Kīlauea Recovery and Resilience Plan

ACKNOWLEDGMENTS

Cover art: “Love for Hawai‘i Island” by Jubilee Nelson Drake of Hawai‘i Academy of Arts and Science. “*The hands are kind of there to kind of hold the love for the island, in the heart, there is what makes this island special from the mountain to the nēnē goose. These are some of the things that I think make the island as amazing as it is and shows some of its colors like in the flowers.*”

KĪLAUEA RECOVERY AND RESILIENCE PLAN

CONTENTS

Photo: USGS

A river of lava flows from Fissure 8 in Leilani Estates during the 2018 Kīlauea eruption

EXECUTIVE SUMMARY

Photo: Scott Wilson

The 2018 Kīlauea eruption altered the landscape of Kapoho. Located near the center of the photo stood the subdivisions of Vacationland Hawaii and Kapoho Beach Lots. Kapoho Bay and nearby tidepools were also covered.

Kīlauea has erupted 34 times since 1952. Residents and visitors alike witnessed this extraordinary natural volcanic phenomenon as the Pu‘u ‘Ō‘ō eruption flowed nearly continuously for 35 years. On April 30, 2018, the Pu‘u ‘Ō‘ō eruption on the volcano’s Middle East Rift Zone ended when its crater floor and lava lake catastrophically collapsed, and magma began moving toward the Leilani Estates subdivision. On May 3, a fissure opened on Mohala Street in Leilani Estates, marking the start of a four-month-long eruption along the Lower East Rift Zone that would ultimately cover 13.7 square miles in lava and create 875 acres of new land along the coast. In total, 24 fissures opened in the area, releasing massive amounts of sulfur dioxide, and upending residential communities and farmland. Additionally, 200 earthquakes a day, on average, occurred leading up to the eruption and caldera collapse, including a 6.9-magnitude earthquake that occurred on the volcano’s south flank on May 4. The collapse of the caldera floor at the summit of Kīlauea as a result of the Lower East Rift Zone eruption produced towering ash plumes and tens of thousands of earthquakes that significantly impacted roads and structures throughout Hawai‘i Volcanoes National Park, Volcano Village, and surrounding areas. It was the largest eruption and caldera collapse recorded for Kīlauea in the last 200 years. On May 11, a Presidential Disaster Declaration (FEMA 4366-DR-HI – Kīlauea Volcanic Eruption and Earthquakes) was issued for the County of Hawai‘i.

A LINEAGE OF ISLANDER RESILIENCE

*"We are a resilient people with a long lineage of islanders who have been living with Tūtū Pele for thousands of years — a people who **THINK** and **LIVE LIKE AN ISLAND**, a people whose kinship with the environment is best captured by the term ʻohana."*

~ Pualani Kanahele et al (2016)

Photo: ©istockphoto.com

ʻŌhiʻa Lehua tree

It was the sixth Disaster Declaration issued for events associated with Kīlauea Volcano in the last 65 years. Two years after the Declaration, many affected residents are still trying to recover. Many of the community residents impacted by the 2018 Lower East Rift Zone eruption were also affected by previous eruptions, including the flows from the Puʻu ʻŌʻō-Kūpaianaha eruption that covered over 200 residences, historical sites, and large areas of natural and cultural resources in Royal Gardens and Kalapana. This Recovery and Resilience Plan (the Plan) is focused primarily on the 2018 Lower East Rift Zone eruption; and incorporates the impacts from the Puʻu ʻŌʻō-Kūpaianaha eruption. The Plan identifies recovery and mitigation strategies to guide decisions to minimize impacts from future eruptions.

The 2018 eruption at Kīlauea's Lower East Rift Zone resulted in a loss of historical and culturally sacred places. Multiple neighborhoods — Leilani Estates, Lanipuna Gardens, Kapoho Beach Lots and Vacationland Hawaii– were inundated, some completely, and a public charter school, Kua O Ka Lā, and Ahalanui Park were destroyed. Life savings were lost as over 700 structures were inundated with lava flows. Lawaiʻa lost access to fishing grounds from the only boat ramp in Puna when material from the eruption enclosed Pohoiki Bay. Agricultural farms were lost, and road access was hampered to ones that became isolated by the lava flow. Businesses shut down and lack of road access created major challenges for the remaining residents.

The impacts of the eruption also exacerbated existing challenges of limited affordable housing options, limited opportunities for job growth, and access to health and social services. Economic impacts were not

limited to the Puna District; effects on the business and tourism sectors were islandwide and resulted in estimated damages of $796 million for a period of one year from the start of the eruption. Response and recovery efforts also put significant strain on County staff and resources as well as on federal, state, private, non-profit, and community organizations.

The impacts of the 2018 volcanic event are quantified in terms of numbers of people, homes, and roads lost; however, the eruption is also recognized as the ongoing creation of new land by the Hawaiian volcano goddess, Pelehonuamea or Pele, repeating a sequence of evolution that is millions of years old.

We are part of this ongoing process to learn what it means to live with Pele.

While the experiences of the 2018 Kīlauea Eruption are marked with displacement and loss, recovery from this event provides an opportunity to learn from the past, adapt it to what it means today to bounce forward after a disaster, and learn to be more resilient moving forward.

The Kīlauea Recovery and Resilience Plan (the Plan) is built upon lessons from the past, as well as defines opportunities that will enable the community to recover in a manner that will also benefit future generations. The Plan addresses ongoing recovery needs from the 2018 eruption with a priority to providing relief to those impacted by the eruption, assisting those who can rebuild in areas of lower risk, and fostering the mutual assistance, resilience, and entrepreneurship within the community.

Recovery from a disaster like the 2018 Kīlauea eruption also requires us to understand the continued exposure to hazards and reduce future risks associated with these hazards. Through science, technical analysis, and input from the community, there is an expressed need for us to protect public health and safety of island residents and businesses from future eruptions where the risks are highest.

A priority of the Plan is to reduce vulnerabilities and mitigate risk to volcanic and other natural hazards. The exposure to volcanic hazards exists to varying degrees across our island. Science, history, and cultural knowledge tell us that Puna experiences a high level of exposure to volcanic hazards. It is the County's responsibility to protect public health and safety and promote public awareness about hazards.

The Plan also defines the priority to ensure alignment with the goals, objectives, and policies of the Puna Community Development Plan and County General Plan in areas of long-term recovery related to redevelopment, land-use decisions, and investments in infrastructure, housing, and economic development.

Another priority of the Plan is to build the resilience of the Puna community. The recovery process can build community capacity and facilitate investments that can create opportunities for residents, farmers, and entrepreneurs in conjunction with choices to manage the risk of exposure to volcanic hazards. The work in recovery can catalyze how the community bounces forward by fostering collaboration on recovery solutions and shifting the socioeconomic conditions in the community prior to, and as a result of, the eruption.

The Plan was developed in collaboration with community members, private and not-for-profit sectors, and key stakeholders across federal, state, and county governments. As a result of the community and stakeholder engagement and input, the Plan's vision was developed to meet the near-term and long-term goals through the implementation of strategies and projects, as illustrated in Figure 1.

VISION

To foster resilient communities that respect the Puna region's ever-changing landscape. This vision honors ʻāina, supports our communities to recover from the 2018 Kīlauea eruption, builds our capacity to mitigate against disaster events by reducing risk to life and property, and facilitates economic opportunity and well-being for residents.

GOALS

Near-Term Goal: Facilitate projects and efforts that continue to provide relief to residents and businesses impacted by the eruption in the Puna District.

Long-Term Goal: Implement strategies, policies, and projects that protect public health and safety, enhance community well-being, and help create a resilient economy islandwide.

	KĪLAUEA ERUPTION RECOVERY	DISASTER READINESS	COMMUNITY RESILIENCE — BUILDING COMMUNITY CAPACITY
STRATEGIES	Invest in infrastructure that supports recovery, promotes housing security, addresses eruption-impacted properties, and supports community economic recovery.	Improve community planning and disaster preparedness, manage development in high-hazard areas through land use, and implement mitigation measures for natural and built infrastructure.	Build networks and community capacity, invest in targeted revitalization efforts in Puna to support disaster resilience and economic growth, identify areas for natural and cultural resources management and agriculture development, and improve access to goods and services.
PROJECTS	Road Restoration ▪ Housing Buyout Program ▪ Housing Relocation Services ▪ Parks and Recreation Recovery Initiative ▪ Water Infrastructure Recovery Projects ▪ Kīlauea Recovery Grant Program ▪ Pohoiki Boat Ramp Access ▪ Pāhoa Master Plan ▪ Tourism Strategic Plan ▪ Workforce Development ▪ Broadband Feasibility Study ▪ Mass Transit Master Plan ▪ Kalapana Recovery and Mitigation	Damage Assessment Protocol and Capacity Building ▪ Land Use Policies for Recovery and Mitigation ▪ Emergency Response Communication – Backup Power Transfer Switches ▪ Transportation Route Design & Construction ▪ Islandwide Shelter Analysis & Construction-Retrofit ▪ Volcanic Gas Monitoring and Climatology ▪ Pre-Disaster Recovery Preparedness Framework ▪ Earthquake/Hurricane Retrofit Incentive Program ▪ Puna Wastewater Programmatic Environmental Assessment ▪ GIS Data Management ▪ Evacuation and Sheltering Assessment and Protocol ▪ Project 360 – A Resiliency Project of Hawaiʻi County Citizen Corps Council and Civil Defense Agency	Natural and Cultural Resources Management Program ▪ Community-Based Disaster Management ▪ Network of Resilience Hubs ▪ Food Security & Resilience and Agriculture Development ▪Youth Development and Resilience ▪ Access to Social, Health & Medical Services

Figure 1.

ABBREVIATIONS

CDBG-DR	Community Development Block Grant – Disaster Recovery
CERT	Community Emergency Response Team
COH	County of Hawai‘i
CPD	Community Planning District
CPT	Core Planning Team
DEM	Department of Environmental Management
DHHL	Department of Hawaiian Home Lands
DHS	U.S. Department of Homeland Security
DLNR	Department of Land and Natural Resources
DOE	Department of Education
DPR	Department of Parks and Recreation
DPW	Department of Public Works
DWS	Department of Water Supply
EDA	U.S. Economic Development Administration
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HI-DARRT	Hawai‘i Island Disaster Assistance Response and Recovery Team
HUD	U.S. Housing and Urban Development
ISD	Institute for Sustainable Development
NEHRP	National Earthquake Hazards Reduction Program
Puna CDP	Puna Community Development Plan
Tetra Tech	Tetra Tech, Inc.
USDA	United States Department of Agriculture
USGS	United States Geological Survey
USGS HVO	United States Geological Survey Hawaiian Volcano Observatory

INTRODUCTION TO THE PLAN AND THE PROCESS

RECOVERY AND RESILIENCE PLAN ORGANIZATION

The Kīlauea Recovery and Resilience Plan (the Plan) provides an overview of the volcanic event; describes the impacts and vulnerabilities; defines the planning process; summarizes the community and technical input; and outlines the resulting goals, strategies, policies, and projects for recovery and resilience. The Plan supersedes the Interim Recovery Strategy adopted by the Hawai‘i County Council through Resolution 271-19.

PLAN DEVELOPMENT AND IMPLEMENTATION

While most of the physical effects from the 2018 Kīlauea eruption occurred within the Puna District, economic, response capacity, and resource impacts are county-wide. The Plan encompasses specific strategies aimed to help impacted communities in the Puna district recover from the eruption event as well as strategies to support building resilience islandwide.

The Plan is for residents who suffered property loss or damages, business owners, various community stakeholders, islandwide citizens, county, state, federal government officials, and other interested parties.

The County of Hawai‘i governs the development and adoption of the Plan. Implementation of this Plan requires continued collaboration across government, community and private sector stakeholders. Specific working groups were instrumental in providing input for plan development and will also continue to work together to support plan implementation. A brief description of the working groups and their continued role in the recovery process is below.

RECOVERY TEAM (RT)

The County established a Recovery Team to build its capacity to manage the long-term recovery from the 2018 Kīlauea eruption. The Recovery Team is a division the County’s Planning Department and collaborates across County departments and agencies. The team, led by the Disaster Recovery Officer, managed the recovery planning process. The Recovery Team facilitated, collaborated, and coordinated with the public, and federal, state and county stakeholders to ensure the Plan was developed through broad stakeholder engagement throughout the entire recovery planning process. The Recovery Team is responsible for coordinating the implementation of this Plan. The team will collaborate with the Recovery Working Groups (see Implementation section) along with partner organizations to review, prioritize, implement projects as well as identify new projects based on the project evaluation criteria.

CORE PLANNING TEAM (CPT)

The Core Planning Team (CPT) provided oversight and strategic direction for the recovery planning process. The CPT consisted of representatives from County government departments. The CPT provided input on the damage analysis, recovery and mitigation planning, program/project identification, and implementation for the County. The CPT also provided assistance to ensure that recovery activities are feasible and consistent with other community and County efforts. Members of the CPT may be consulted as needed during the implementation of the strategies and projects.

RECOVERY TASK FORCE

The Recovery Task Force (Task Force) is an advisory group that consists of stakeholders who form a broad-base and knowledgeable representation of the County and various local communities. The Task Force was charged with advising on the development of policy decisions

and recovery strategies. The Task Force brought local government and community together to advise on decisions that are critical to this recovery effort. The work of the Task Force will transition to the Recovery Working Groups (see Implementation section) as a structure that can support the implementation of the strategies and projects.

PUNA COMMUNITY DEVELOPMENT PLAN ACTION COMMITTEE

Established by ordinance (HCC §16-4) to steward the implementation and update of the Puna Community Development Plan (CDP), the Puna CDP Action Committee has supported recovery efforts by helping the County to develop a holistic understanding of the community's CDP vision in relation to recovery goals and objectives. As part of its responsibility to monitor progress and effectiveness of the CDP in changing conditions, such as the 2018 Kīlauea eruption, the Puna CDP Action Committee worked to broaden community awareness of the interdependence between CDP implementation and recovery efforts and engaging the community in the recovery planning process. The Puna CDP Action Committee may participate in the implementation of community-based recovery actions in collaboration with the Recovery Working Groups by fostering partnerships that support the implementation of prioritized recovery and resilience projects.

FUNDING SOURCE REQUIREMENTS

Funding to support the implementation of recovery and resilience projects within the Plan will come from multiple sources, some of which are yet to be determined. Each funding source will have specific requirements and limitations for use. For example, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program must mitigate future risk, and funds must be expended within three years from the close of the application period. Community Development Block Grant Disaster Recovery (CDBG-DR) funds must be expended within six years, and have extremely limited applicability in lava zones 1 and 2. State and county funds may be needed as matches to federal funds. Some priority projects without known funding sources are included in the Plan. The implementation guide serves as an outline for the identification and use of disaster recovery funding.

Recovery team member Bob Agres, second left, speaks with Kapoho Vacationland board members Deb Smith, far left, and Susan Kim, second right, and Puna Councilmember Ashley Kierkiewicz, far right, during a site visit to Kumukahi.

COLLABORATION

Recovery involves a multitude of local, state, and federal agencies, not-for-profits, community members, and the private sector. It is vital that all stakeholders remain informed of ongoing activities through communication and collaboration. The Kīlauea Eruption Recovery website (https://recovery.hawaiicounty.gov/) will continue to be updated with current information about the recovery and resilience projects and community-based actions.

LESSONS LEARNED

A natural phenomenon, such as a volcanic eruption, only becomes a disaster event when it causes fatalities and/or overwhelming property damage in populated areas. While it is not desirable to suffer the consequences of a natural phenomenon within populated areas, the opportunity does present itself to learn from the event and work towards implementing measures that will prevent or minimize impacts from future events. In the case of the Kīlauea Lower East Rift Zone eruption, Hurricane Lane also occurred (August 2018) during the eruption period. It is imperative that lessons learned from both events are used to inform, guide, and build upon actions that can be taken to build resilient communities across the Island of Hawai'i. A lessons learned section is included in the Plan that outlines the significant lessons learned; however, it is not inclusive of all lessons learned. The Recovery Team will continue to work with the community and partner organizations to identify and act upon lessons learned that will benefit all communities in the county.

COMMITMENT

Recovery does not occur quickly. Success is attained when the Plan enjoys widespread support and sustained action. All who are involved in recovery will need to remain resolute over the long haul in their commitment to a resilient community recovery and a thriving island.

The projects are based on public input identified during stakeholder and community meetings. The projects described include steps that can be taken to implement projects and potential funding sources. Ultimately, it is up to the identified project leads, working groups, and community stakeholders to prioritize and decide which projects to implement and how to proceed with their implementation.

HOW TO USE THIS PLAN

The Plan is an outline of key strategies and projects with a structure for implementation based on action. Implementation of the Plan will be coordinated by the Recovery Team and used by the Recovery Working Groups and community partners to make critical decisions about action steps, funding sources, and resource allocation during the implementation phase of the recovery process.

The Plan is a guideline rather than a set of instructions. It will evolve as more details become known, and circumstances change. It is important to remain flexible within the context of the community's vision.

MEASURING PROGRESS

The projects identified in this Plan require collaboration, resources, focused plans, and enabling mechanisms to implement; and each will operate on its own timeframe. While discrete actions may be prioritized and happen in the near-term, some projects may take shape over many years. Measuring and communicating success is important for maintaining momentum and keeping with the vision.

Project timelines are proposed to provide direction on the progress and completion of specific projects in implementation. Generally, timelines are defined as:

- Ongoing: Progress is underway and/or long-term collaboration
- Near-Term: 1-2 years
- Medium-Term: 3-5 years
- Long-Term: More than 5 years

OUR ISLAND HOME

ISLAND OF HAWAIʻI

The Hawaiian Islands are at the southeast end of a chain of volcanoes that began to form more than 70 million years ago (U.S. Geological Survey [USGS] 2019) (Figure 2). There are five volcanoes located in the Island of Hawaiʻi, four of which are considered active, as shown in Figure 3. Lōʻihi is also an active submarine volcano located 22 miles southeast of the Island of Hawaiʻi.

Kīlauea is a shield volcano that forms the southeast part of the Island of Hawaiʻi in the Puna district. Kīlauea is one of the most active volcanoes in the world, with eruptions occuring at Kīlauea's summit or along one of its two rift zones: the Southwest Rift Zone and the East Rift Zone. Rift zones are weak areas in a volcano's structure where eruptions are more likely to occur. In the 19th and early 20th centuries, eruptive activity was nearly continuous at Kīlauea's summit, and numerous eruptions occurred at vents on Kīlauea's East and Southwest Rift Zones. For the past 200 years, eruptions of Kīlauea and Mauna Loa have occurred at their summits and/or along one of their rift zones—and future eruptions on these volcanoes are likely to occur in the same areas (USGS 2019). The 1859 eruption of Mauna Loa is an exception; the eruption occurred on the northwest flank of the volcano.

Figure 2. Lava flows in the past ~1,000 years (USGS)

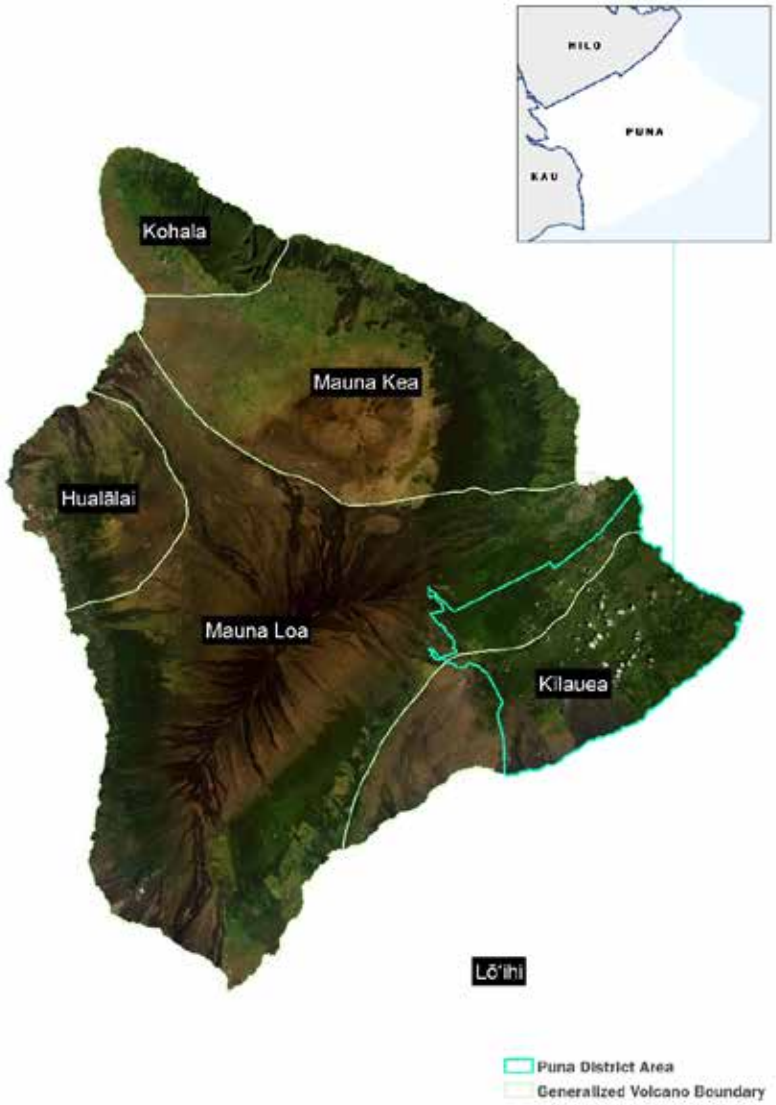

Figure 3.

COMMUNITY OF PUNA

The interplay of many dynamic, natural elements in Puna makes it one of the most culturally sensitive areas in all of Hawai‘i (McGregor, 2007). It is the easternmost district of the Island of Hawai‘i, the land where the sun first rises. It is the district where the volcano continuously creates new land, and new vegetation comes to life on this newly formed land (McGregor 1996). The Hawaiian communities of Puna, particularly the lower part, remains distinct, geographically, culturally, and socially. There is still a significant group descended from the first families who migrated to and settled in the district. They have a strong tradition of perseverance in a district that has constantly changed and evolved (McGregor, 1996).

Living on the slopes of Kīlauea, one of the world's most active volcanoes, has shaped a resilient population. The people of Puna are creative and generous; entrepreneurship is the natural response to this environment. Independent and self-reliant, the people of Puna take adversity at face value and work together to support one another through difficult times.

Currently, 47,352 residents are living in Puna (American Community Survey 2017), 45% of which are in lava zones 1 and 2 (high severity of hazard). Economically, low wage jobs dominate the local economy; 78% of Puna district is ALICE* and/or in poverty. The basic cost of living outpaces wages. Housing expense is the highest cost of living and insurance in lava zones 1 and 2 is extremely difficult to acquire.

Non-conforming subdivisions were created prior to the adoption of the zoning and subdivision codes. There are more than 50,000 lots in these substandard subdivisions. Some subdivisions have decent roads, electricity, and broadband access. Most homes do not have municipal water, and none have sewer service. More than 90% of subdivision lots rely on rainwater catchment for water supply.

