo Grazing Regulations. April 1, 2018. https://www.govinfo.gov/content/pkg/CFR-2018-title25-vol1/xml/CFR-2018-title25-vol1-part167.xml
28. Navajo Family Voices. A brief overview of Navajo Nation land tenure. 2019. https://navajofamilies.org/land.html