> *"Puna is the piko (center) of our family.*
>
> *We are a healthy family because we have a place we are tied to — a place that helps us stay strong as a family and a community.*
>
> *This is a place where generations of my family have been raised and lived fluidly with Tūtū Pele.*
>
> *We own the change — we respect the change that Tūtū Pele brings.*
>
> *The change can really hurt our hearts, but the memories are good. Our families have had to be dynamic, they have had to adjust to what is in front of us — we might not be able to grow what we used to, but we will grow something else in its place."*
>
> **~ Amy Ka‘awaloa**

Puna is the fastest growing area in Hawai‘i and has the largest number of vacant parcels, which indicates a further potential for in-fill development within existing subdivisions. These are among the most affordable properties on the island.

*ALICE = Asset Limited, Income Constrained, Employed; income above the Federal Poverty Level (FPL), but not high enough to afford a basic household budget

HISTORY OF KĪLAUEA ERUPTIONS: 1955 – 2018

The district of Puna, located on the eastern end of the Island of Hawai'i, has a long history of lava flows. In February 1955, the Lower East Rift Zone along Kīlauea erupted for the first time since 1840 (USGS 2018e). Since 1955, there have been a series of major eruption periods with recorded impacts on the community, as shown in Figure 4. Figure 5 outlines the timeframe and major impacts incurred during these eruptions. Between 1954 and 2018, FEMA issued six major disaster declarations for the County of Hawai'i for volcanic hazards.

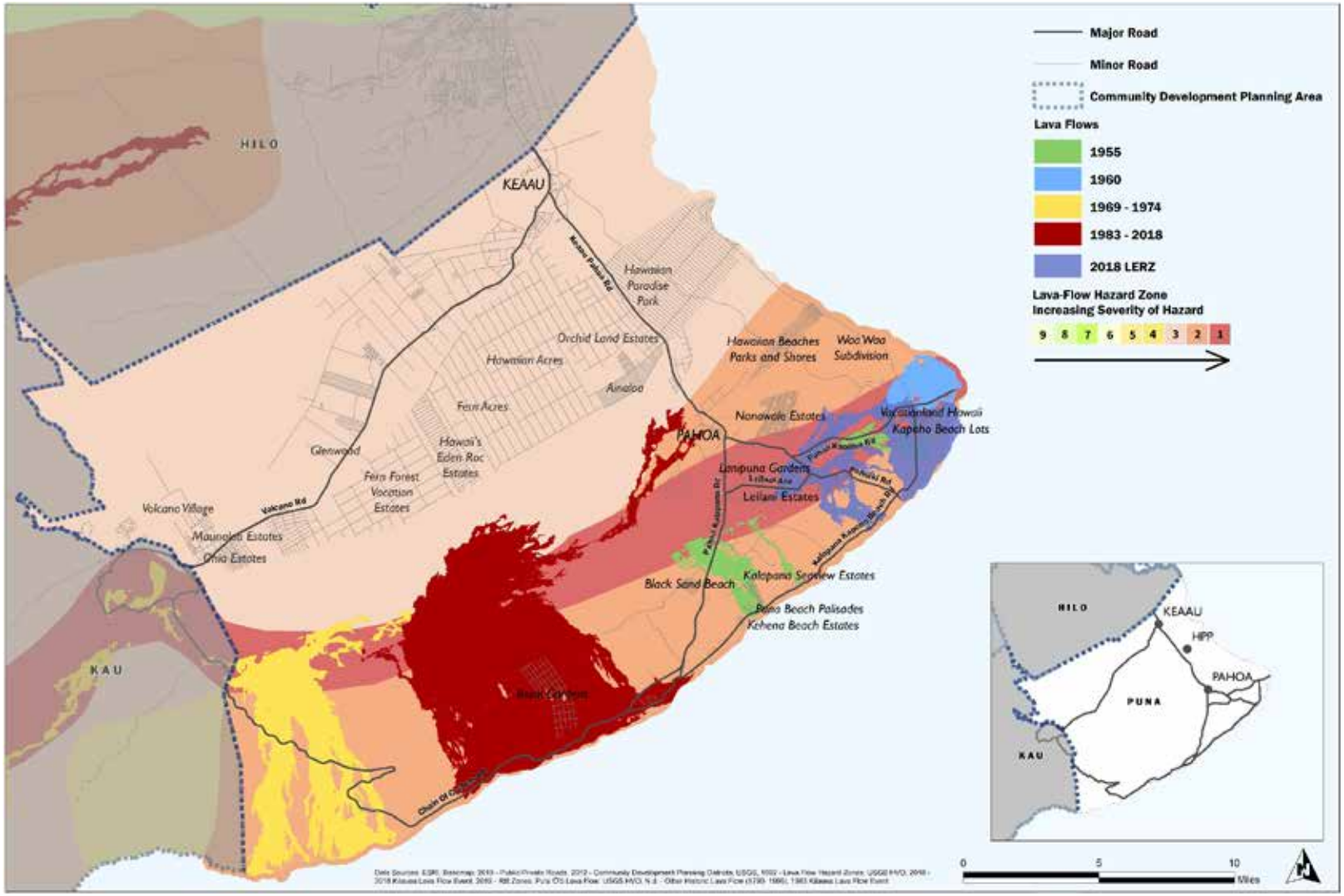

Figure 4.

HISTORY OF KĪLAUEA ERUPTIONS - **IMPACTS OVER THE LAST 65 YEARS**

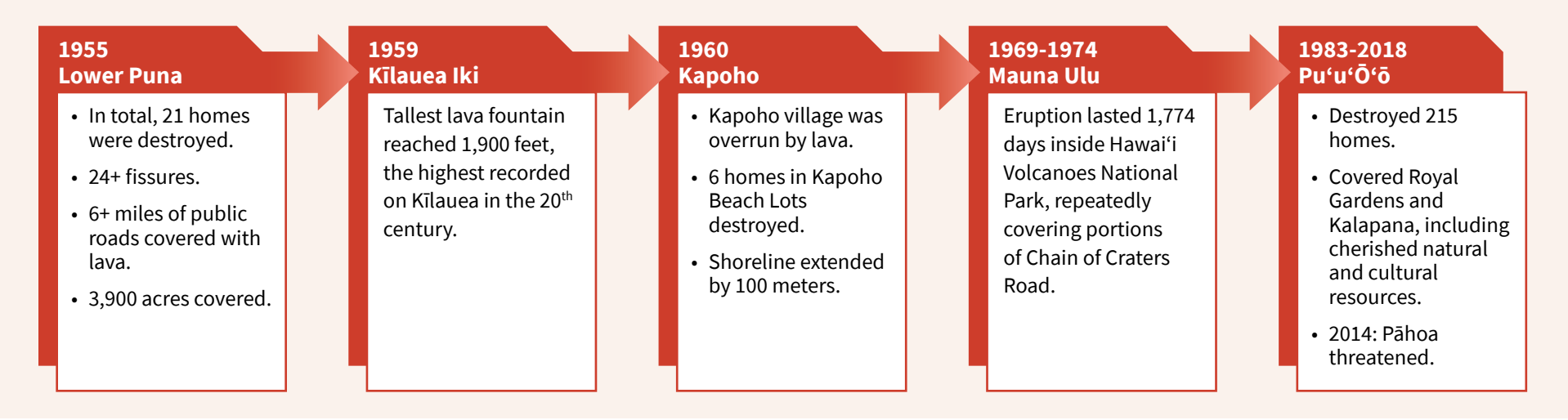

Figure 5.

KĪLAUEA PU‘U ‘Ō‘Ō ERUPTION 1983 – 2018

In 1983, the Pu‘u ‘Ō‘ō eruption began and continued for the next 35 years. The eruption was the longest and most voluminous known outpouring of lava in 500 years. The eruption occurred along the Kīlauea Volcano’s Middle East Rift Zone. Between 1983-2018, scientists from the US Geological Survey (USGS) documented 61 eruptive episodes over five time periods. The last of these eruptive episodes occurred on April 30, 2018, when Pu‘u ‘Ō‘ō’s crater floor and lava lake collapsed, and the eruption ended. Figure 6 summarizes the multiple impacts on communities in Puna during the Pu‘u ‘Ō‘ō eruption and prior to the 2018 Lower East Rift Zone eruption.

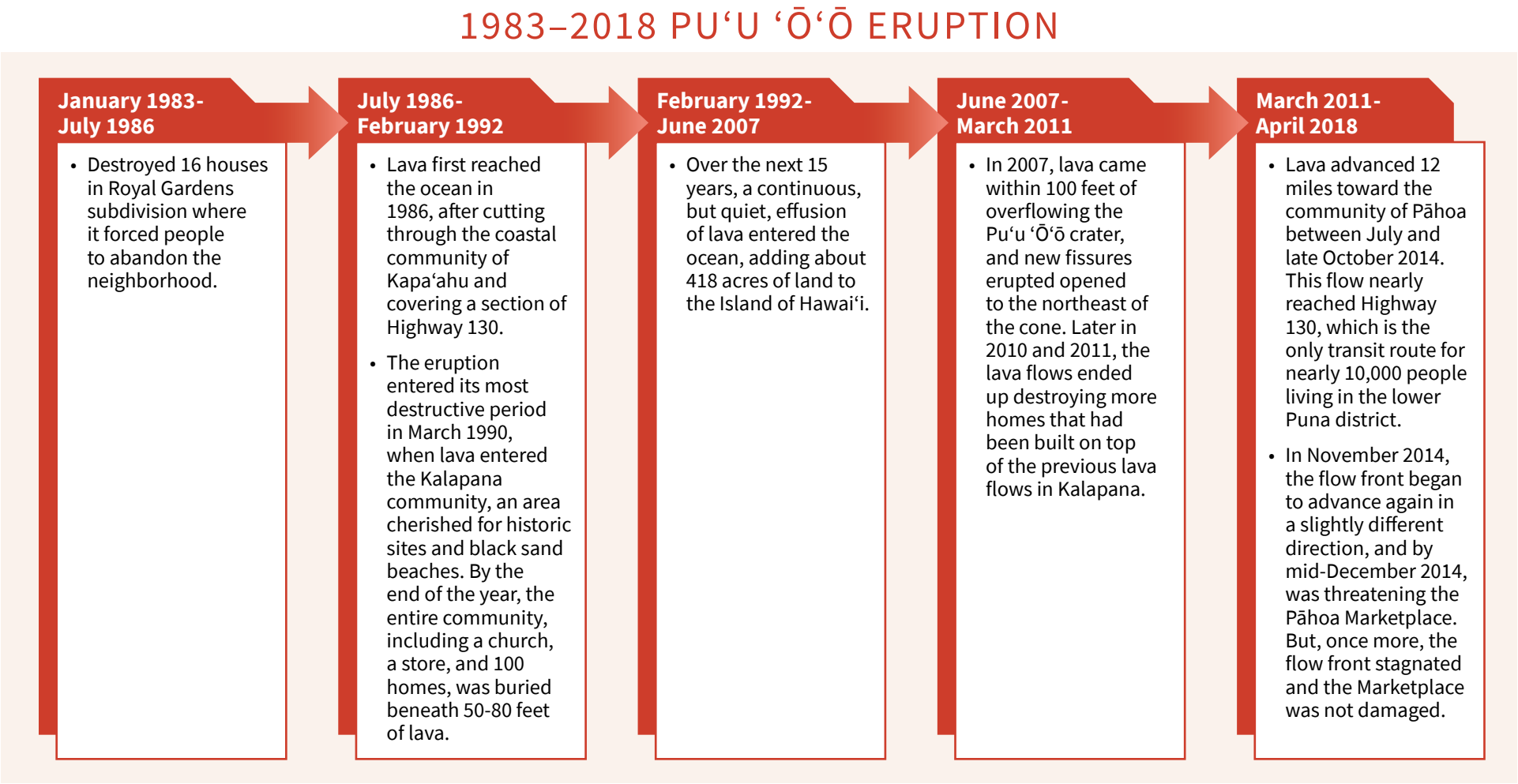

Figure 6.

The 2018 Kīlauea eruption was a dramatic bookend to a series of volcanic events that included the 35-year-long Puʻu ʻŌʻō-Kupaianaha eruption in the Middle East Rift Zone and the decade-long summit eruption that produced a lava lake in Halemaʻumaʻu. The communities of Kalapana experienced many of these events directly. The largest impacts occurred in 1990 when lava from the Kupaianaha vent inundated the community, destroying homes and cherished beaches and cultural landmarks. In 2018, the eruption in the Lower East Rift Zone threatened to isolate residents of this area of lower Puna as magma nearly breached the surface at Highway 130 between Pāhoa and Kalapana.

The inundation in 1990 not only altered the landscape; it upended a more traditional way of life for many. For decades, Hawaiian culture survived in this community despite the pressures of economic development and the arrival of new residents following the creation of Royal Gardens and Kalapana Gardens subdivisions starting in the 1960s. Community ties and interdependence between families were strong, and the sea provided food and other resources. People worked hard and shared with each other. When faced with additional development in the 1970s, residents rallied to oppose plans to build a new hotel in order to help preserve their way of life.

> *We were rich. We were rich in our culture…we had our beach, we never run out of food, we never know we was poor.*
>
> **~ Elaine Hauanio, *Haliʻa Aloha no Kalapana* (*Fond Memories of Kalapana*)**

Lava from the Puʻu ʻŌʻō-Kūpaianaha eruption inundates Kalapana.

Lava from the Pu‘u ‘Ō‘ō-Kūpaianaha eruption inundates Kalapana.

> *It’s no longer about real estate and subdivisions. It’s about community and ‘ohana.*
>
> **~ Tootsie Peleiholani, Hawaii Tribune-Herald**

While some residents stayed or later returned following lava inundation, the 1990s saw the community become dispersed as residents moved to other parts of Puna or the island. Among those who stayed is the Keli‘iho‘omalu family, whose property in Kaimū on the edge of the lava flow has remained a popular gathering spot for Kalapana and the broader Puna community where weekly night markets have been held. Years after the inundation, some displaced residents moved to the Kīkalā-Kēōkea subdivision created on state land nearby for eruption survivors. Additionally, new residents are building homes again in Kalapana Gardens, where private road access has been restored.

With the change brought about by the volcano, came acceptance. According to the book, *Under the Volcano, The People of Kalapana, 1823 to 2010*: “Many had been taught by their parents that the land belonged to Pele, goddess of volcanic activity, and that if she sent her lava flows to take the land she was welcome." For Kalapana Hawaiians who attributed the flow to the Christian God, their attitude was the same: "if God wants to take the land, let him." During the 2018 eruption, in the face of more dramatic changes, the Kalapana community remained resilient and resolute, with culture and its connection to the land and family remaining an anchor in a changing environment. It also signaled the end of the Pu‘u ‘Ō‘ō-Kupaianaha eruption and the beginning of their own long-awaited recovery.

Lost places of significance:

- Kaimū beach
- Harry K. Brown Park
- Queen’s Bath
- Waha‘ula Heiau

2018 LOWER EAST RIFT ZONE ERUPTION EVENT—RESPONSE AND IMPACTS

KĪLAUEA LOWER EAST RIFT ZONE 2018 ERUPTION

Source: USGS

THE 2018 LOWER EAST RIFT ZONE ERUPTION

On April 30, 2018, a series of earthquakes occurred when the Puʻu ʻŌʻō crater on the east flank of Kīlauea collapsed, and magma moved toward the Lower East Rift Zone. Numerous ground cracks were reported in and around Leilani Estates. On May 3, lava broke through the surface in Leilani Estates, with records indicating a lava fountain spewing from the initial fissure on Mohala Street. As a result, County of Hawaiʻi Civil Defense Agency issued evacuation orders for the Leilani Estates and Lanipuna Gardens subdivisions. The island experienced its most significant earthquake since 1975 when a 6.9-magnitude earthquake occurred May 4 on Kīlauea's south flank. On May 9, the United States Geological Survey Hawaiian Volcano Observatory (USGS HVO) notified the public of potential explosions at the summit of Kīlauea. A Presidential Disaster Declaration (FEMA 4366-DR-HI – Kīlauea Volcanic Eruption and Earthquakes) was issued on May 11.

Lava flowed for nearly four months and covered 8,448 acres of land and permanently altered the landscape. Figure 7 displays the lava flows between the time periods of May 5 to August 1, 2018. There have not been any active lava flows since August 2018; however, ongoing thermal impacts are still occurring in the area. USGS developed a preliminary map of the lava flow thickness, as shown in Figure 8. Lava flows added about 875 acres of new land to the island, and varies in thickness across the flow field. The greatest thickness on land, at Fissure 22, is approximately 55 meters (180 feet), and the greatest thickness in the lava delta (new land created where lava entered the ocean) is approximately 280 meters (919 feet). This map will be updated after all remote sensing data have been collected and processed (USGS).

Hawaiian Volcano Observatory geologist stands next to cracks on Nohea Street in Leilani Estates. Prolonged volcanic activity beneath the surface has expanded cracks in the ground throughout Kīlauea's East Rift Zone. *Source: USGS*

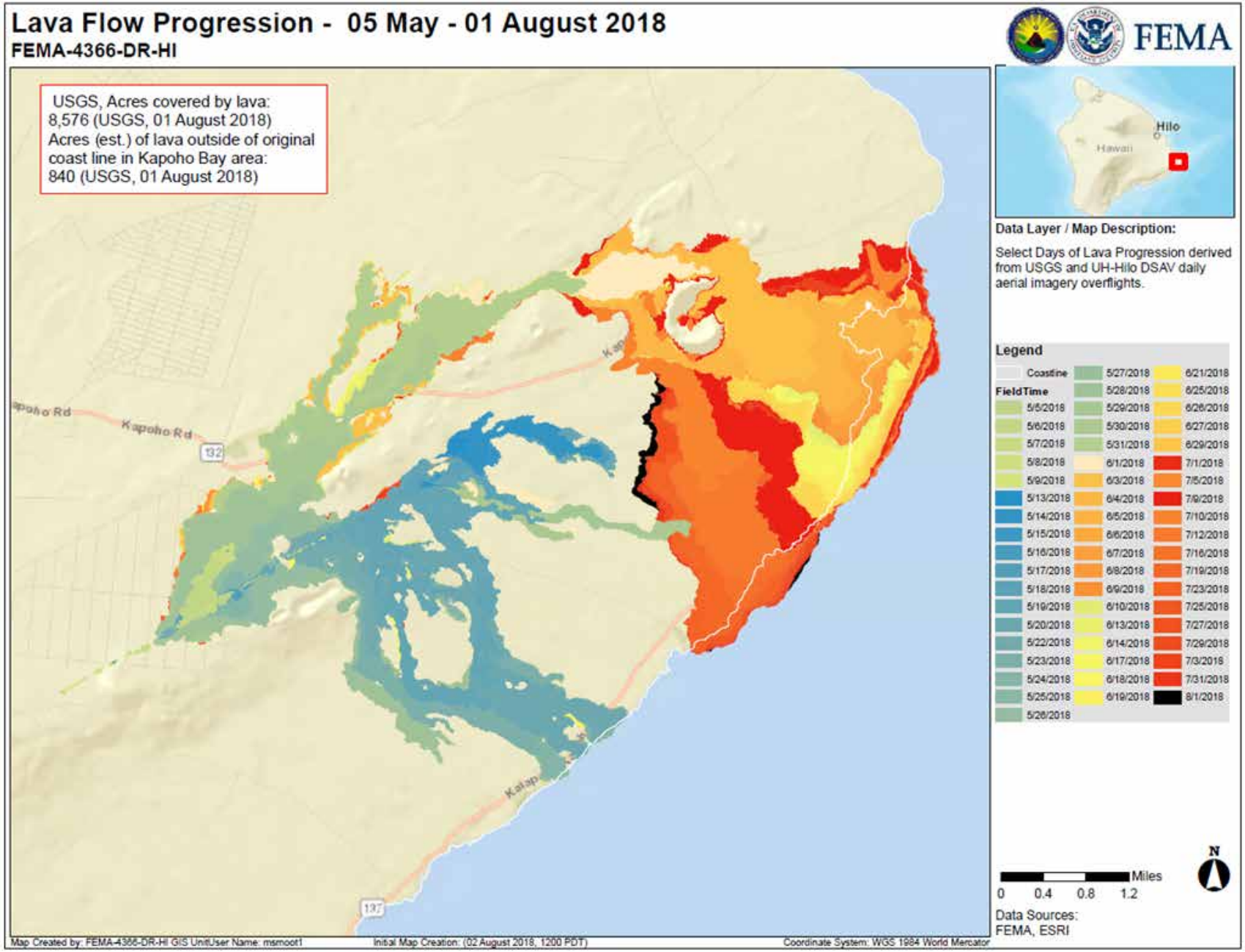

Figure 7. Lava Flow Progression - 05 May - 01 August 2018

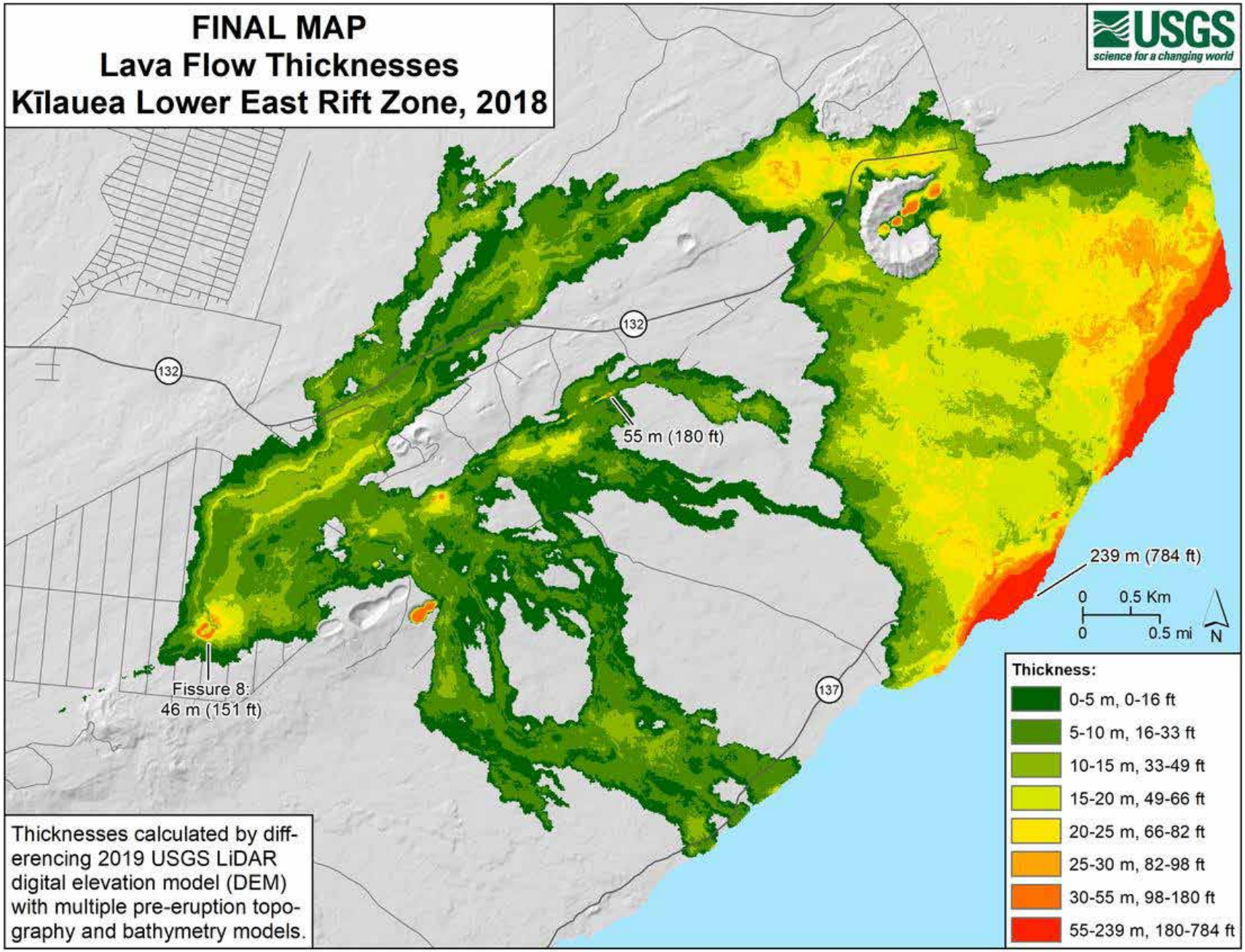

Figure 8. Lava Flow Thicknesses, Kīlauea Lower East Rift Zone Eruption, 2018

MORE THAN A LAVA FLOW

Within a few months of the start of the 2018 eruption and caldera collapse, USGS HVO reported a total of 24 known fissures, thousands of felt earthquakes, and an eruption equivalent to eight years of Kīlauea's magma supply. Puna suffered significant losses, especially from lava inundation. Multiple neighborhoods—Leilani Estates, Lanipuna Gardens, Kapoho Beach Lots and Vacationland—were inundated (some completely), and a charter school, Kua O Ka Lā, and Ahalanui Park were destroyed. In addition to lava flows, earthquakes, vog (volcanic smog), ash, tephra, and laze (lava haze), affected not only the residents of Puna but residents and visitors across the island and state.

The sheer volume of the magma supply was one of the most significant distinguishing characteristics of the 2018 Kīlauea event. Simultaneously, Kīlauea's summit experienced its largest collapse in 200-plus years, with a total of 1,640 feet subsidence and 200 earthquakes a day, on average, with a smaller number felt by surrounding communities. Volcanic gases and ash created a cloud of vog that reached the island of Oʻahu. Dozens of new fissures opened along a line of craters in Puna. Lava erupted into residential neighborhoods from dozens of fissures that opened along a line of craters in Puna.

Within a few months of the start of the 2018 eruption and caldera collapse, the Hawaiian Volcano Observatory reported a total of 24 known fissures, 60,000 earthquakes, and an eruption equivalent to 8 years of Kīlauea's magma supply.

ESCAPING GASES. A scientist with the U.S. Geological Survey measures fumes along a fractured, ash-covered road in Leilani Estates, on the Lower East Rift Zone. Noxious gases, such as sulfur dioxide and carbon dioxide, earthquakes, and instability of the situation caused closure of Hawaiʻi Volcanoes National Park from May 11 to September 22. *Source: USGS*

COMMUNITY AND COUNTY RESPONSE

Puna residents stand up for their neighbors. When misfortune hits, we are ʻohana. During the response to the 2018 Kīlauea eruption, hundreds of volunteers gave thousands of hours to help their community. Volunteers made door-to-door notifications throughout the threatened areas as the eruption persisted. They staffed shelters, distributed resident placards, and served as escorts to neighbors in closed and restricted areas. Community members opened the Hub providing food, meals, clothing, household supplies, and aloha with the contributions of donors from across the state and around the world.

The efforts of volunteers and community leaders complemented the response efforts led by county, state, and federal agencies. Many residents invited lava refugees into their homes. People shared daily news updates with drone flights, photography, and on-the-ground information. Volunteers rescued hundreds of animals from lava threatened and isolated areas. They opened their fields and pastures to rescued livestock. These actions of mutual assistance were often provided in coordination with government response and assistance. This work by community volunteers also developed new models for local disaster response and addressed gaps in government assistance.

Community meeting during the 2018 Kīlauea Lower East Rift Zone Eruption.

COMMUNITY AND COUNTY RESPONSE

SPRING 2018

Eruption begins

- Immediate County, neighbor to neighbor, and HI-DARRT response to emergency and shelter need
- Presidential Major Disaster Declaration
- EOC is activated
- Mayor assigns recovery team

SUMMER 2018

Eruption ceases at Fissure 8

- Federal/State recovery funding sought
- Governor provides $12 million for disaster relief
- Unemployment/employment benefits
- Shelters close

FALL 2018

Administration sets 6-month lava cooling wait-period to ensure safety and confirm eruption end

- Kūkulu Hou housing fair
- HI-DARRT and community partners continue outreach and health, human service, and housing support

WINTER 2018/2019

- Governor provides $10 million for relief and planning
- Public call for road access
- Temporary reopening of a portion of Hwy 137
- Pāhoa Aquatic Center reopening
- Community, County, and PGV collaborate to restore road access
- Launch ‘Ohana Talk Story Sessions

SPRING 2019

6-month wait period ends given no eruptive activity

- Talk Action, Take Action community meetings begin
- Puna business recovery workshops
- $60 million State Legislature appropriation: $20 million subsidy for relief, recovery, mitigation, and remediation assistance and $40 million loan intended to match federal infrastructure grants
- Consultants for volcanic risk mitigation, economic recovery, and recovery plan hired
- Priority Recovery Objective crafted by the community, affirmed and recommended by the Puna CDP Action Committee
- Begin road construction: Highway 132 temporary access
- Recovery full website launch

SUMMER 2019

- Priority Recovery Goals crafted by the community, affirmed and recommended by the Puna CDP Action Committee
- County Interim Recovery Strategy to County Council
- Case Management contract initiated through FEMA grant
- Kīlauea Eruption Risk Assessment (KERA)
- Household, Community & Business Impact Surveys Launched
- Recovery SpeakOut event in Kea‘au

FALL 2019

- Completed Highway 132 construction
- Recovery SpeakOut II and Recovery Youth SpeakOut in Pāhoa

WINTER 2019/ SPRING 2020

- Recovery Task Force established
- Develop Volcanic Risk Assessment
- Develop Kīlauea Recovery and Resilience Plan
- Develop Disaster Economic Recovery Plan

SUMMER/FALL 2020

- Complete Kīlauea Recovery and Resilience Plan
- Complete Volcanic Risk Assessment
- Complete Disaster Economic Recovery Plan
- Release CDBG-DR Action Plan
- Submit plans for selected road restoration

IMPACTS FROM 2018 KĪLAUEA ERUPTION

The 2018 Kīlauea eruption resulted in multiple impacts on residents and resources in the Puna district as well as across the county and the state. These impacts on residents and the environment were the result of volcanic activity, including:

- Lava flows
- Vog
- Laze
- Fire
- Volcanic glass (Pele's hair)
- Explosive eruption
- Ashfall
- Earthquakes
- Ground failure/subsidence
- Acid rain

The Puna community and individuals directly impacted by this eruption experienced trauma from the loss of homes and farms, displacement, and lava inundation of a school and natural and cultural resources.

Residents experienced health impacts from the gases during the eruption.

Residents are still experiencing mental health issues from the impact of the eruption and earthquakes.

Some families and individuals have been able to secure new housing, while many with limited financial resources continue to have an unmet need in terms of their housing.

Renters were displaced in what was already a tight housing market, and the displacement from the eruption exacerbated homelessness among those who were already housing insecure.

The following sections outline the impacts of the 2018 Kīlauea eruption across natural and cultural resources, housing, infrastructure, the economy, health and social services, and response and recovery capacity.

Kapoho Bay prior to the 2018 Kīlauea eruption.

Kapoho area following the 2018 Kīlauea eruption.

NATURAL AND CULTURAL RESOURCES IMPACTS

Traditional Hawaiian culture places natural and cultural resources at the heart of the community. Native Hawaiian residents in the district supplement their incomes by engaging in subsistence fishing, hunting, and gathering for their ʻohana by using traditional access to the ocean offshore of the Puna district and the adjacent mauka forest lands (McGregor 2007). Recent stakeholder engagement efforts support that much of the community impacted by the 2018 Kīlauea eruption still hold these values in high regard.

Lava flows and vog from the 2018 Kīlauea eruption impacted natural and cultural resources in Puna. Lava flows covered Pūʻālaʻa inundating 600 acres of intact lowland rainforest, 40-acres of an intact ancient Hawaiian fishing village, burial and the Makahiki grounds. The Mālama-Kī Forest Reserve and surrounding areas were buried under acres of lava or scorched by fumes of sulfur dioxide, destroying important populations of two endangered plants on the lsland of Hawaiʻi. The largest known populations of the Nānāwale haʻiwale (*Cyrtandra nanawaleensis*), and Hilo Ischaemum (*Ischaemum byrone*) were lost. The Nānāwale haʻiwale, a shrub in the African violet family, is found only amid the lowland wet forests of Puna. Before the eruption, only 200 mature plants existed in the wild. These plants, representing more than one-third of the known existing plants on the Island of Hawaiʻi, were lost to lava flows in Mālama-Kī Forest Reserve. The Reserve also served as a habitat to sub-populations of native forest birds. The lava flow left behind patches of isolated intact forest resources traditionally referred to as kīpuka.

The Pohoiki boat ramp, an important community meeting place that provided residents with access to the ocean for their livelihoods and food security, was rendered land-locked due to volcanic activity. The lack of access for fishing boats incurred significant economic impacts upon some individuals and families, but what was lost cannot be quantified in terms of numbers or values. Generations of families learned traditional fishing methods from their ancestors. Pohoiki was not just a fishing dock; it was a way of life for many. The community was built around sharing and preserving these traditions.

Pohoiki was also well known by residents for its seven surf breaks. There is limited access to coastal resources and no additional surf spots along the southeast coast of the Island of Hawaiʻi.

The lava flows impacted existing natural and cultural resources, but new areas of natural resources were created. New black sand beaches were formed at Kumukahi and also at Isaac Hale Beach Park, named after Isaac Kepoʻokalani Hale, in Pohoiki Bay. Four new natural ocean thermal ponds formed as a result of the lava flow in the area of Pohoiki Bay.

NATURAL AND CULTURAL RESOURCES IMPACTED BY LAVA

- 500 acres forest reserves
- 80 anchialine pools
- Pohoiki Boat Ramp
- Pohoiki Bay
- Ka Wai a Pele (Green Lake)
- Kapoho Bay
- Waiʻōpae Tidepools Marine Life Conservation District
- Pūʻālaʻa low-land rainforest and historic fishing village
- Ahalanui Park

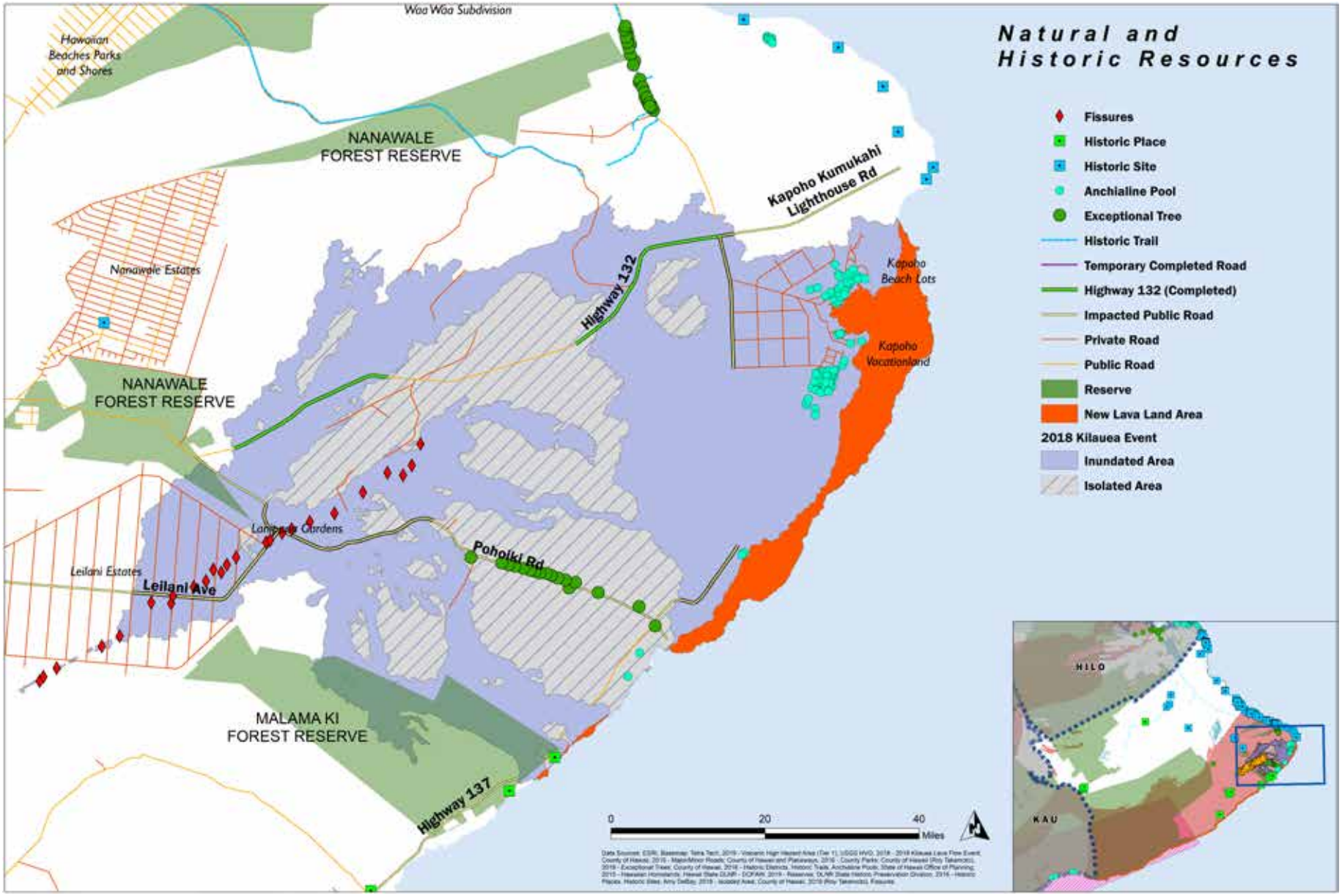

Figure 9. Natural and Cultural Resources Impacted by Lava

HOUSING

At the time of the 2018 Kīlauea eruption, there were 49,475 residents (with the median age of residents being 40.4 years old) and a total of 18,035 households in the Puna District (FEMA 2019). The average household size in the Puna District is 2.74 people. Puna residents generally live on large parcels with an acre or more of land, many of which are used for farming or subsistence. Some residents own second homes, living in Puna part-time. However, many families have lived on their land for several generations. Some properties are owned by individuals and some by a collective of families. Numerous residents live off the electrical grid, and the majority of residents are on their own water catchment systems. Some houses lack complete plumbing and kitchen facilities. Telephone service is not available for some residents. Many Puna residents have cesspools which must be replaced according to state regulations with approved on-site disposal systems or connection to a county wastewater system by 2050.

The 2018 Kīlauea eruption impacted a total of 1,770 parcels, with 1,579 parcels inundated, including 612 homes. Few roads transect Puna, and many of them became impassible from this event. After the event, 116 residences were inaccessible due to lava inundation surrounding their homes. After the County reconstructed Highway 132 and the extension of Highway 137 on a temporary basis by Isaac Hale Beach Park, 19 homes remain in isolation.

Secondary impacts included homes being compromised by earthquakes, gases, and steam venting, which forced many to flee their homes and farms. Impacts from the 2018 Kīlauea eruption have further exacerbated the already limited supply of housing on the Island of Hawai‘i as displaced residents have had to find new places to live (FEMA 2019).

These impacts are being felt in surrounding subdivisions and villages throughout Puna. Immediate and long-term relocation of residents from the impacted area into surrounding areas has resulted in additional stress on systems that were already at capacity, including roads and schools.

HOUSING IMPACTS*

- 1,770 total parcels impacted
- 1,579 inundated parcels
- 612 inundated residences
- 111 ‘other’ structures inundated
- 39 inundated agricultural lots (non-residential)
- 19 homes remaining in isolation
- 808 vacant parcels inundated

*Housing impact data reflects the most current data analysis conducted after the initial damage reports were issued. Real property tax data was utilized in addition to multiple federal and county impact databases.

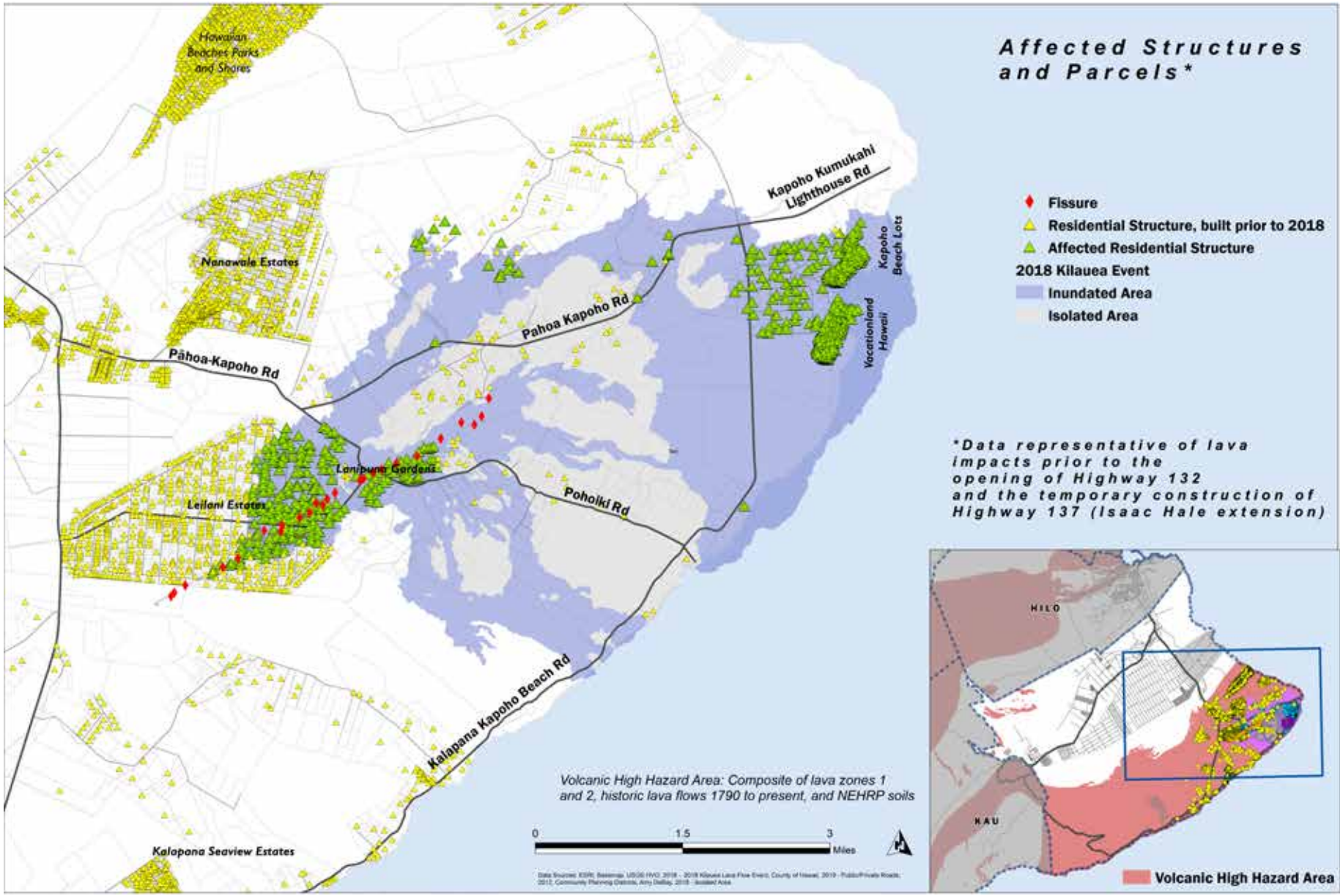

Figure 10. Affected Structures and Parcels

INFRASTRUCTURE AND CRITICAL FACILITIES

Infrastructure and critical facilities within Puna are limited in their quality, capacity, and volume. State highways and County roads are primary transportation routes for Puna residents (County of Hawai‘i 2011). Most roads servicing Puna District subdivisions are privately owned and not designed for through traffic. Water and wastewater services to the area are limited. Power generation from Puna Geothermal Venture (PGV) provides a significant source of power to the island. Residents must travel to hospitals located outside of Puna.

Roads and critical facilities were inundated or isolated by lava from the 2018 Kīlauea eruption. Among public utilities that were lost, County water provided service to the Lanipuna Gardens subdivision, and public wells provided water to farms and homes in Vacationland and Kapoho through private distribution. The eruption changed the geology of the area in such a way that the restoration of water supply remains a challenge. The eruption has impacted the water quality at private, non-DWS source wells makai of the line of fissures. The ongoing elevated temperatures of the lava flow areas prevent the rebuilding of waterlines.

Waterlines and road infrastructure into Isaac Hale Beach Park were impacted by lava, rendering an important gathering place for the community without access and public facilities. All infrastructure providing services to Ahalanui Park were destroyed when the park was covered by lava. Pohoiki boat ramp was rendered land-locked after material from the lava flows filled in Pohoiki Bay (Sea Engineering 2019). PGV’s connection to Hawai‘i Electric Light Company went offline because of the eruption.

The Kua O Ka Lā Public Charter School, along with 600-plus acres of natural areas stewarded by the school community, were inundated by lava. This school’s specialized program provides students with core curriculum, content area, and electives in keeping with the State of Hawai‘i requirements, combined with Native Hawaiian values, culture, and a place-based approach to education.

INFRASTRUCTURE IMPACTS:

- 32.3 miles public and private roads inundated – 12.44 miles County-owned and 19.86 miles privately owned
- 14.5 miles waterlines destroyed
- 1 public charter school inundated
- 900 utility poles destroyed
- 2 geothermal wells inundated, 1 isolated
- 1 electrical substation isolated
- 1 DWS water well inundated
- 2 DWS reservoirs (100,000 gallons each) isolated

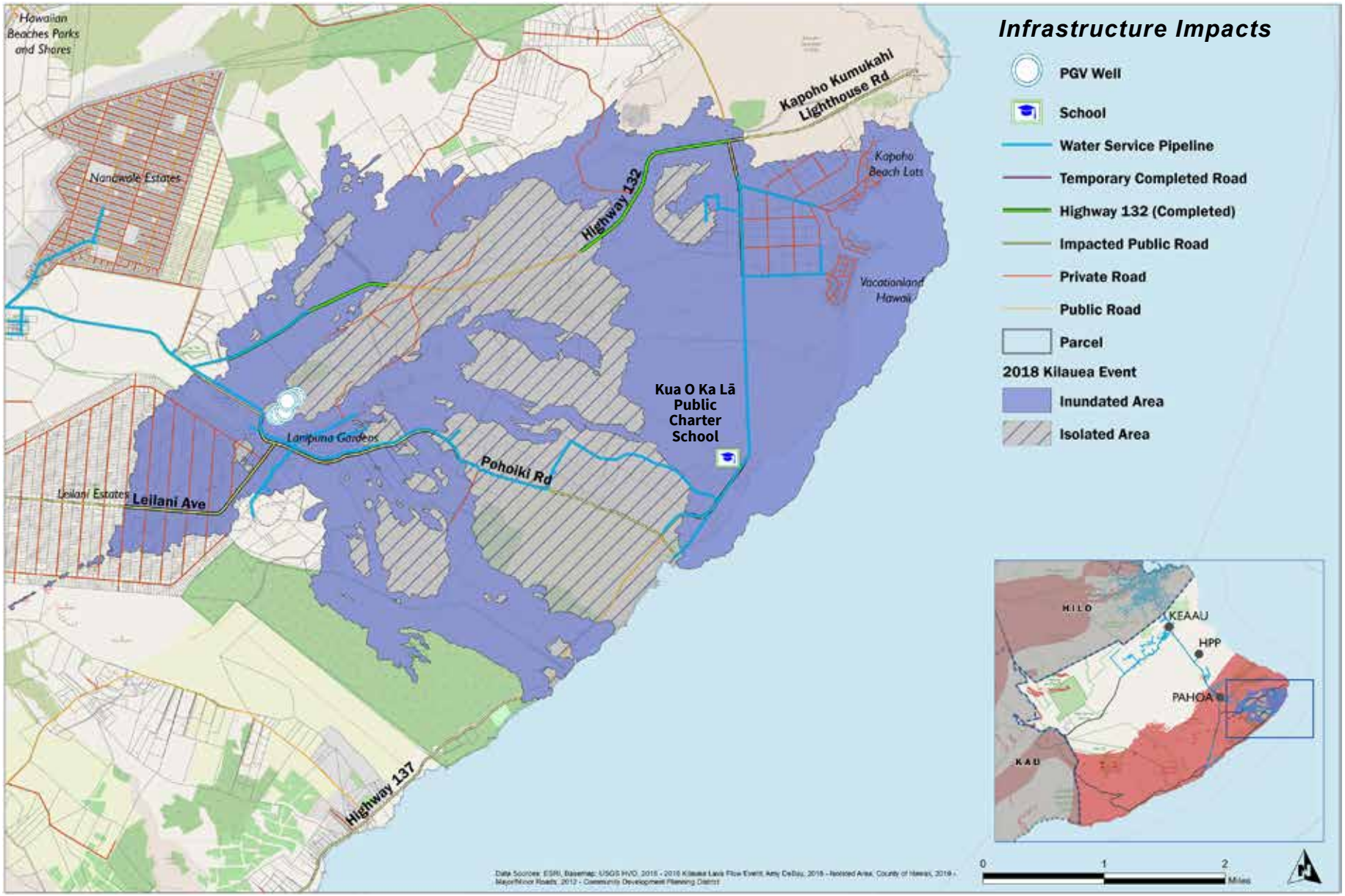

Figure 11. Infrastructure

ECONOMY

The majority of businesses on the Island of Hawai‘i are small, and 80% of the workforce is employed by small businesses. The tourism industry employs 17% of county residents. Diversified agriculture, especially coffee, macadamia nuts, and flowers, are also important within the county. Prior to the 2018 Kīlauea eruption, the unemployment rate on the Island of Hawai‘i had fallen to a low of 2.8%.

The immediate economic impact of the 2018 Kīlauea eruption caused unemployment to rise to 3.9% (ISD, 2019). The economic sectors most impacted across the entire Island of Hawai‘i are tourism and agriculture. The economic impact measured from May 2018 to April 2019 resulted in a loss of assets and income of at least $796 million as a low estimate for the County of Hawai‘i, its residents, and businesses.

While not subject to any lava inundation, the western side of the island experienced vog from the eruption. Vog and perceptions of the eruption as an islandwide phenomenon led to thousands of visitors canceling reservations. Cruise ships adjusted several scheduled visits, resulting in hundreds of thousands of dollars in losses.

Hawai‘i Volcanoes National Park closed for 162 days, and the Jaggar Museum was condemned due to structural damage. Several businesses located within the park and nearby Volcano Village that relied on visitors closed, as did long-standing island businesses that were reliant on tours to see active volcanic activity. The park had been the largest single attraction in the State of Hawai‘i, with approximately 2,000,000 visitors per year on average. This was also highly significant for the town of Hilo, which had been the primary gateway to the volcano for visitors arriving via air and the harbor on cruise ships.

Revenue for small businesses and vacation rentals reportedly remains down as much as 50% in communities such as Pāhoa due to declines in tourism, some of which may directly be associated with reduced access to tourist destinations. Small businesses have also been affected by labor shortages as employees who have lost homes or been affected by increased travel times have relocated out of the area.

Sand and other material created by lava entering the ocean filled in Pohoiki Bay, resulting in the closure of Puna’s only boat ramp. The ramp was the third most productive commercial fishing harbor on the Island of Hawai‘i (DLNR DAR). The reduction in access to both commercial and subsistence fishing in Puna has impacted the local economy.

According to a study by the University of Hawai‘i and State Department of Agriculture, at least 46 farms were directly affected by the eruption. Some 25 farms that were destroyed also had loans through the state totaling $2.5 million. Some of these farms are now non-producing due to the inaccessibility of lava-impacted roads. A total of 171 acres of agricultural land was inundated with lava from the 2018 Kīlauea eruption.

ECONOMIC IMPACTS*

- 2,950 jobs lost
- $415 million revenue loss inland-wide
- $236 million infrastructure loss
- $296 million home loss
- $99.4 million Hawai‘i Volcanoes National Park closure
- $27.9 million agriculture loss

*Impact data covers a one-year period from May 2018-April 2019

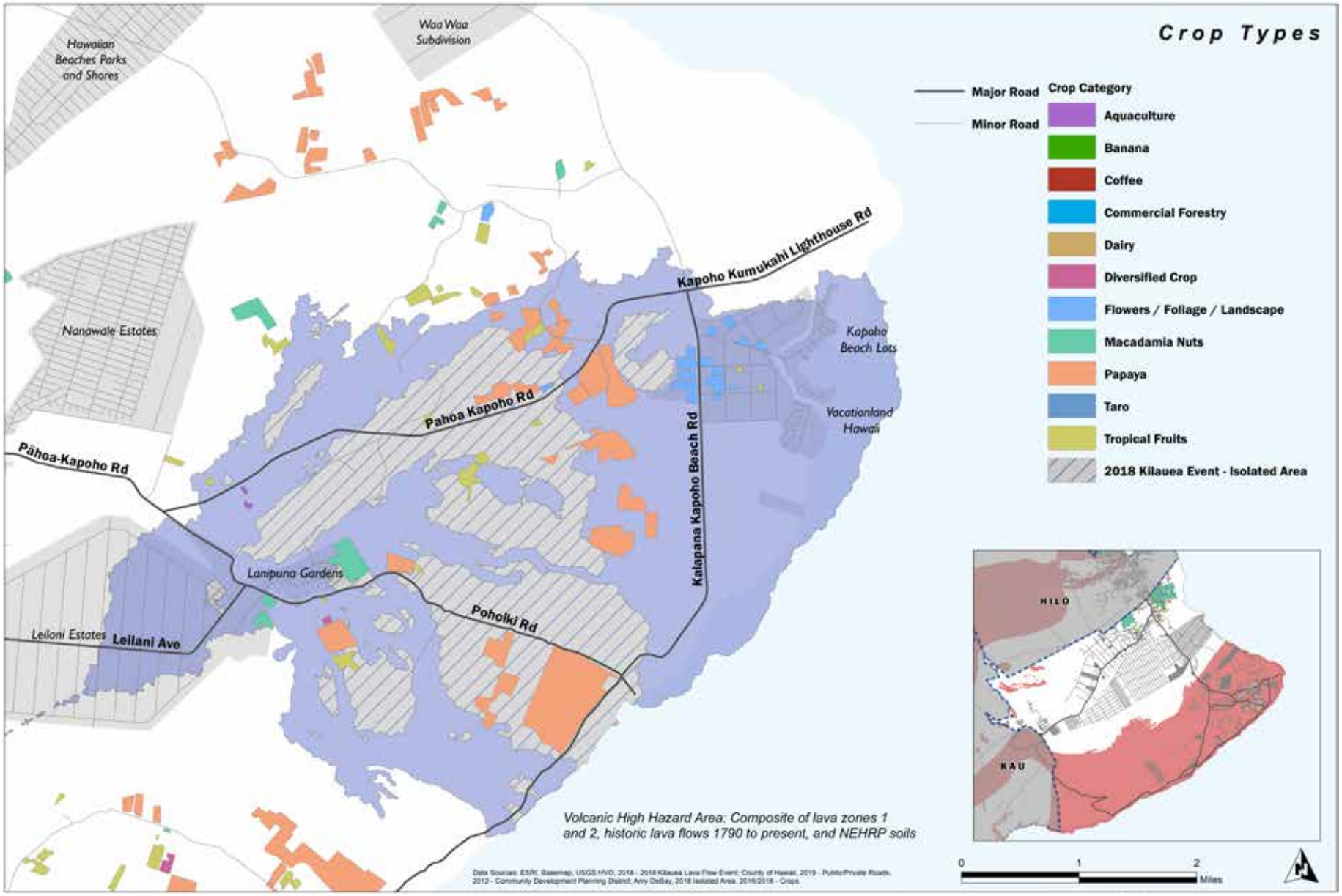

Figure 12. Crop Types

HEALTH AND SOCIAL SERVICES

Health and social services in Puna were limited prior to the 2018 Kīlauea eruption. Most residents travel to Hilo or other areas for medical services. Community, nonprofit, and religious organizations have a strong presence in Puna, providing many social and environmental services in the area.

Health clinics and mental health professionals reported an increase in mood disorders following the eruption, including post-traumatic stress disorder, acute trauma disorder, depression, anxiety, panic attacks, and night terrors. Impacted residents experiencing mood disorders may have self-medicated in the form of over drinking or experimenting with drugs resulting in an increase in substance abuse. The psychological and social impacts of displacement from housing insecurity, including street homelessness, contributed to depression, social isolation, and decreased or non-compliance with healthcare. Limited infrastructure and access to basic services exacerbated the health impacts of the displaced population. Lack of reliable cell and internet services inhibited health and employment opportunities.

Health was also impacted by deteriorated air and water quality. Many residents were exposed to vog, laze, particulates (Pele's Hair), and sulfur dioxide. While there has been a reduction in all pollutants since the eruption subsided, residents continue to be at risk of sulfur dioxide exposure. The need to repair or replace water catchment systems that many residents rely on for clean water contributed to the strain for those trying to recover from the eruption.

Educators from schools throughout the district have observed increases in mood disorders, attendance issues, and social isolation among students directly impacted by the eruption as a result of the displacement, stress, and grief the event caused for families and individuals.

HEALTH AND SOCIAL SERVICES IMPACTS

- Air quality – many residents were impacted by the exposure to vog, laze, particulates (Pele's hair), and sulfur dioxide
- Water quality – catchments systems were either destroyed or damaged
- Mental health – increase in mood disorders including post-traumatic stress disorder, acute trauma disorder, depression, and anxiety
- Low access to health care – the 2018 disaster compounded the low access to health care in rural communities in Puna
- Continuity of education – Kua O Ka Lā Public Charter School was inundated with lava causing multiple impacts to youth, families, and teachers
- Public safety – homes isolated by the lava flows experienced an increase in theft and break-ins

RESPONSE AND RECOVERY CAPACITY

Impacts from the 2018 Kīlauea eruption had broad-reaching implications on county, state, and federal agencies, private sector businesses, and not-for-profit organizations. Representatives from all the respective entities were challenged to support the County's Emergency Operations Center (EOC) response efforts that spanned 139 days while maintaining daily functions within each respective agency. Staff was limited, and most agencies incurred many hours of overtime for months on end. Emergency response personnel utilized all available resources but often left other districts in the county without adequate support. Limited response and emergency equipment required significant maintenance from the overuse in the harsh environment during the volcanic eruption. Shelter management was a challenge due to a switch in authorities and protocols at the onset of the eruption. Evacuation protocols were challenged by the public and put emergency responders and the public at unnecessary risk. Lack of communication services in certain areas was a major challenge to response and continues to put emergency responders and the general public at risk. Limited staff was available to conduct damage assessments and prepare damage estimates.

The 2018 eruption response had many examples of community and government working together to address the needs of the community. There were also documented examples of the need for additional capacity to improve a coordinated response as well as to put measures in place to prevent unnecessary impacts upon response personnel and the general public. Disruption of road connectivity and access to food supplies and resources was addressed by several community groups who “stood up” and offered necessary relief to the impacted communities. A summary of community resources provided is included below. However, it is noted that this is representative data and not inclusive of all resources provided to communities.

Community Response Resources:

- Grants strategically increased the capacity of non-profit organizations to help disaster survivors and leverage other funding sources and donations
- 18 organizations received over $903,000 in funding to address community needs:
  - Community Emergency Response Team (CERT)members served more than 5,000 hours running the resident placard service, escorting residents into the mandatory evacuation area, and staffing the forward operations base
  - 1,200 requests for assistance received through the STREAK database
  - 321,000 pounds of food, water, and supplies distributed
  - 27,000 pounds of personal hygiene kits, diapers, household items and camping gear distributed
  - 62,000 meals served
  - $362,000 in supplies distributed (e.g., gas, grocery and pharmacy gift cards)
  - 88 households placed in permanent housing
  - 26 loan applications for over $495,000 in loan capital processed
  - A network of community and faith-based and service organizations constructed 30 housing units, connected six families back to their home and 15 families to new permanent housing
  - Child & Family Services served 572 individuals; including the provision of airfare, rental assistance and distribution of gift cards

Opportunities exist to capture the best practices from the 2018 eruption, but also to increase the capacity across the government agencies and within the community to support preparedness, response, and recovery for future events.

Community planning efforts include government agencies ensuring they have enough resources and capacity to support public safety measures. It also includes working across community groups and networks, not-for-profit agencies, academia, and the private sector. The Island of Hawai'i includes seven community planning districts (CPD). Each CPD has a Community Development Plan that is under the umbrella of the County General Plan, wih the exception of the Hilo CPD. The intersection between government and the community is a necessary component in preparedness planning for recovery and building community resiliency.

RESPONSE AND RECOVERY CAPACITY IMPACTS

- EOC activated for 139 days
- 18 Departments and Agencies required to respond
- Lack of redundancy in the agencies to backfill positions
- Impact on limited response equipment
- Limited access to necessary response equipment
- Lack of redundancy in staff; impact on existing responsibilities

Volunteers build mirco-unit shelters for displaced residents in Pāhoa.

ONGOING THERMAL IMPACTS IN THE LOWER EAST RIFT ZONE OF KĪLAUEA

Note: This summary was updated on May 16, 2020. Impacts continue to be monitored.

The eruption ended after four months; however, thermal impacts will continue to be felt in parts of the eruption area for years to come. Sources of the heat include the subsurface magmatic dike and thick surface lava flows that are still cooling. The ongoing presence of heat and steam could make the restoration of infrastructure and residences in some areas challenging.

Documented impacts include heat migrating away from the magmatic dike near Ala'ili Road, Halekamahina Road, and within Leilani Estates, as shown in Figure 13. This has caused steam vents to migrate across properties and under some homes, making it difficult for residents to return or stay. This process was first noticed during the eruption on Ala'ili Road. In late 2019, migrating heat and steam was noticed in Leilani Estates near Fissures 9 and 10 and off Halekamahina Road near Fissure 17.

As of May 2020, eight properties reported impacts, according to USGS HVO. One resident was forced to dismantle and relocate her home from an area of hot, steaming ground with decomposing vegetation as a result of the heat. Another resident has seen his acre-sized yard go from a mowable lawn to wilted, followed by dead vegetation, turning into decaying mush, and now bare rock.

Ground temperatures ranged from 154 degrees to 204 degrees Fahrenheit in these areas as of late 2019; however, the presence of any gases is likely the result of decomposing vegetation and not degassing of magma, according to USGS HVO.

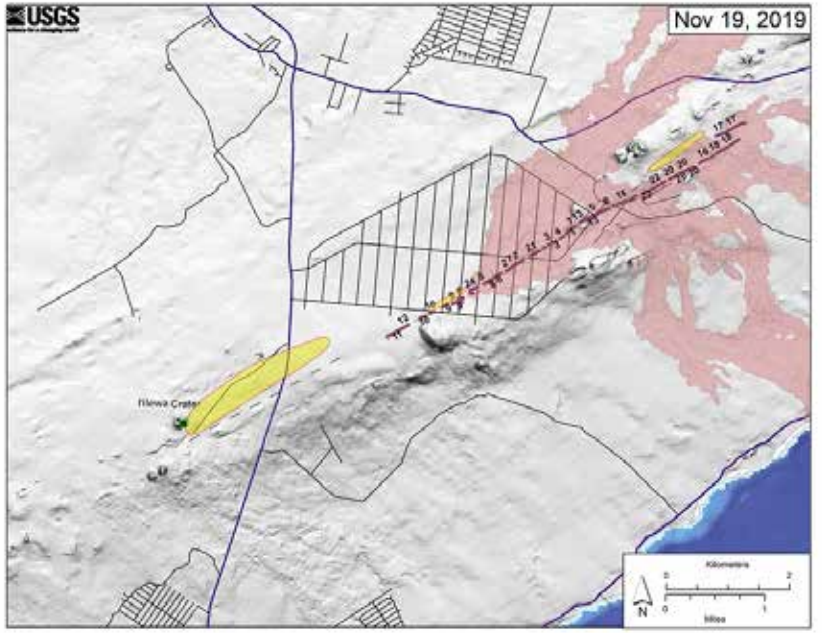

Figure 13. Highlighted areas in yellow roughly show where heat and steam is migrating out from the 2018 intrusion of magma below ground. (USGS 2019)

Heat can persist long after the surface of a lava flow has cooled. This was demonstrated during the reconstruction of Highway 132 in 2019. As bulldozer operators graded the flow in the Kapoho area, they encountered rock as hot as 800 degrees Fahrenheit at 6 to 8 feet below the surface.

Estimating cooling times of rock insulated under the surface of a flow can be difficult. According to USGS HVO, the average flow thickness, based on a preliminary analysis, is between 10 and 15 meters (33 to 50 feet) in Leilani Estates and neighboring subdivisions. Flows of that thickness could take roughly eight months to 1 year after the eruption to solidify. As solidification occurs at a temperature of about 1,560 degrees

Fahrenheit, high temperatures will still be present at this point. The flows are thicker near the coast and the communities of Kapoho and Vacationland. These thicknesses range from 20 to 30 meters (65 to 100 feet) and could take about 2.5 to 4 years to become solid. The thickest flows on land, which are approximately 55 meters (180 feet) thick, may take roughly 20 years to reach a completely solid state.

Lava flows can continue to steam after they become solid. For flows of between 10 and 15 meters (33 to 50 feet) thick, one model incorporating the effects of rainfall (at 115 inches annually) estimated it could take 3 to 4 years after the eruption for the flow to cool below the boiling point of 100 degrees Celsius (212 degrees Fahrenheit) – another three years after it has solidified. A flow with a thickness of 25 meters (82 feet) could take seven years to reach that point, based on the same model. As seen with historical eruptions on Kīlauea, steam can be present for decades after an eruption.

It is possible that Halekamahina area residents will continue to see increasing impacts into the future, as have the Ala‘ili residents.

In summary, the generation of heat, steam, and other gases in the area is ongoing, challenging people’s ability to occupy their homes.

Steam vents on property along Ala‘ili Road.

Kai Sorte stands near steam vents that opened where a cabin stood. The cabin was removed after being damaged by the steam.

RECOVERY PLANNING PROCESS

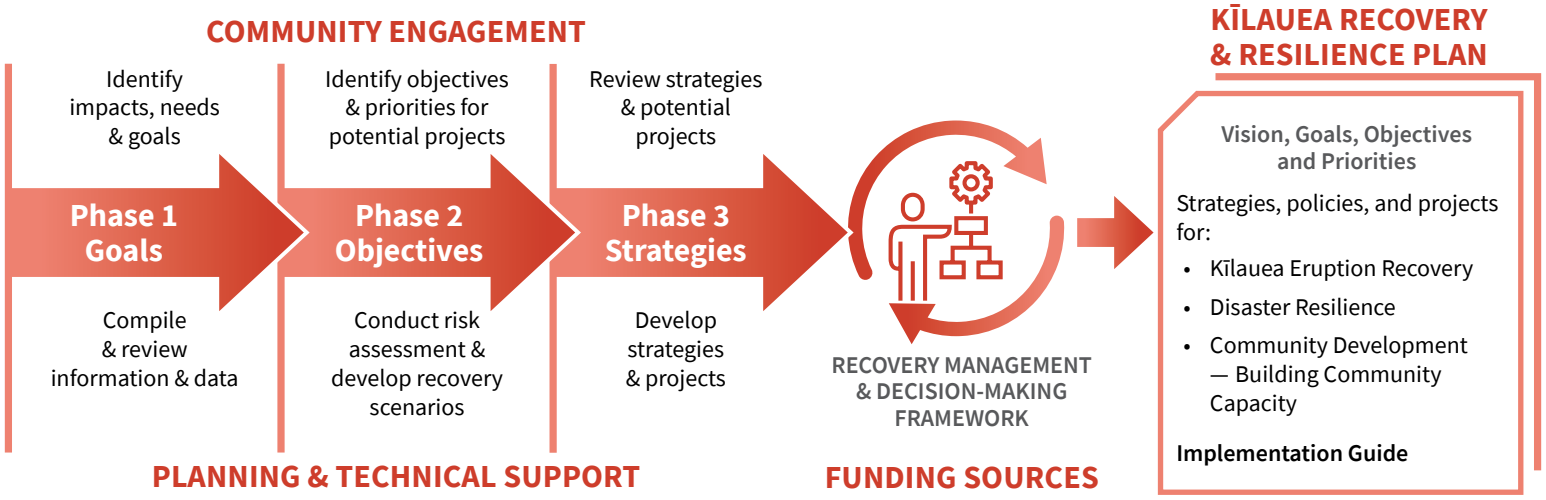

Figure 14.

The County used a multi-faceted approach to support recovery efforts and the development of the Plan.

- The Recovery Team gathered input from the community to confirm the long-term community goals and establish the recovery specific objectives and priorities.
- The Planning and Technical Support Team incorporated community input and conducted technical analyses to provide options for recovery strategies and projects .
- The Recovery Team worked with the working groups to evaluate community input and technical data to make informed decisions on recovery strategies and projects.

Community SpeakOut event in October 2019.

Puna high school studnets talk about what it means to be Puna Strong during a Youth SpeakOut event in 2019.

It is estimated that at least 3,600 persons representing a broad cross-section of the community provided input that helped shape and inform the Plan, as shown in Figure 15. The Recovery Team worked with the Puna Action Committee and the community to affirm the community goals established for the Puna Community Development Plan and to establish the recovery objectives for the Kīlauea Recovery and Resilience Plan. The County also issued multiple surveys to confirm agreement with the recovery objectives, gauge the impacts and unmet needs of the residents in the Puna District as well as define economic impacts county-wide. Figures 16 through 19 represent the Puna CDP goal, recovery objectives, impacts, and recovery priorities. Recovery priorities were utilized as the framework to establish the strategies and projects outlined in the Plan.

TOTAL COMMUNITY OUTREACH – 3,600+ PERSONS

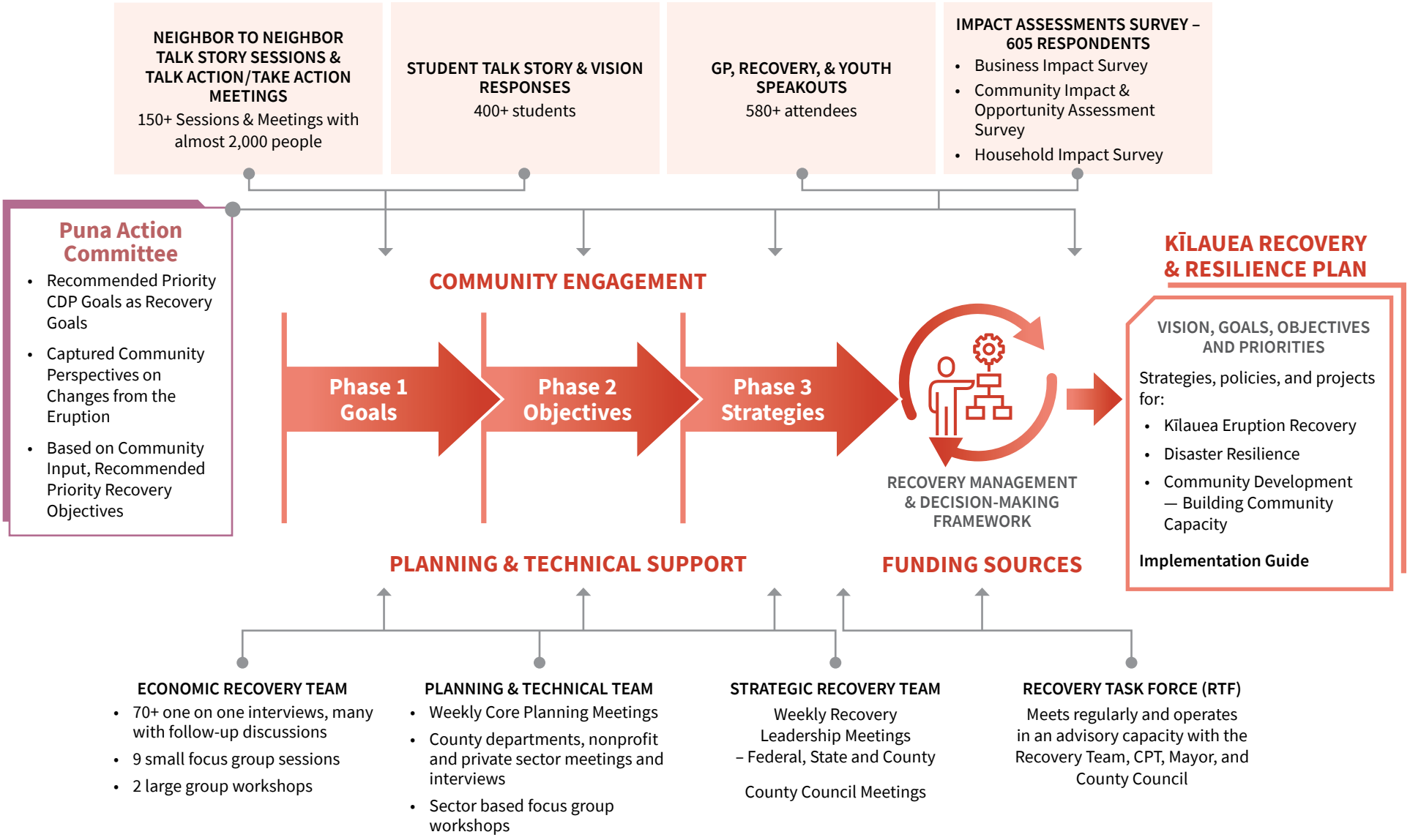

Figure 15. Total Community Outreach

PUNA CDP PRIORITY GOAL — NATURAL & CULTURAL RESOURCE MANAGEMENT

Preserve native ecosystems, maintain pono uses of natural resources, and protect increasingly threatened forests.

IMPACTS

- 500 acres of forest reserves lost – inundation of Mālama-Kī Forest Reserve and loss of significant populations of endangered plant species.
- Loss of 80 anchialine pools and Waiʻōpae Tidepools Marine Life Conservation District.
- Loss of natural, cultural, economic and recreational resources at Pohoiki Bay, Ka Wai O Pele, Kapoho Bay, and Puʻalaʻa.
- Kīpuka Formed – patches of isolated areas with intact forest resources.

RECOVERY OBJECTIVES

Native Ecosystems – Protect and provide increased restoration of native ecosystems and habitats, significant natural and cultural features and ecologically sensitive lands mauka to makai.

Historical & Cultural Resources – Protect and preserve historical, cultural, and scenic resources and increase shoreline public access and agricultural land and open space preservation.

WHAT WE HEARD RECOVERY PRIORITY THEMES

Preservation & Restoration

– "A lot of areas were destroyed so we have to *take care of what we have left*."

– "These things represent important cultural values and the Hawaiian practice of sharing *aloha for our ʻāina*."

– "Primary focus should be on *invasives*."

Productive & Shared Uses

– "We lost our safe places to *access the ocean*."

– "*Gathering rights* for native Hawaiians must be honored in these spaces."

RECOVERY PRIORITIES

Preservation & Restoration of Natural & Cultural Resources:

- ☐ Historical, cultural and scenic resource management
- ☐ Ecologically sensitive lands mauka to makai
- ☐ Native ecosystem and habitat restoration
- ☐ Invasive species mitigation

Productive & Shared Use of Natural & Cultural Resources:

- ☐ Public access to shoreline and natural spaces
- ☐ Multi-use agricultural land and open space

Figure 16. Natural and Resource Management Recovery Priorities

PUNA CDP PRIORITY GOAL — HOUSING, ECONOMIC DEVELOPMENT & SERVICES

Create Village Town Centers that provide residents with greater access to goods, services, educational resources, and economic opportunities in a thoughtful and sustainable manner, including options for marketing locally produced products.

IMPACTS

- 1,579 parcels inundated, including 612 residences and an additional 116 residences isolated by lava inundation surrounding their homes.
- Homes being compromised by earthquakes, gases, and steam venting.
- 2,950 jobs lost and $415 million in revenue loss islandwide.
- 171 acres of agricultural land inundated, at least 45 farms directly impacted, and $27.9 million in agricultural losses.

RECOVERY OBJECTIVES

Housing Options – Increase rural and urban affordable housing choices with a diversity of housing types and locations that address the range of affordability needs of residents so that they have a safe, secure home.

Local Economy – Increase the number and diversity of income sources for residents that pay a living wage, including encouraging jobs and entrepreneurial opportunities that complement the ecology, culture, and evolving demographics of the island.

Amenities and Services – Provide access to basic amenities and services within village and town centers, including groceries, childcare, parks, and other public facilities, that provide jobs and economic opportunities for local businesses, farmers, and entrepreneurs.

WHAT WE HEARD RECOVERY PRIORITY THEMES

Choice – Housing Options

– "I believe in the freedom to choose where you want to live. There should be choices."

– "Housing is not a 'one-size-fits-all' subject."

Diversity of Economic Opportunities

– "I think there is too much emphasis on the visitor industry – and the island needs a more diverse economy to be resilient."

– "Agriculture is the industry that keeps East Hawai'i stable.

Place-Based Solutions

– "Hawai'i County needs sustainable industries that will provide good-paying jobs for its residents. We need to stop the brain drain from our island."

– "Less travel time and cost for residents. Better jobs closer to home."

– "I do not support further development in my community."

RECOVERY PRIORITIES

Housing Choice

- ☐ Relocate outside of the impacted area
- ☐ Rebuild in the impacted area

Land Use Development

- ☐ Limit development to keep Puna rural
- ☐ Proximity to basic amenities within town centers
- ☐ Reduce risk to life and property from natural hazards

Economic Development

- ☐ Jobs located within the community
- ☐ Diversity of job types and entrepreneurial opportunities
- ☐ Jobs related to local resources, ecology, culture, demographics, and opportunities

Figure 17. Housing, Economic Development & Services Priorities

PUNA CDP PRIORITY GOAL — INFRASTRUCTURE DEVELOPMENT

Develop essential infrastructure to provide livable spaces, including increased connectivity of roads to provide alternative routes for emergency situations and managed traffic flow and increased internet connectivity to encourage employment, educational and economic opportunities for residents.

IMPACTS

- 12.44 miles of County and 19.86 miles of private roads inundated – a total of 32.3 miles.
- 14.5 miles of waterlines destroyed, 1 water well inundated, 2 reservoirs isolated, and private catchment systems destroyed or damaged.
- 900 utility poles destroyed, 2 geothermal wells inundated and 1 isolated, and 1 electrical substation isolated.
- Kua O Ka Lā Public Charter School inundated.
- Ahalanui Beach Park inundated, public facilities and access to Isaac Hale Beach Park

RECOVERY OBJECTIVES

Access & Mobility – Establish complete roadway connectivity for local traffic, emergency access, alternative routes, and evacuation and develop a safe, convenient, accessible, and affordable transportation system.

Utilities – Restore, improve, and expand adequate and affordable utilities (water, wastewater, energy, phone, and internet services) where needed and infrastructure is lacking.

Gathering Spaces – Develop new and improve existing built and natural community gathering spaces that are available for cultural, educational, and recreational purposes and restore and improve educational facilities to serve as multifunctional community hubs.

WHAT WE HEARD RECOVERY PRIORITY THEMES

Access

– "Can't live here if you can't get there."

– "Establish emergency access, yes. However, we shouldn't be investing in newly paved roadways in lava prone areas."

– "Public transportation is an absolute must, especially of a kind that is affordable and reliable."

Connectivity

– "Connectivity is our #1 issue."

– "Better cell phone service and internet hotspots are needed for safety, business, and convenience."

Community Hubs

– "Community hubs – schools, parks, and senior centers are important."

– "All communities need a place to gather."

RECOVERY PRIORITIES

- ☐ Invest in infrastructure that supports the vision for recovery and long-term resilience
- ☐ Improved roadway and emergency connectivity (built connections)
- ☐ A safe, convenient, accessible, and affordable transportation system
- ☐ A network of multifunctional community resilience hubs (community and place connections)
- ☐ Internet service connectivity (interpersonal connections)

Figure 18. Infrastructure Development Recovery Priorities

PUNA CDP PRIORITY GOAL — HEALTH AND WELLBEING

Promote the development of medical facilities and services, social services and programs, and family economic self-sufficiency services and programs to increase the mental, physical, emotional, and economic health and wellbeing of communities and residents, especially the most vulnerable in the community.

IMPACTS

- *Mental Health* – Increase in mood disorders reported, including post-traumatic stress disorder, acute trauma disorder, depression, and anxiety.
- *Increase in Substance Abuse* –Many afflicted with mood disorders self-medicated in the form of overdrinking or experimenting with drugs.
- *Air Quality* – Many residents were impacted by exposure to vog, laze, particulates, and sulfur dioxide.
- *Low Access to Health Care* – Eruption compounded minimal access to health care in Puna.
- *Continuity of Education* – Kua O Ka Lā Public Charter School was inundated with lava causing multiple impacts to youth, families, and teachers. Attendance and enrollment at Pāhoa schools, Hawai‘i Academy of Arts and Science, and Keonepoko Elementary School declined, while enrollment at Upper Puna schools substantially increased.

RECOVERY OBJECTIVES

Physical & Mental Health – Increase resident access to quality health services, including healthcare facilities, programs, and community-based care for the medically underserved population and expand options and facilities that promote physical activity and healthy lifestyle choices for all ages, keiki to kūpuna.

Social Health & Safety – Ensure access to quality social services to support a high quality of life, decrease social problems, and extend life expectancies and increase police, fire, and emergency personnel to an appropriate ratio between population and geography.

Family Economic Health – Progressively increase the percentage of residents that are economically self-sufficient.

WHAT WE HEARD RECOVERY PRIORITY THEMES

Quality Services

– “No one cares this whole place has PTSD.”

– “The distance to a hospital from lower Puna is well over an hour.”

– “We don’t have enough medical facilities compared to the population.”

Coverage

– “Get the services to where the people live.”

– “Emergency services and police responsiveness are key to a healthy community.”

Self-Sufficiency

– “Local food production is another wave that is a must for future social and personal health.”

– “Lots of jobs in Hawai‘i don’t pay enough for people to be able to afford to live in Hawai‘i.”

RECOVERY PRIORITIES

- Improve access to quality health services.
- Improve police, fire, and emergency responsiveness.
- Options of services and facilities that enhance physical, mental, emotional, and spiritual health and quality of life that meet needs of keiki to kūpuna.
- Support economic empowerment and self-reliance.
- Increase community and county capacity to prepare for, respond to and recover from hazard events.

Figure 19. Health and Wellbeing Recovery Priorities

Recovery planning and technical support included the compilation and review of existing information and data, impact and vulnerability assessments, and recovery scenario development and analysis. These activities, guided by inputs from community engagement activities, were used to develop recovery guiding policies, strategies, and projects.

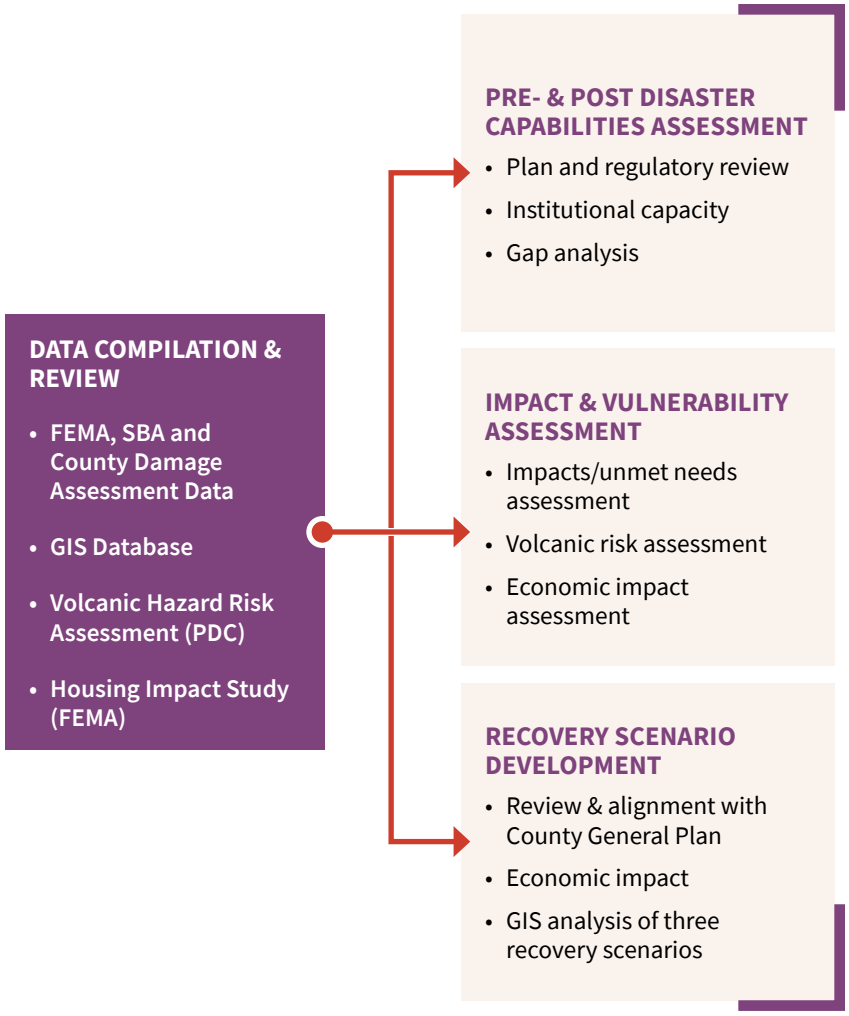

Figure 20.

DATA COMPILATION AND REVIEW

Spatial data were compiled within a geographic information system (GIS) database to support the recovery planning process. The data was used within a series of spatial analysis and scenario-building processes which help to quantify impacts, needs, and identify potential future actions. Impact and volcanic hazard exposure assessment areas were defined for Puna and islandwide to support recovery planning.

Past and concurrent planning initiatives within Puna and islandwide were reviewed and used as input to the Plan. The County General Plan and the Puna CDP were helpful in establishing values and a desired future state for the impacted area (County of Hawai‘i 2019, 2011). This analysis of complementary planning initiatives helped to identify strategies, projects, and future vision of the County and community for achieving more sustainable and resilient growth and development.

The Plan was also informed by additional studies undertaken by the County, such as the Volcanic Hazard Risk Assessment conducted by the Pacific Disaster Center and a Housing Impact Study conducted by FEMA. The information and data from these studies were used as input to the volcanic hazard exposure assessment and recovery scenario development and analysis.

VOLCANIC RISK ASSESSMENT

A Volcanic Risk Assessment was conducted to identify the continued exposure and risk to residents, property, and the environment from future volcanic activity (Tetra Tech 2020b). The assessment provides quantitative and qualitative information on volcanic hazards islandwide. The cumulative exposure to lava flows, in addition to exposure to other high hazard areas, such as sea-level rise, tsunami, and floods, were incorporated into the assessment to support recovery

planning. In 2019, the Pacific Disaster Center released the Kīlauea Eruption Risk Assessment (KERA) report that identified key social drivers of volcanic hazard vulnerability: (1) Socioeconomic status, (2) Access to information, and (3) Household composition (Pacific Disaster Center 2019). To align with the KERA report, the County examined the exposure of these vulnerable populations to the volcanic hazard. Tetra Tech utilized the results of the Kīlauea Eruption Risk Assessment conducted by the Pacific Disaster Center to inform a more detailed analysis at the parcel level (where feasible) and organized the results by Community Development Plan districts.

RECOVERY SCENARIO DEVELOPMENT AND ANALYSIS

Recovery scenarios were developed building on scenarios already constructed to explore growth alternatives as part of the Hawai‘i General Plan update. Three recovery scenarios were explored for the area directly impacted and those displaced from the 2018 event. The scenarios were based on risk tolerance and other objectives for future growth and development for the County. Data from the Volcanic Risk Assessment was input for the scenario development and analysis. Scenario development was an iterative process in which Hawai‘i County staff reviewed location criteria and ultimate goals for recovery. Using the ArcGIS extension for planning, CommunityViz, the County explored scenarios to understand the range of recovery options to identify housing and infrastructure policies and projects based on three alternatives: (1) high-risk tolerance, (2) medium-risk tolerance, and (3) low-risk tolerance.

Each combination of potential locations and hazard avoidance has associated impacts on settlement patterns and infrastructure development. These tradeoffs include future repetitive loss, infrastructure investment, and timing. The criteria, methodology, and

Community SpeakOut event in October 2019.

results of the scenarios were presented to the CPT. Upon the review of the relevant information, spatial allocations, and statistical outputs, the County concluded that the third scenario's spatial results, Resilient Recovery & Redevelopment – Low-Risk Tolerance, was the preferred outcome for recovery.

STRATEGY WORKSHOPS

Building upon the Recovery Scenario Analysis, recovery strategy working documents were developed to support the identification of recovery strategy and policies in alignment with the Low-Risk Tolerance scenario. The strategy documents were developed across sectors, including Natural & Cultural Resources, Housing, Infrastructure, Economic Recovery, and Health & Social Services.

The County conducted multiple working sessions with stakeholders to review the documents and provide input on impacts, capture challenges, identify solutions, and develop recovery strategies. The strategy documents were further developed to document projects, objectives, and goals as the recovery planning process progressed. These documents were made available to the County, as well as department stakeholders for review at various times.

CAPABILITIES ASSESSMENT

A capabilities assessment, describing the status of County department capabilities before and after the 2018 Kīlauea eruption, was conducted utilizing document reviews and interviews with all relevant County departments. This assessment included a review of County plans, regulations, and human resource capacity to identify areas that need strengthening and capacity building to support the development and implementation of the Plan. Stakeholder interviews were conducted with key County departments, as well as non-governmental organizations, in order to compile the needed information. The capabilities assessment was conducted and used as a tool for the identification of potential recovery and resiliency projects, as well as the required capacity to implement the projects.

DISASTER ECONOMIC RECOVERY PLAN

The County contracted the Institute for Sustainable Development (ISD) to undertake a island-wide economic recovery plan to address both the impacts from the 2018 Kīlauea eruption as well as the impacts from Hurricane Lane. ISD engaged with business stakeholders to determine impacts and develop an understanding of goals, objectives, strengths, weaknesses, opportunities, and threats. The collected data was analyzed to quantify the economic impacts. This information was used to develop a broad range of economic recovery strategies based on information and values shared by the community.

IMPACT AND UNMET NEEDS ASSESSMENT

An impact and unmet needs assessment was conducted to quantify the total loss from housing, infrastructure, loss to the economy, and the amount of individual and public assistance received to date. Information from surveys conducted as part of community engagement activities provided quantitative and qualitative data to inform the unmet needs and were incorporated into the recovery planning process. The unmet need is commonly defined as the difference between damage assessment values and recovery assistance received to date. This assessment helps identify projects and appropriate funding mechanisms required for the U.S. Housing and Urban Development (HUD) Community Development Block Grant – Disaster Recovery Action Plan (CDBG-DR Action Plan) (Tetra Tech 2020).

DISASTER CASE MANAGEMENT

Case management services for impacted residents were initiated in September 2019. Case managers at Neighborhood Place of Puna worked with impacted residents to further document recovery needs and bring together resources to meet their unmet recovery needs. Over 1,400 individuals impacted by the 2018 Kīlauea eruption were engaged by the program. While many individuals did not immediately need the services provided through disaster case management, more than 550 referrals were provided to services in the community. Nearly 190 individuals participated through in-take and an assessment of their household needs, including, home reconstruction, finding permanent housing, rental assistance, and financial services. Nearly 100 additional households were seeking a buyout of their lava inundated property as one part of their recovery plan. Through the work of the Kīlauea Hui, a group of not-for-profit organizations leveraging organizational and philanthropic funding to directly assist disaster survivors, over $815,000 of assistance has been provided to meet individuals' needs including advocacy to increase FEMA individual assistance, repairs to homes, replacement of building systems, rental assistance, and basic needs.

PLAN INTEGRATION

The County utilized the unique opportunity afforded by the development of the Kīlauea Recovery and Resilience Plan to integrate and align hazard risk information and risk reduction policies across the County's network of plans. Plan integration is a critical task for reducing risk and improving resilience that involves a two-way exchange of information between hazard mitigation plans and other community plans (U.S. Department of Homeland Security 2017).

The development of the Kīlauea Recovery and Resilience Plan and concurrent update of the County General Plan and Multi-Hazard Mitigation Plan was informed by the results of the Volcanic Risk Assessment. The County General Plan will provide county-wide risk reduction policies to support community development plan updates.

The strategies and projects in the Kīlauea Recovery and Resilience Plan include additional plans that have been developed or have been identified for development: Pāhoa Master Plan, Tourism Strategic Plan, Broadband Feasibility Study, and Mass Transit Master Plan. These plans are critical to enabling the implementation of this Plan in order to facilitate economic development and recovery objectives in Puna, and to coordinate available funding sources.

Figure 21. Integration of hazard risk reduction across the network of County plans

WHAT DID WE LEARN — VOLCANIC RISK

The Volcanic Risk Assessment (Tetra Tech 2020b) identifies the continued exposure and risk to residents, property, and the environment from future volcanic activity. The assessment provides quantitative and qualitative information on volcanic hazards in Puna and islandwide.

In consultation with USGS HVO, a Volcanic High Hazard Area (VHHA) was delineated for the Island of Hawai‘i based on the best available spatial data on volcanic hazards. The VHHA represents the areas across the Island of Hawai‘i with the greatest exposure to volcanic hazards (Figure 22).

The VHHA is the combined area of lava hazard zones 1 and 2 (with a 1,000-foot buffer), historic lava flow areas dating back to 1790, and National Earthquake Hazard Reduction Program (NEHRP) class soils D and E.

Lava hazard zones 1 and 2 were selected because, according to USGS, they are the zones identified with the greatest severity to the lava flow hazard. A 1,000-foot buffer was applied to each lava zone 1 and 2 to account for the uncertainty of the location to these boundaries. Historic lava flow events and associated inundation extent were only available for the last 230 years; however, they were included because lava zones do not have an associated probability and, when considering policy and mitigation, it is important to understand where previous impacts have occurred to avoid future repetitive losses. Further, NEHRP-classified D and E soils, which amplify and magnify ground shaking and increase building damage and losses, were also included in the VHHA.

Utilizing lava hazard zones 1 and 2 for volcanic risk assessment is in alignment with the Pacific Disaster Center’s (PDC) 2018 Kīlauea Eruption Risk Assessment (KERA), which assessed exposure to these two lava hazrdzones as well.

The island’s exposure to the volcanic hazards was examined to provide an indication of risk; and where possible, the more vulnerable and exposed community assets identified, and potential impacts estimated. Results include the amount of land, population, buildings, critical facilities, lifelines, roads, environmental resources, and cultural assets that are exposed to volcanic hazards to inform future recovery and mitigation strategies.

Because the island is exposed to additional natural hazards, the combined exposure to volcanic hazards and other high hazard areas (i.e., sea-level rise, tsunami, and floods) were incorporated into the assessment. This provides a more holistic evaluation of mitigation needs to support mitigation planning and the achievement of long-term resilience for the Island of Hawai‘i.

The results of the analysis are summarized for the island as a whole and for each CDP area. The results of this assessment are being used to develop risk reduction tools, policies, strategies, and projects for integration into both the Multi-Hazard Mitigation Plan 2020 update and the County General Plan update. The results can also be integrated into future CDP plan updates.

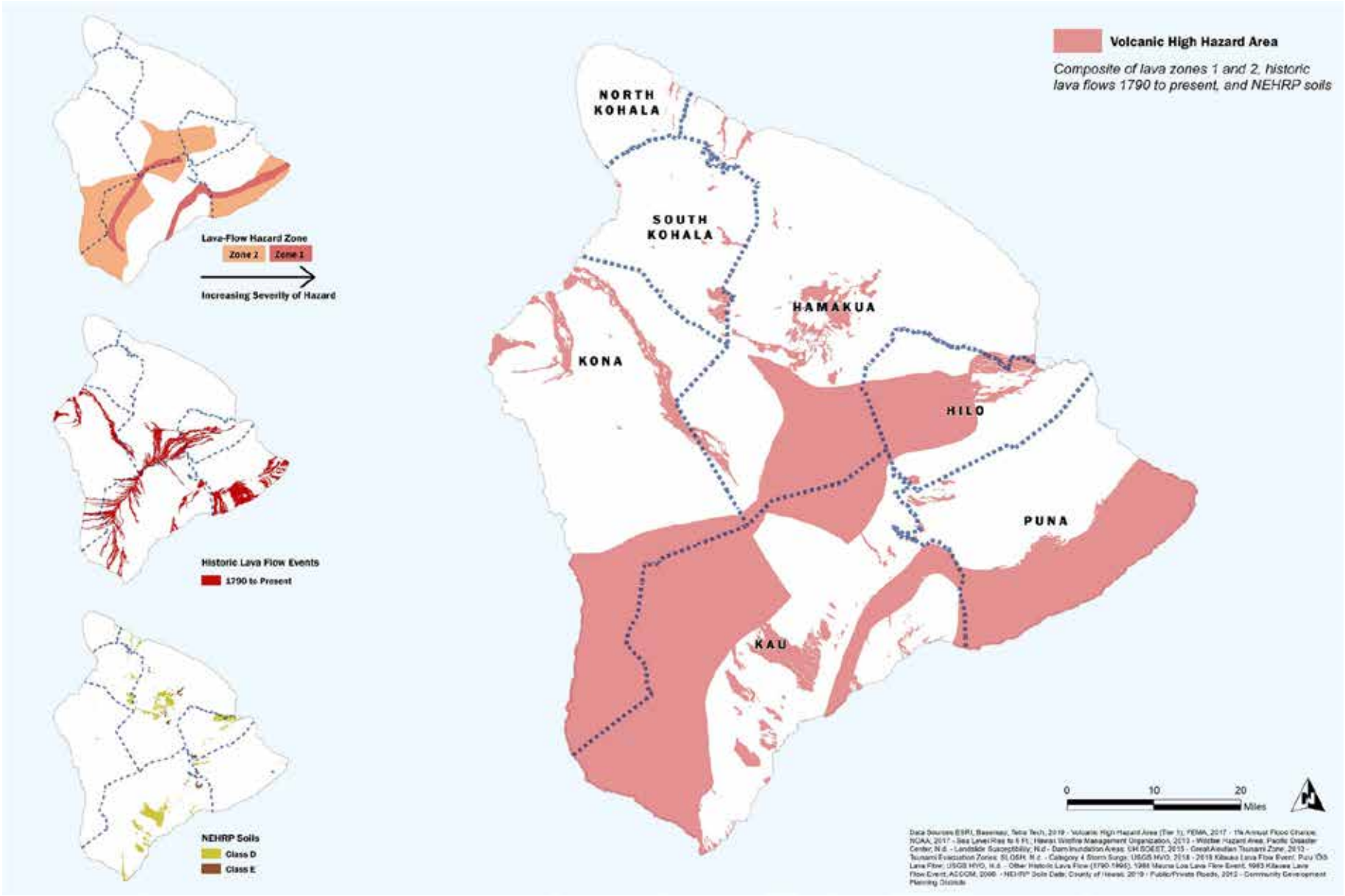

Figure 22. Volcanic High Hazard Areas in the Island of Hawai‘i

WHAT DID WE LEARN — VULNERABILITY TO RISK IN PUNA

Research has shown that some populations, while they may not have more hazard exposure, may experience exacerbated impacts and prolonged recovery if/when impacted. This is due to many factors, including their physical and financial ability to react or respond during a hazard. This population is referred to as socially vulnerable to hazard events.

A large population that resides in the Puna District is likely to qualify as socially vulnerable due to the poverty levels, lack of job opportunities, and high cost of living. In addition, acquiring insurance in lava zones 1 and 2 is extremely difficult, adding to the vulnerability. Although Puna residents may be faced with exposure to a greater number of natural hazard events, this may have increased their overall level of resilience. This is likely due to factors including, but not limited to, historical knowledge of hazard events, intimate knowledge of the natural elements, and capacity for self-sufficiency.

The Puna district is exposed to all natural hazards that Island of Hawai'i faces, however, the Puna District is highly vulnerable to future eruptions from Kīlauea Volcano due to the location of residential populations living in lava zones 1 and 2. Kīlauea has erupted 34 times since 1954. Approximately 40% of lava zone 1 and 2 have been inundated with lava flow in the last 65 years.

The Puna District has:

- The greatest number of households in the county located in the Volcanic High Hazard Area: 4,417 households
- The greatest number of households located in lava zone 1: 913 households
- The greatest number of households located in lava zone 2: 3,504 households
- 2,047 parcels identified as undeveloped residential land in lava zone 1

11,080
Estimated Number of Puna Residents Living in the Volcanic High Hazard Area

23.4%
of Total Puna Residential Population Living in the Volcanic High Hazard Area

23.2% of Total Volcanic High Hazard Area Population is **under 18**
2,448 residents

27.6% of Total Volcanic High Hazard Area Population is **over 65**
2,202 residents

2.74 people
Average Household Size in Puna

$31,176
2017 Median Annual Income: Pāhoa

25.3%
of Puna's Volcanic High Hazard Area Residents Live Below Poverty Line

The data derived from the exposure and vulnerability assessment was used to help define the recovery strategies and projects that will result in a reduction of risk to the current and future populations.*

Note: The statistics provided in this report are estimates. They were generated using multiple sources and are suitable for planning purposes. Population statistics are based on ACS 2017 Census spatial layers and the average statistics in each individual tract. The number of residential households is based on the Real Property attributes and parcel layers provided by the County. These statistic totals in the report are separate, generated using different data sources, and should be interpreted as estimates. Further detail on the methodology for data analysis can be accessed via the Hawai'i County Volcanic Risk Assessment (Tetra Tech 2020b).

WHAT DID WE LEARN — ECONOMIC IMPACTS AND RECOVERY

Among the many effects of the devastating 2018 Kīlauea eruption and Hurricane Lane, one of the worst was the damage to Hawai'i Island's economy. In response, the County of Hawai'i, with the assistance of the U.S. Economic Development Administration, commissioned this Disaster Economic Recovery Plan. This plan addresses both the fourteen square miles of volcanic eruption, but also the impacts of Hurricane Lane, which struck Hawai'i Island during the eruption. The impacts of these two events affected tourism and visitor services, supply chains, infrastructure, real estate, and consumer shocks islandwide.

Before the months-long Kīlauea disaster and Hurricane Lane, the island's economy was on an upward trajectory dating back to 2015. In the first four months of 2018, businesses had been ramping up for what was forecast to be a record-breaking year of tourism and population

Lava flows enter Kapoho Bay.

growth. Instead, within one year, the damage to the economy in terms of impacts to industry, infrastructure, and capital assets was more than $974.9 million—the worst economic disaster for the Island of Hawai‘i in recent history. More than 2,950 jobs were lost from the island’s workforce over 12 months, while the whole state lost 4,100 jobs over the same period. Numerous small businesses closed or downsized.

Multiple stakeholder outreach efforts were conducted to engage with the business community to develop economic recovery goals and strategies. Interviews were conducted, community surveys were issued, and stakeholder workshops were conducted to capture the impacts and the strengths, weaknesses, opportunities, and threats associated with economic impacts and recovery options. The resulting data from the stakeholder outreach efforts and impact analysis was used to develop the Economic Recovery Goals and Strategies outlined in Figure 23.

The goals and strategies identified in the Disaster Economic Recovery Plan, are in alignment with the Kīlauea Recovery and Resilience Plan, as well as the Puna Community Development Plan. Several of the strategies presented in the Disaster Economic Recovery Plan have been incorporated into the Kīlauea Recovery and Resilience Plan. However, the Disaster Economic Recovery Plan has a broader vision for long term economic recovery, and many of the strategies presented will be implemented in alignment with the Comprehensive Economic Development Strategy (CEDS).

STRATEGIC RECOMMENDATIONS	**GOAL** 1 Respect for Natural and Cultural Resources	**GOAL** 2 Direct Impact Zone Recovery	**GOAL** 3 Island-wide Recovery	**GOAL** 4 Future Resilience and Sustainability	**GOAL** 5 A Robust Economic Support System
Support Place-Based Development	✓	✓	✓		✓
Build Workforce Development and Business Skills	✓	✓	✓	✓	
Enhance the Economic Support System	✓	✓	✓	✓	✓
Utilize Incentives to Promote Economic Growth		✓	✓	✓	✓
Invest in Critical infrastructure	✓	✓	✓	✓	
Build Financial Capacity	✓	✓	✓	✓	✓
Strengthen Communications and Outreach	✓		✓	✓	
Promote Future Economic Resilience	✓	✓	✓	✓	✓

Figure 23.

COMMUNITY INPUT + TECHNICAL DATA = STRATEGIES AND PROJECTS

The technical data resulting from the multiple analyses conducted were used to define the parameters of recovery in the context of identified high hazard areas, continued exposure to vulnerability, and mitigation strategies that will result in risk reduction over time. The recovery goals, objectives, and priorities resulting from community and stakeholder input created the framework for the development of specific strategies and projects that will support the recovery process and foster resilience for the Island of Hawai‘i.

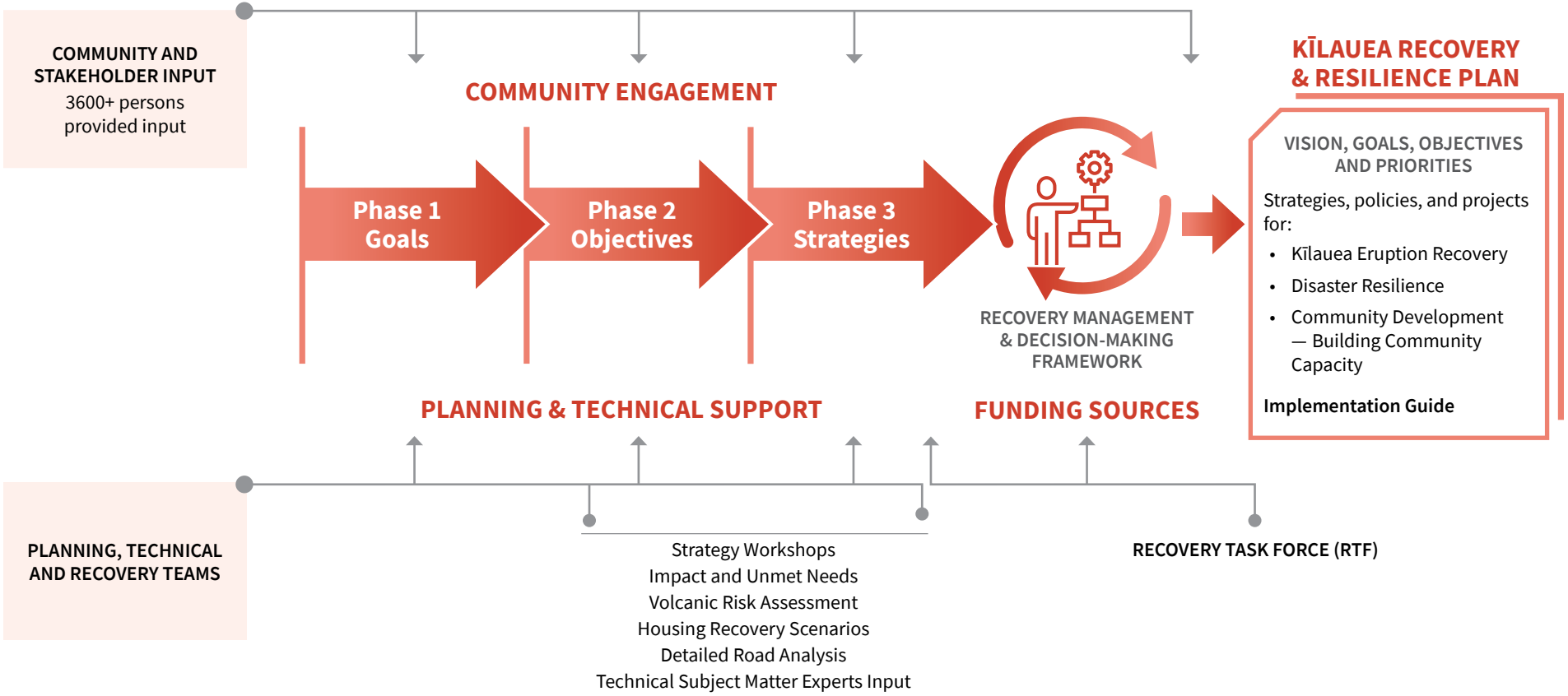

Figure 24.

RECOVERY PLAN VISION, STRATEGIES AND PROJECTS

RECOVERY PLAN VISION, GOALS, STRATEGIES & PROJECTS

The Recovery and Resilience Plan's vision was developed to meet the near-term and long-term goals through the implementation of strategies and projects, as illustrated in Figure 25. The strategies and projects were developed to address the ongoing needs of the community, become more resilient to future hazard events, and to support communities in building capacity and growing network. Project action sheets are included for each of the projects listed within the three strategies.

Civil Defense Emergency Operations Center.

Recovery Team at Puna Strong Event 2019.

VISION

To foster resilient communities that respect the Puna region's ever-changing landscape. This vision honors ʻāina, supports our communities to recover from the 2018 Kīlauea eruption, builds our capacity to mitigate against disaster events by reducing risk to life and property, and facilitates economic opportunity and well-being for residents.

GOALS

Near-Term Goal: Facilitate projects and efforts that continue to provide relief to residents and businesses impacted by the eruption in the Puna District.

Long-Term Goal: Implement strategies, policies, and projects that protect public health and safety, enhance community well-being, and help create a resilient economy islandwide.

	KĪLAUEA ERUPTION RECOVERY	DISASTER READINESS	COMMUNITY RESILIENCE—BUILDING COMMUNITY CAPACITY
STRATEGIES	Invest in infrastructure that supports recovery, promotes housing security, addresses eruption-impacted properties, and supports community economic recovery.	Improve community planning and disaster preparedness, manage development in high hazard areas through land use, and implement mitigation measures for natural and built infrastructure.	Build networks and community capacity, invest in targeted revitalization efforts in Puna to support disaster resilience and economic growth, identify areas for natural and cultural resources management and agriculture development, and improve access to goods and services.
PROJECTS	Road Restoration ■ Housing Buyout Program ■ Housing Relocation Services ■ Parks and Recreation Recovery Initiative ■ Water Infrastructure Recovery Projects ■ Kīlauea Recovery Grant Program ■ Pohoiki Boat Ramp Access ■ Pāhoa Master Plan■ Tourism Strategic Plan ■ Workforce Development ■ Broadband Feasibility Study ■ Mass Transit Master Plan ■ Kalapana Recovery and Mitigation	Damage Assessment Protocol and Capacity Building ■ Land Use Policies for Recovery and Mitigation ■ Emergency Response Communication – Backup Power Transfer Switches ■ Transportation Route Design & Construction ■ Islandwide Shelter Analysis & Construction-Retrofit ■ Volcanic Gas Monitoring and Climatology ■ Pre-Disaster Recovery Preparedness Framework ■ Earthquake/Hurricane Retrofit Incentive Program ■ Puna Wastewater Programmatic Environmental Assessment ■ GIS Data Management ■ Evacuation and Sheltering Assessment and Protocol ■ Project 360 – A Resiliency Project of Hawai'i County Citizen Corps Council and Civil Defense Agency	Natural and Cultural Resources Management Program ■ Community-Based Disaster Management ■ Network of Resilience Hubs ■ Food Security & Resilience and Agriculture Development ■Youth Development and Resilience ■ Access to Social, Health & Medical Services

Figure 25.

KĪLAUEA ERUPTION RECOVERY PROJECTS

These projects are directly related to restoring key infrastructure components, promote housing security, address eruption-impacted properties, and support community economic recovery.

- Road Restoration
- Voluntary Housing Buyout Program
- Housing Relocation Services
- Parks and Recreation Recovery Initiative
- Water Infrastructure Recovery Projects
- Kīlauea Recovery Grant Program
- Pohoiki Boat Ramp Access
- Pāhoa Master Plan
- Tourism Strategic Plan
- Workforce Development
- Mass Transit Master Plan
- Broadband Feasibility Study
- Kalapana Recovery and Mitigation

PROJECT: **ROAD RESTORATION**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Improved roadway and emergency connectivity.
- A safe, convenient, accessible, and affordable transportation system.
- Public access to the shoreline and natural spaces.
- Multi-use agricultural land and open space.

DESCRIPTION

The County plans to take action to restore public road access via the following projects:

- Restore Pohoiki Road with improvements for safe two-way traffic through a new alignment intersecting Highway 137;
- Restore Highway 137 to Vacationland, and near ʻOpihikao where temporary measures were completed;
- Restore Lighthouse Road along with an integrated management plan for Kumukahi;
- Restore section of Leilani Avenue to allow access to isolated properties in the kīpuka near Pohoiki Road.

ACTION STEPS

- ☐ Update any designs and cost estimates with FEMA.
- ☐ Work with FEMA to complete the Environmental and Historic Preservation review for each project.
- ☐ Secure the necessary permits (action is completed for Pohoiki Road).
- ☐ Secure the notice to proceed from FEMA for construction.
- ☐ Partner with the state, county, and community stakeholders to develop an area management plan for Kumukahi to accompany the restoration of Lighthouse Road.
- ☐ Identify and scope alternative projects for unallocated funding from public road segments, which will not be restored.

IN PROGRESS

1. Highway 132 and 137 near ʻOpihikao have been repaired and reopened since the 2018 Kīlauea Eruption.
2. All impacted public road estimates have been submitted to FEMA under the Public Assistance 428 program. The 428 program is established to utilize public assistance funding to fund alternative infrastructure projects as well as infrastructure projects that mitigate future risk.
3. The County has secured an obligation of approximately $61 million in funding from FEMA based on agreed-upon cost estimates for road restoration. Within this amount, the County is providing $21 million in a local match to the federal funding of $61 million.

DESIRED OUTCOMES

The road restoration projects will enable emergency evacuation, coastal access, and improve emergency response times.

POTENTIAL FUNDING SOURCES

FEMA Public Assistance Program, State Loan to County of Hawaiʻi

PROJECT LEAD

Department of Public Works (DPW)

PARTNERS

Recovery Team, Puna Community Development Plan Action Committee and Puna Connectivity Working Group, community partners

TIMELINE

Near-Term

PROJECT: **VOLUNTARY HOUSING BUYOUT PROGRAM**

RECOVERY PRIORITIES

- Recovery from the recent volcanic eruption.
- Relocate outside of the impacted area.
- Guide future development to minimize risk impacts to current and future populations from volcanic and other natural hazard events.

DESCRIPTION

The purpose of this program is to support the voluntary buyout of homes that were either impacted by the volcanic disaster or are threatened by future volcanic events to assist impacted households in their recovery, and a long-term effort to implement policies of risk reduction.

The priority areas for buyouts will be the lands inundated or isolated by lava from the 2018 Kīlauea eruption, as well as areas experiencing surface heat as a result of volcanic activity. Priority will be given to low- to moderate-income households and primary homes followed by all other income levels, second homes and vacant residential properties. The County is seeking federal funding not related to the 2018 Kīlauea eruption, such as the Hazard Mitigation Grant Program, to design a buyout program for homes destroyed during the Puʻu ʻŌʻō eruption between 1983 and 2018.

ACTION STEPS

- Execute a grant agreement with the U.S. Department of Housing and Urban Development (HUD) for $83.8 million Community Development Block Grant - Disaster Recovery (CDBG-DR) funding to support the voluntary housing buyout program.
- Develop voluntary housing buyout program implementation guide and related policies and procedures.
- Establish intake centers, develop an application process, and advertise the program to property owners impacted by the 2018 Kīlauea eruption.
- Develop a management plan for acquired properties to remain open space or low-intensity agriculture.
- Provide housing relocation assistance, as needed.

IN PROGRESS

CDBG-DR Action Plan outlines the specifications and eligibility requirements for the voluntary housing buyout program. The CDBG-DR Initial Action Plan was released for public comment in July 2020 and was approved by HUD in October 2020.

DESIRED OUTCOMES

- To provide choices to relocate, including low- and moderate-income households that otherwise cannot afford to relocate.
- Reduces risk hazards for people and property located in volcanic hazard areas.
- Create opportunities for open space and agriculture.

POTENTIAL FUNDING SOURCES

CDBG-DR, FEMA Hazard Mitigation Grant Program

PROJECT LEAD

Recovery Team

PARTNERS

OHCD, HI-DARRT

TIMELINE

Near-Term

PROJECT: **HOUSING RELOCATION SERVICES**

RECOVERY PRIORITIES

- Recovery from the recent volcanic eruption.
- Relocate outside of the impacted area.
- Guide future development to minimize risk impacts to current and future populations from volcanic and other natural hazard events.

DESCRIPTION

Housing relocation services include:

- Identification and location of rental properties;
- Financial assistance with housing security costs, including security deposits and closing costs; and
- Identification and location of housing for sale for ownership.

Applicants applying for Housing Relocation Services will be processed according to priorities based on identified criteria with a focus on serving households that are low- to moderate-income (LMI). The CDBG-DR Action Plan will provide details on program eligibility and prioritization.

ACTION STEPS

- Execute a grant agreement with the U.S. Department of Housing and Urban Development (HUD) for $83.8 million Community Development Block Grant - Disaster Recovery (CDBG-DR) funding to support the housing relocaiton services.
- Develop housing relocaiton services implementation guide and related policies and procedures.
- Establish intake centers, develop an application process, and advertise the program to property owners and renters impacted by the 2018 Kīlauea eruption.

IN PROGRESS

CDBG-DR Action Plan outlines the specifications and eligibility requirements for housing relocation services. The CDBG-DR Initial Action Plan was released for public comment in July 2020 and was approved by HUD in October 2020

DESIRED OUTCOMES

- To provide choices to relocate, including low- and moderate-income households that otherwise cannot afford to relocate.
- Reduces risk hazards for people and property located in volcanic hazard areas.

POTENTIAL FUNDING SOURCES

CDBG-DR

PROJECT LEAD

Recovery Team

PARTNERS

OHCD, HI-DARRT

TIMELINE

Near-Term

PROJECT: **PARKS AND RECREATION RECOVERY INITIATIVE**

RECOVERY PRIORITIES

- Historical, cultural and scenic resource management.

DESCRIPTION

Significant impacts occurred in parks and recreation facilities at Ahalanui Beach Park and Isaac Hale Beach Park. Due to feasibility concerns related to rebuilding the inundated facilities as well as limited funding made available by FEMA for the costs to restore the facilities the properties will not be rehabilitated. Available recovery funding may be allocated to planning and pre-construction activities for identified parks projects in Puna. Parks and Recreation are under capacity in terms of maintenance and operations for all current facilities. Equipment may be purchased for maintenance and operations and will support improved management and preparedness measures in advance of an impending hazard event.

ACTION STEPS

- Develop alternate projects to maintain and enhance parks facilities in Puna.
- Engage with the community on identified alternate projects.
- Develop scope and cost estimates for selected alternate projects and submit plans to FEMA for approval prior to project implementation.

IN PROGRESS

All impacted parks and recreation estimates have been submitted to FEMA under the Public Assistance program. FEMA and the County have secured an agreement of approximately $5 million from the loss of these County facilities, which includes 75% of funding available as a grant from the FEMA with 25% covered by the County. The FEMA Public Assistance program provides funding to restore damaged or destroyed infrastructure following a disaster. Funding may be allocated to alternate infrastructure projects, including those that mitigate against future risk from natural disasters.

DESIRED OUTCOMES

Increase internal capability and resources to maintain, prepare, respond and recover from any hazard event.

POTENTIAL FUNDING SOURCES

FEMA Public Assistance Program

PROJECT LEAD

Department of Parks and Recreation (DPR)

PARTNERS

Recovery Team

TIMELINE

Medium-Term

PROJECT: **WATER INFRASTRUCTURE RECOVERY PROJECTS**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.

DESCRIPTION

The primary function of the Department of Water Supply (DWS) is to provide safe drinking water service through its 23 individual water systems distributed around the island. The lava flows from the 2018 eruption impacted the reservoirs and water distribution lines in the Puna District. Due to the ongoing thermal impacts from the lava flow, the water distribution lines are not going to be restored at this time.

DWS continues to work with and provide input to the Recovery Team to assist with the recovery planning process. It is the aim of DWS to invest in water infrastructure that is aligned with the overall recovery plan. Alternative water infrastructure projects will be evaluated to support system resiliency in the Puna District as well as identifying potential expansion of the water system to support affordable housing development and provide safe drinking water in Puna.

ACTION STEPS

- DWS works with Recovery Team and community to identify alternative water infrastructure recovery projects
- Develop designs and cost estimate for alternate projects for water supply infrastructure
- Secure agreement from FEMA on alternate projects

IN PROGRESS

The Department of Water Supply (DWS) has secured an obligation of approximately $30 million in funding from FEMA based on agreed cost estimates for restoration of damaged infrastructure. Within this amount, the County is providing $10 million in a local match to the federal funding of $30 million.

DESIRED OUTCOMES

- Resilient water system to provide safe drinking water to the residents of the Island of Hawai‘i.
- Identify potential expansion of the water system to support the affordable housing development and provide safe drinking water in Puna.

POTENTIAL FUNDING SOURCES

FEMA Public Assistance Program

PROJECT LEAD

Department of Water Supply

PARTNERS

Recovery Team, OHCD

TIMELINE

Medium-Term

PROJECT: **KĪLAUEA RECOVERY GRANT PROGRAM**

RECOVERY PRIORITIES

- Recovery from the recent volcanic eruption.
- Historical, cultural and scenic resource management.
- Facilitate projects and efforts that continue to provide relief to residents and businesses impacted by the eruption.

DESCRIPTION

Ordinance 2020-028 was adopted by the Hawai‘i County Council to amend Chapter 2 of the Hawai‘i County Code, becoming Article 47. Article 47 created a mechanism to establish the Kīlauea Recovery Grant Program to assist Puna residents, non-profits, businesses, and community organizations in restoring, revitalizing, and sustaining recovery projects in the affected areas.

ACTION STEPS

- ☐ Fund community grants and work with grant recipients on implementation.
- ☐ Connect applicants not awarded grant funds to resources and supports for their projects.
- ☐ Administer reporting, review outcomes, report to Hawai‘i County Council.

IN PROGRESS

Approximately $3.7 million was awarded to 18 not-for-profit organizations and their partners to restore road access, reestablish agriculture and floriculture operations, provide supportive services, and support affordable housing in the eruption area through the inaugural round of funding.

DESIRED OUTCOMES

Puna residents and groups receive funding for community-based projects that address disaster recovery and rebuilding related to the 2018 Kīlauea eruption in the affected areas. Puna residents have access to funding for projects that were otherwise unaddressed in recovery efforts.

POTENTIAL FUNDING SOURCES

Recovery Grant from State Legislature

PROJECT LEAD

Recovery Team

PARTNERS

Department of Finance, Community not-for-profit organizations

TIMELINE

Ongoing

PROJECT: **POHOIKI BOAT RAMP ACCESS – STATE DLNR**

RECOVERY PRIORITIES

- Support economic empowerment and self-reliance.
- Jobs located within the community.
- Invest in infrastructure that supports the vision for recovery and long-term resilience.

DESCRIPTION

The accumulation of sand and rock from the 2018 Kīlauea eruption filled in Pohoiki Bay and created a new beach that isolated the boat ramp. Pohoiki Bay was the island's third most productive commercial fishing harbor. The reduction in access to both commercial and subsistence fishing in Puna has impacted the local economy and the subsistence of lawai'a. The Pohoiki Boat Ramp is managed by the State Department of Land and Natural Resources (DLNR), which was preparing to start a feasibility study about potential locations for its reconstruction/replacement. In response to input from fishermen, and projected limited availability of funds for building a new boat ramp, DLNR announced in September 2020 that the study would be deferred and plans to dredge the ramp would move forward. Sources of funding for the project include $1.5 million appropriated by the State Legislature and assistance from the Federal Emergency Management Agency. Dredging is anticipated to be completed in 2021.

ACTION STEPS

- ☐ Coordinate and collaborate with DLNR on progress to restore boat access at Pohoiki Bay.

IN PROGRESS

Coordination and collaboration between the Recovery Team and State DLNR are ongoing.

DESIRED OUTCOMES

- Restored economic opportunities for fishing operations.
- Restored access for recreational uses.
- Reestablishment of gathering spaces.

POTENTIAL FUNDING SOURCES

State Capital Improvement Budget, FEMA Public Assistance Program

PROJECT LEAD

State Department of Land and Natural Resources

PARTNERS

Recovery Team

TIMELINE

Near-Term

PROJECT: **PĀHOA MASTER PLAN**

RECOVERY PRIORITIES

- Proximity to basic amenities within town centers.
- Diversity of job types and entrepreneurial opportunities.
- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Support economic empowerment and self-reliance.

DESCRIPTION

The purpose of this project is to engage the professional services of a qualified planning consultant to develop a new detailed Regional Town Center Master Plan for Pāhoa.

ACTION STEPS

- ☐ Engage a consultant to prepare a Regional Town Center Master Plan.
- ☐ Work with Puna Community Development Plan Action Committee and community on engagement and input to the master plan.

IN PROGRESS

Pāhoa Village Design Guidelines are established by ordinance covering village design, signage, and review committee. This project has been previously funded.

DESIRED OUTCOMES

- Collaborative engagement with a variety of stakeholders
- An integrated document that reflects the needs and desires of the community and helps direct future decision making as it relates to the orderly growth, revitalization, and sustainable development of Pāhoa town.
- Framework for the development of future public policy pertaining to development, redevelopment, infrastructure improvement and expansion, streetscaping, and provision of community services over the next 20 years.
- Major issues and areas of focus that the new Pāhoa Regional Town Center Master Plan will address will include Wastewater Feasibility Study and Recommendations; Future Land Use; Economic Development; Transportation and Circulation; Parks and Open Space; Community Services; Urban Design; Environmental and Cultural Resources; and Implementation.

POTENTIAL FUNDING SOURCES

COH, EDA

PROJECT LEAD

Planning Department

PARTNERS

Puna CDP Action Committee

TIMELINE

Near-Term

PROJECT: **TOURISM STRATEGIC PLAN**

RECOVERY PRIORITIES

- Build community and visitor industry partnerships to ensure that tourism is inclusive, sustainable and in alignment with Puna's natural and cultural resources.
- Economic revitalization to the impacted district.
- Increase capacity through industry partnerships.

DESCRIPTION

The vision of the Tourism Strategic Plan, Ola ka 'Aina, Ola ke Kanaka (Healthy Land, Healthy People), symbolizes the importance of a high quality of life for residents and a focus on social benefits will support a meaningful and reciprocal experience for residents and visitors. It also aims to align with other County processes and plans including the General Plan and the Community Development Plans. Community based initiatives will be implemented to achieve goals pertaining to responsible tourism, pono-based communication, place-based education for residents and infrastructure.

ACTION STEPS

- ☐ Develop action plans and metrics for strategies that achieve responsible tourism, pono-based communication, place-based education for residents and infrastructure.
- ☐ Convene cohorts for each of the action plans on a monthly basis to oversee implementation, provide capacity building and technical assistance and synthesize information for decision making.
- ☐ Build a network of community and industry people to help implement the action plans, and nurture islandwide collaboration.

IN PROGRESS

The County's Department of Research and Development worked with an industry advisory group to develop its Tourism Strategic Plan. The County has convened cohorts to facilitate implementation of this plan along with capacity building with and technical assistance to tourism industry partners.

DESIRED OUTCOMES

- Jobs and entrepreneurial opportunities located within the community, and are complimentary to local resources, ecology, culture, demographics and opportunities.
- Improved infrastructure that provide social benefits to residents and visitors which include transportation, community assets and housing.
- Place-based education for Residents that support and encourage community-driven and institutional initiatives that educate and train a local workforce.

POTENTIAL FUNDING SOURCES

EDA

PROJECT LEAD

Research and Development

PARTNERS

Hawai'i Tourism Association, Puna CDP Action Committee, Action Cohorts

TIMELINE

Ongoing

PROJECT: **WORKFORCE DEVELOPMENT PROGRAM COORDINATION**

RECOVERY PRIORITIES

- Jobs located within the community.
- Diversity of job types and entrepreneurial opportunities.
- Jobs relative to and complimentary to local resources, ecology, culture, demographics, and opportunities.

DESCRIPTION

There are multiple workforce development projects currently being initiated across the County of Hawai‘i. This project has been included to identify the opportunity to coordinate with the various partners to identify opportunities to improve the workforce in the Puna District. The current initiatives are briefly described below:

ALU LIKE, INC.
- Ho‘omānea ‘Ōiwi – Employment & Training
- Goodwill Hawai‘i Workforce Development Programs

HAWAI‘I TOURISM AUTHORITY
- ClimbHI
- Native Hawaiian Hospitality Association’s Ho‘okipa: Hawai‘i Style

HAWAI‘I COMMUNITY COLLEGE EDvance
- UAS Academy (Unmanned Aerial Systems)
- Apprenticeship Programs

GOFARM HAWAI‘I AT UNIVERSITY OF HAWAI‘I
- Beginning Farmer Training Program

THE KOHALA CENTER
- Ōhāhā High School Agriculture Program

W. M. KECK OBSERVATORY
- High School Employment Program: Real-life work experience
- Akamai Workforce Initiative: College internships.
- Keck Visiting Scholar Program: Early career scientists training
- Kamehameha Schools Kāpili ‘Oihana Internship Program
- Maunakea Scholars: Provides observing time to high school students

ACTION STEPS

- ☐ Coordination and collaboration with partner organizations to identify opportunities to improve the workforce in the Puna District.

IN PROGRESS

Coordination and collaboration among these partners will be supported through the development of the Community Resilience Hub networks

DESIRED OUTCOMES

- Building capacity across community networks to provide economic development opportunities.
- Diversity of income sources for residents and growing “green” industries and tourism would strengthen the local economy.

POTENTIAL FUNDING SOURCES

EDA, State, and Local Funds

PROJECT LEAD

Research and Development

PARTNERS

Alu Like Inc, HTA, Hawai‘i Community College, Gofarm Hawai‘i At University Of Hawai‘i, Kohala Center, W.M. Keck Observatory

TIMELINE

Ongoing

PROJECT: **TRANSIT AND MULTI-MODAL TRANSPORTATION MASTER PLAN**

RECOVERY PRIORITIES

- Invest in infrastructure that supports mass transit systems within the Puna region.
- A safe, convenient, accessible, and affordable transportation system.
- Economic revitalization through greater access to jobs and services.

DESCRIPTION

Accessible, reliable and affordable public transportation was identified as a top connectivity issue and need for the Puna region during community engagement conducted through the Recovery process. Improvements to the mass transit system within the County of Hawai'i can assist in providing alternative methods of transportation to residents for access to jobs and services within Puna and other districts, creating greater economic opportunity. The goals articulated in the County Transit and Multi-Modal Transportation Master Plan, issued in August 2018, is a key component to establishing these long-term services.

ACTION STEPS

- ☐ Execution of proposed new mass transit bus routes for Puna.
- ☐ Continued phased approach to establishing the full hub and spoke system recommended to serve Puna.

IN PROGRESS

The Mass Transit Agency updated schedules for on-time performance and has introduced flex service for Hawaiian Beaches, Nanawale, and between Pāhoa and Keaau for further connection routes into Hilo and other economic and services industry core areas. The Agency continues a phased approach to establishing the full hub and spoke system recommended to serve Puna.

DESIRED OUTCOMES

- Reliable mass transit-oriented system implemented with accessibility for the Puna communities.
- Improved transportation infrastructure to provide social benefits to residents and visitors which include transportation.
- Economic revitalization and financial security through increased access to jobs and services.

POTENTIAL FUNDING SOURCES

COH, Federal Operating Assistance Grant, Passenger Fares

PROJECT LEAD

Mass Transit Agency

PARTNERS

Puna CDP Action Committee, Planning Department, Research and Development

TIMELINE

Ongoing

PROJECT: **BROADBAND FEASIBILITY STUDY**

RECOVERY PRIORITIES

- Internet service connectivity.
- Support economic empowerment and self-reliance.
- Diversity of job types and entrepreneurial opportunities.
- Improve access to quality health services.

DESCRIPTION

Internet access is necessary for education and will also provide new opportunities for businesses, particularly those that are home-based. The island currently has many gaps in service. Small populations in some areas make it non-economically viable for providers to construct broadband facilities. Taking matters into their own hands, some businesses have created mobile hot spots, but these may not be adequate for the long-term.

The project will determine the feasibility of internet service installation to fill the critical need of access to outside markets, businesses assistance, educational resources, and development options in the area. Once completed, the project will provide long-term economic growth, support business development, and create new jobs throughout the island.

ACTION STEPS

- ☐ Develop scope for Broadband Feasability Study.
- ☐ Identify and secure funding for the project.
- ☐ Procure services to complete the study.

IN PROGRESS

The County has worked with local partners to deploy mobile internet connectivity assets across the island in response to the COVID-19 pandemic and the related need for distanced learning and work. The County will develop a scope for this feasibility study and seek funding for the project. Implementation will require close partnership with private telecommmunications providers.

DESIRED OUTCOMES

- Reliable internet connection and telephone service for communities across Puna.
- Improved access to information, education and training opportunities.
- Economic revitalization in Puna by promoting new industries and entrpreneurship locally.

POTENTIAL FUNDING SOURCES

EDA, USDA, Private

PROJECT LEAD

Research and Development

PARTNERS

Private Telecommunications Providers, Public Works

TIMELINE

Near-Term

PROJECT: **KALAPANA RECOVERY AND MITIGATION**

RECOVERY PRIORITIES

- Historical, cultural and scenic resource management.
- Native ecosystem and habitat restoration.
- Reduce risk to life and property from natural hazards.
- Improved roadway and emergency connectivity (built connections).

DESCRIPTION

As part of the recovery process, the County will seek opportunities to assist communities affected by both the 2018 eruption and the 1983-2018 Pu'u 'Ō'ō-Kūpaianaha eruption, which continue to be exposed to volcanic hazards and future disasters. While they started decades apart, both of these volcanic events ended the same year, and the impacts continue to be felt across lower Puna.

ACTION STEPS

- Develop alternate project to restore access along Chain of Craters Road.
- Explore opportunities for buyouts in inundated residential areas as a mitigation strategy.
- Identify strategies to maintain or enhance natural and cultural resources in the Kalapana area.

IN PROGRESS

The County is working to identify funding that could support these recovery and mitigation activities.

DESIRED OUTCOMES

- Communities impacted by the Pu'u 'Ō'ō-Kūpaianaha eruption develop implementable strategies for recovery.
- Long-term management of areas impacted by the Pu'u 'Ō'ō-Kūpaianaha eruption.

POTENTIAL FUNDING SOURCES

FEMA Hazard Mitigation Grant Program, CDBG-Mitigation

PROJECT LEAD

Recovery Team

PARTNERS

Civil Defense, Public Works, DPR

TIMELINE

Medium-Term

DISASTER READINESS PROJECTS

The projects will improve community planning and disaster preparedness, manage development in high hazard risk areas through land use and implement mitigation measures for natural and built infrastructure.

- Damage Assessment Protocol and Capacity Building
- Land Use Policies for Recovery and Mitigation
- Emergency Response Communication - Backup Power Transfer Switches
- Critical Infrastructure Needs Assessment
- Islandwide Shelter Analysis & Construction-Retrofit
- Volcanic Gas Monitoring and Climatology
- Pre-Disaster Recovery Preparedness Framework
- Earthquake/Hurricane Retrofit Incentive Program
- Puna Wastewater Programmatic Environmental Assessment
- GIS Data Management
- Evacuation and Sheltering Assessment and Protocol
- Project 360 – A Resiliency Project of Hawai‘i County Citizen Corps Council and Civil Defense Agency

PROJECT: **DAMAGE ASSESSMENT PROTOCOL AND CAPACITY BUILDING**

RECOVERY PRIORITIES

- Increase community and county capacity to prepare, respond and recover from hazard events.

DESCRIPTION

The purpose of this project is to establish a rapid response Damage Assessment capacity that would include a complete and current inventory of the county and state assets. Damage Assessment is reliant on a robust GIS capacity and trained assessment personnel.

Develop a protocol for collecting and storing data necessary to develop damage assessments. Research use of drone technology and IT solutions to take footage and convert into assessments.

ACTION STEPS

- Conduct an inventory of all County assets.
- Establish a protocol for updating the information on a yearly basis.
- Collaborate with building maintenance and accounting departments to assure all inventories are reconciled.

IN PROGRESS

Civil Defense is currently working on developing a damage assessment process and will utilize additional funds and resources to augment the current initiative.

DESIRED OUTCOMES

Well staffed and equipped rapid response teams for all of the County's assessment needs, county, state, commercial and residential.

POTENTIAL FUNDING SOURCES

FEMA Hazard Mitigation Grant Program, COH

PROJECT LEAD

Civil Defense

PARTNERS

Finance, County Operational Departments

TIMELINE

Near-Term

PROJECT: **LAND USE POLICIES FOR RECOVERY AND HAZARD MITIGATION**

RECOVERY PRIORITIES

- Reduce risk to life and property from natural hazards.
- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Preservation and restoration of natural and cultural resources.

DESCRIPTION

The purpose of this project is to explore and identify land-use policies to support recovery and hazard mitigation. These policies can be developed in conjunction with recovery from the 2018 Kīlauea eruption and can facilitate mitigation against volcanic hazards islandwide. These policies may also apply to other hazards such as sea-level rise and coastal erosion. Objectives for these policies may include (a) rezoning land acquired by the County in lava inundated and isolated areas for conservation, agriculture, and open space; (b) the identification and analysis of potential development and permitting policies to manage rebuilding in eruption-impacted areas or the Volcanic High Hazard Area; (c) evaluating criteria or conditions for development in areas of exposure to natural hazards including incentives or zoning actions; and (d) direct redevelopment and supporting infrastructure to areas within or adjacent to Urban Growth Areas as part of recovery and mitigation actions.

ACTION STEPS

- ☐ Work with the community to Identify and evaluate the specific land-use policies for recovery and hazard mitigation based on zoning best practices and an analysis of the feasibility and impacts of each policy proposal.
- ☐ Incorporate land-use policies for recovery and hazard mitigation into the recommended draft General Plan for public review prior to adoption in order to assess applicability with other land-use policies and proposals along with future proposed land uses.
- ☐ Work to adopt any new land-use policies for recovery and hazard mitigation in the adopted General Plan with public review and action by the County Council.
- ☐ Work with County Council to adopt any related changes to the County Code.

IN PROGRESS

The 2020 update to the Multi-Hazard Mitigation Plan is complete and pending adoption; and current initiatives are underway to update the County General Plan. Hazard layers and risk identification are or will be incorporated to identify mitigation projects that will result in a reduction of risk and also to implement land-use policies that will prevent or minimize future development in high hazard risk areas.

DESIRED OUTCOMES

- Developing policies for recovery and hazard risk reduction.
- Building community capacity for recovery and hazard risk reduction.
- Ensuring that the County and the communities of the Island of Hawai‘i are better prepared to recover from another disaster event.

POTENTIAL FUNDING SOURCES

COH

PROJECT LEAD

Planning Department

PARTNERS

Recovery Team, Research and Development, Department of Public Works, Civil Defense, County Council, Community Development Plan Action Committees

TIMELINE

Long-Term

PROJECT: **EMERGENCY RESPONSE COMMUNICATION – BACKUP POWER TRANSFER SWITCHES**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Increase community and county capacity to prepare, respond and recover from hazard events.
- Reduce risk to life and property from natural hazards.

DESCRIPTION

There are several areas of improvement in communications that are critical to the next crisis preparedness and response. There is a need to assess, design, procure, and expand the installation of emergency backup power transfer switches, expand coverage of public communications systems, improve auxiliary community capability, construct new public safety communications towers, and a public safety dispatch center. A new Public Safety Dispatch Center would be equipped with state-of-the-art equipment to assist in response efforts before, during, and after a crisis and improve response times during normal emergency occurrences.

ACTION STEPS

- ☐ Procure experts to analyze the need, itemize a list of equipment with cost estimates, including installation costs and land/building acquisition (if required).
- ☐ Identify locations to install devices.
- ☐ Procure firm to install or use County maintenance personnel.
- ☐ Develop a maintenance/testing plan for continued operations.

IN PROGRESS

A communications specialist has been hired at Civil Defense. Most of the radio tower, antenna, and repeater locations have been located, and agreements are made or in process.

DESIRED OUTCOMES

Improved public safety and continuity of services during an emergency.

POTENTIAL FUNDING SOURCES

FEMA Hazard Mitigation Grant Program, Department of Homeland Security

PROJECT LEAD

Civil Defense

PARTNERS

Hawai‘i Fire Department, Hawai‘i Police Department, HIEMA

TIMELINE

Medium-Term

PROJECT: **CRITICAL INFRASTRUCTURE NEEDS ASSESSMENT**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Improved roadway and emergency connectivity (built connections).
- A safe, convenient, accessible, and affordable transportation system.

DESCRIPTION

Conduct a vulnerability and needs assessment of identified critical roads and bridges that will result in the identification of retrofitting projects and identifies critical routes in support of evacuation planning improved road connectivity.

ACTION STEPS

- ☐ Analyze the existing roadway network, including demand and functioning, prior to the 2018 eruption and current.
- ☐ Determine improved connectivity routes for Puna.
- ☐ Determine alternative evacuation routes in Puna.
- ☐ Communicate these routes to the general public.

IN PROGRESS

This project has been included in the Multi-Hazard Mitigation Plan 2020; and will require continued coordination with the Recovery Team, Civil Defense, and project partners.

DESIRED OUTCOMES

- Improved community resiliency through improved roadway and emergency connectivity.
- A safe, convenient, accessible, and affordable transportation system.

POTENTIAL FUNDING SOURCES

COH, FEMA Hazard Mitigation Grant Program, CDBG-DR

PROJECT LEAD

Department of Public Works

PARTNERS

Civil Defense, Puna Community Development Plan Action Committee and Road Connectivity Working Group

TIMELINE

Near-Term

PROJECT: **ISLANDWIDE SHELTER ANALYSIS & CONSTRUCTION-RETROFIT**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Increase community and county capacity to prepare, respond and recover from hazard events.
- Reduce risk to life and property from natural hazards.

DESCRIPTION

Shelter facilities need to be designed to withstand hurricane-force winds, seismic events, and any other hazard the region faces. Additionally, during an event, the facilities should have cots for sleeping, water, food, restroom facilities, and any other amenities needed for a short stay. This project will include an assessment of facilities utilized as shelters and identify mitigation needs as well as develop evacuation and sheltering protocol, policies, and procedures.

ACTION STEPS

- [ ] Analyze site locations based on the most recent hazard study information.
- [ ] Identify the most appropriate locations. Determine if there are buildings that can be retrofitted to meet the required needs.
- [ ] Procure services for design.
- [ ] Procure construction/equipment/furniture, fixtures and equipment services.
- [ ] Determine what, if any, uses the facility could have other than a shelter (e.g., town center, school, etc.).

IN PROGRESS

This project has been included in the Multi-Hazard Mitigation Plan 2020; and will require continued coordination with the Recovery Team, Civil Defense, and project partners.

DESIRED OUTCOMES

- Increased preparedness measures for public safety.
- Increased response.

POTENTIAL FUNDING SOURCES

FEMA Hazard Mitigation Grant Program

PROJECT LEAD

Civil Defense

PARTNERS

County Operational Departments

TIMELINE

Long-Term

PROJECT: **VOLCANIC GAS AND PARTICULATE MONITORING AND CLIMATOLOGY**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Increase community and county capacity to prepare, respond and recover from hazard events.
- Reduce risk to life and property from natural hazards.

DESCRIPTION

The purpose of this project is to develop a monitoring plan and provide equipment and staff for monitoring and analysis of vog emissions and climatology. In addition to monitoring daily vog concentrations, the project will analyze vog climatology to enable forecasting needed to inform public health/evacuation. A sulfur dioxide gas monitoring and warning system will be constructed across the Island of Hawai‘i. Partnerships will be formed between local stakeholders and federal and state entities with the capability to provide resources for improved air quality measures and monitoring. Organizations may include the U.S. Environmental Protection Agency, USGS, or public or private stakeholders. The outputs of the vog climatology can be used to update the Volcanic High Hazard Area.

ACTION STEPS

- ☐ Define a scope of work for monitoring vog and climatology to forecast and inform public health/evacuation with the University of Hawai‘i Manoa/State Deptarment of Health Strategy.
- ☐ Purchase/install any new/additional equipment required.
- ☐ Conduct training to support equipment maintenance.

IN PROGRESS

This project has been included in the Multi-Hazard Mitigation Plan 2020; and will require continued coordination with the Recovery Team, Civil Defense, and project partners.

DESIRED OUTCOMES

- The outputs of the vog climatology can be used to update the Volcanic High Hazard Area hazard layer.
- Provide training and develop a monitoring plan to support a gas monitoring system.
- Increase public communication and warning.
- Increase safety for public and response personnel.

POTENTIAL FUNDING SOURCES

FEMA Hazard Mitigation Grant Program, COH

PROJECT LEAD

Civil Defense

PARTNERS

Fire, Police, USGS, DOH, University of Hawai‘i - Manoa

TIMELINE

Near-Term

PROJECT: **PRE-DISASTER RECOVERY PREPAREDNESS FRAMEWORK**

RECOVERY PRIORITIES

- Increase community and county capacity to prepare, respond and recover from hazard events.

DESCRIPTION

The purpose of this project is to develop a pre-disaster recovery preparedness framework to support improved coordination and expedited and resilient recovery efforts building on lessons learned from the 2018 Kīlauea eruption. The framework would codify: (1) a recovery governance structure and decision-making framework led by the County but composed of federal, state, and community stakeholders, (2) policies that would be activated to seize opportunities to build resilience to future disasters, and (3) a communication and community engagement strategy to support recovery.

ACTION STEPS

- ☐ Identify lessons learned from the 2018 Kīlauea eruption, in particular to the organizational capacity that can be applied to future recovery efforts.
- ☐ Develop and refine a draft framework.
- ☐ Adopt a framework by ordinance with County Council.

IN PROGRESS

A pre-disaster preparedness framework is currently drafted. The Recovery Team will coordinate with County leadership and County Council to advance the approval and adoption of the pre-disaster recovery preparedness framework.

DESIRED OUTCOMES

- Established recovery decision-making framework to improve coordination and efficiency.
- Improved response and recovery coordination.
- Increased county and community capacity to implemented preparedness and response measures.

POTENTIAL FUNDING SOURCES

COH

PROJECT LEAD

Recovery Team

PARTNERS

County Council, FEMA, HIEMA

TIMELINE

Ongoing

PROJECT: **EARTHQUAKE/HURRICANE RETROFIT INCENTIVE PROGRAM**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Increase community and county capacity to prepare, respond and recover from hazard events.
- Reduce risk to life and property from natural hazards.

DESCRIPTION

Conduct a study to determine the feasibility for the County to deploy an incentive-based program that would encourage private property owners to retrofit their properties against the impacts of earthquakes and tropical cyclones. The key to this study will be a vulnerability analysis that attempts to identify the general building stock within the County that is most vulnerable to these hazards.

ACTION STEPS

- ☐ Update County GIS database with building inventory.
- ☐ Utilize hazard data to conduct a vulnerability analysis of the general building stock.
- ☐ Identify property mitigation options that homeowners and businesses can utilize to retrofit current buildings.
- ☐ Identify tax reduction incentive options associated with mitigation measures.
- ☐ Conduct community outreach to target property owners in high hazard areas to implement the program.

IN PROGRESS

This project has been included in the Multi-Hazard Mitigation Plan 2020; and will require continued coordination with the Recovery Team, Civil Defense, and project partners.

DESIRED OUTCOMES

- Increased public action and ownership to implement measures that will reduce risk from hazards.
- Reduction of risk to life and property.

POTENTIAL FUNDING SOURCES

FEMA Hazard Mitigation Assistance (Advance Assistance), COH

PROJECT LEAD

Civil Defense

PARTNERS

Finance Department, Real Property Tax

TIMELINE

Long-Term

PROJECT: **PUNA WASTEWATER PROGRAMMATIC ENVIRONMENTAL ASSESSMENT**

RECOVERY PRIORITIES

- Invest in infrastructure that supports the vision for recovery and long-term resilience.
- Options of services and facilities that enhance physical, mental, emotional, and spiritual health and quality of life that meet needs of keiki to kūpuna.
- Preservation of natural resources and ecologically sensitive lands mauka to makai.

DESCRIPTION

The purpose of this project is to do an assessment that will allow the County to make informed choices of planning alternatives for wastewater infrastructure in commercial centers in the Puna district, and for potential impacts and benefits of those alternatives.

ACTION STEPS

- ☐ Inventory existing drinking water and wastewater systems.
- ☐ Analyze existing wastewater conditions.
- ☐ Review and assess county and state regulations.
- ☐ Complete feasibility analysis.
- ☐ Evaluate wastewater treatment master plan.
- ☐ Conduct financing analysis.
- ☐ Develop implementation plan.
- ☐ Conduct public outreach.

IN PROGRESS

The Recovery Team worked with the Departments of Environmental Management (DEM) and Research and Development on an application for funding to the EDA which is expected to be awarded.

DESIRED OUTCOMES

Provide the County with several options, cost estimates, and implementation guidance to move forward with necessary infrastructure improvements.

POTENTIAL FUNDING SOURCES

EDA

PROJECT LEAD

Department of Environmental Management

PARTNERS

Planning, Recovery Team

TIMELINE

Near-Term

PROJECT: **GIS DATA MANAGEMENT**

RECOVERY PRIORITIES

- Increase community and county capacity to prepare, respond and recover from hazard events.

DESCRIPTION

The purpose of this project is to improve ArcGIS data management and increase the capacity and capability of the County GIS system through personnel, equipment, or software acquisitions and/or training for personnel.

The project will improve data management systems to provide actionable information to the planning process during an incident and to capture data for impact statistics and hazard analysis post-incident.

ACTION STEPS

- ☐ Assessment of GIS upgrades, retrofits or new equipment (Perform Benefit-Cost Analysis).
- ☐ Procure equipment and installation.
- ☐ Conduct training and provide access to GIS system county-wide.
- ☐ Increase coordination of GIS management across all County departments.

IN PROGRESS

Civil Defense is currently leading an effort to maintain a redundant emergency data system that can be utilized in the event of network shutdown. Efforts to continue to coordinate GIS data management across County departments will be supported by the Recovery Team.

DESIRED OUTCOMES

Increased coordination and data management will improve preparedness, response, and recovery processes.

POTENTIAL FUNDING SOURCES

FEMA Hazard Mitigation Assistance, COH

PROJECT LEAD

Department of Information Technology

PARTNERS

Civil Defense, Planning Department, all County Departments

TIMELINE

Near-Term

PROJECT: **EVACUATION AND SHELTERING ASSESSMENT AND PROTOCOL**

RECOVERY PRIORITIES

- Increase community and county capacity to prepare, respond and recover from hazard events.

DESCRIPTION

Perform an assessment of facilities utilized as shelters and develop evacuation and sheltering protocol, policies, and procedures.

ACTION STEPS

- Review lessons learned from 2018 eruption event.
- Identify roles and responsibilities.
- Identify policies and procedures.
- Develop an outreach campaign for government agencies, non-profits, and public.
- Conduct training exercises.

IN PROGRESS

This project has been included in the Multi-Hazard Mitigation Plan 2020; and will require continued coordination with the Recovery Team, Civil Defense, and project partners.

DESIRED OUTCOMES

- Enhanced coordination and communication amongst emergency response personnel.
- Improved public communication and awareness.
- Improved safety for public and emergency personnel.

POTENTIAL FUNDING SOURCES

COH

PROJECT LEAD

Civil Defense

PARTNERS

DPR, Fire, Police

TIMELINE:

Medium-Term

PROJECT: **PROJECT 360 – A RESILIENCY PROJECT OF HAWAIʻI COUNTY CITIZEN CORPS COUNCIL AND CIVIL DEFENSE AGENCY**

RECOVERY PRIORITIES

- Increase community and county capacity to prepare, respond and recover from hazard events.

DESCRIPTION

Resiliency starts in our homes and communities. Project 360 starts at the ʻohana level and moves out through the community, volunteer organizations, and Civil Defense to enhance our family, community, and communications networks to create a prepared, self-reliant, and connected island population.

ACTION STEPS

- ☐ Create a template for Community Emergency Response Plans.
- ☐ Create ʻOhana Emergency Plan Booklet.
- ☐ Establish two-way radio communications in all Island of Hawaiʻi communities.

IN PROGRESS

The County's Civil Defense Agency is leading this work with several communities in Puna in coordination with the Hawaiʻi County Citizen Corps Council.

DESIRED OUTCOMES

- Increase the number of communities on the Island of Hawaiʻi with Emergency Response Teams.
- Increase the number of communities on the Island of Hawaiʻi with a Community Emergency Plan.
- Increase the number of households on the Island of Hawaiʻi that have an ʻOhana Emergency Plan and the number of individuals signed up for the Civil Defense alert system.
- Broadening Community-based Emergency Communications Capacity and Capability.

POTENTIAL FUNDING SOURCES

FEMA/Homeland Security, HIEMA, COH

PROJECT LEAD

Civil Defense

PARTNERS

Hawaiʻi County Citizen Corps Council (Community Emergency Response Teams, Neighborhood Watch, Voluntary Organizations Active in Disasters, Medical Reserve Corps)

TIMELINE

Ongoing

Lava flow through agricultural lands during the 2018 Kīlauea Lower East Rift Zone Eruption. *Photo: USGS*

COMMUNITY RESILIENCE — BUILDING COMMUNITY CAPACITY PROJECTS

These projects will build networks and community capacity, invest in targeted revitalization efforts in Puna to support disaster resilience and economic growth, identify areas for natural and cultural resources management and agriculture development, and improve access to goods and services.

- Natural and Cultural Resources Management Program
- Community-Based Disaster Management
- Network of Resilience Hubs
- Food Security & Resilience and Agriculture Development
- Youth Development and Resilience
- Access to Social, Health & Medical Services

PROJECT: **NATURAL AND CULTURAL RESOURCE MANAGEMENT PROGRAM**

RECOVERY PRIORITIES

- Historical, cultural and scenic resource management.
- Ecologically sensitive lands mauka to makai.
- Native ecosystem and habitat restoration.
- Invasive species mitigation.

DESCRIPTION

Coordinate and collaborate with community networks and partner agencies to support ongoing initiatives and to develop and implement projects to:

- Protect and preserve historical and cultural resources and native ecosystems;
- Preserve existing and create new family gathering spaces;
- Control invasive species;
- Reduce pollution; and
- Develop a land management plan for properities participating in the voluntary buyout housing program with property owners and communities where buyout activities occur, including open space, agriculture, and community stewardship.

ACTION STEPS

- ☐ Identify partner roles, project scope, and partner implementation.
- ☐ Identify additional funding and resource capacity needs for program projects.
- ☐ Establish coordination and monitoring mechanism associated with recovery priorities.
- ☐ Consult with lineal descendants on management plans for areas.

IN PROGRESS

See descriptions of project examples in the following section.

DESIRED OUTCOMES

- Increased protection and preservation of natural and cultural resources in the area, including expanded actions to address invasive species.
- Managed access designed to support community-based natural resources restoration efforts, cultural practices and interpretation, agriculture, and recreation.
- Cultural practices and natural resources are protected and sustained so that authentic experiences grounded in place act to guide the local visitor industry.
- Increased support to communities that are generating nature/environmental and culture-based opportunities that drive responsible tourism, entrepreneurial development, education and research, and other economic recovery initiatives.

POTENTIAL FUNDING SOURCES

EDA, USDA, State, COH, NGO and Private Investments

PROJECT LEAD

Recovery Team

PARTNERS

Refer to specific descriptions of project examples for partner organizations.

TIMELINE

Ongoing

NATURAL AND CULTURAL RESOURCE MANAGEMENT PROGRAM – CBRA PROJECT EXAMPLES

The Natural and Cultural Resource Management Program will be supported by the Recovery Team and will include projects like the Community Based Recovery Action (CBRA) examples listed below that are either current ongoing initiatives or initiatives in development by partner organizations.

LIVING & SHARING PONO PRACTICES: COMMUNITY BASED MANAGEMENT OF NATURAL AND CULTURAL RESOURCES

This initiative will establish community-based management methods to protect and sustain cultural practices and natural resources and generate pono cultural, economic, and educational projects and enterprises that benefit ʻāina and residents. Planning efforts at Cape Kumukahi will be coordinated with community-based planning efforts at Waipiʻo, Papakōlea, Kahaluʻu Bay, Keaukaha, and Hoʻokena Beach Park to strengthen partnerships and leverage resource support opportunities.

PROJECT ACTIONS

- Conduct field assessments and stakeholder consultations to assess the condition of natural and cultural resources and identify protection and preservation priorities.
- Develop and implement viable strategies for community-based management of natural and cultural resources.
- Explore opportunitiesand models for responsible tourism and other uses.
- Amend County zoning code and rules to develop regulatory provisions for special protection of wahi pana.

PARTNERS:

- Cape Kumukahi – KAPONO, Nā Lauʻō o Kaʻakepa, Hoʻoulu Lahui, Puna CDP Action Committee, State Historic Preservation Division, University of Hawaiʻi, DLNR, other CBOs
- Waipiʻo/Hāmākua – Waipio Taro Farmers Association, HuiMAU, Hāmākua Cultural Center, Pohaha I Ka Lani, County DPR
- Papakōlea/Green Sands/Kaʻū – Kaʻū Family Tour Operators, Kaʻū CDP Steering/Action Committee, DHHL
- Mauna Kea – Hāmākua Cultural Center, Imiloa Astronomy Center, University of Hawaiʻi, cultural practitioners
- Kahuluʻu Bay – The Kohala Center
- Hoʻokena Beach Park – KUPA, Friends of Hoʻokena Beach Park
- Keaukaha - Edith Kanakaole Foundaiton, MAHA

REVITALIZATION OF NATIVE ECOSYSTEMS & HABITATS

This program will protect critical habitats and generate youth and workforce development, cultural and environmental education and research, and other opportunities. It will increase support for existing and develop additional community-based native forest restoration projects. A model for this effort is restoration work at the Keauʻohana Native Rainforest.

PARTNERS: Hawaiʻi Environmental Restoration, Office of Hawaiian Affairs, Big Island Invasive Species Committee, DLNR, Puna CDP Action Committee

INVASIVE SPECIES

Both the CDP Action Committee and Community Impact Survey respondents identified invasive species as a critical issue in protecting and preserving native ecosystems. This program will take advantage of the weakened state of invasives as a result of the eruption to make significant advances in addressing invasive species issues such as Little Fire Ants, Albizia, and Rat Lung Worm, among others.

PROJECT ACTIONS

- Little Fire Ants: fund efforts to suppress and control LFA using the 2015 University of Hawaiʻi Technical Report as a guide.
- Albizia: fund priority corridors in Puna identified in the 2015 Albizia Hazard Mitigation Plan (2017 update).
- Rat Lungworm: develop Catchment Water Education program (on-site support to residents in Puna); support education efforts for students and teachers; and develop subsidies and access to equipment for rat and slug control.

PARTNERS: Big Island Invasive Species Committee, Puna CDP Action Committee

PROJECT: **COMMUNITY-BASED DISASTER MANAGEMENT**

RECOVERY PRIORITIES

- Increase community and county capacity to prepare, respond and recover from hazard events.
- Support economic empowerment and self-reliance.

DESCRIPTION

A community-based approach to disaster management (CBDM) values and invests in strengthening the knowledge and capacity of residents to address their recovery, readiness, and resilience needs. Thus, this initiative will implement a comprehensive and coordinated capacity building effort that links recovery/resilience funding and financing mechanisms with appropriate and targeted just-in-time technical support programs.

ACTION STEPS

- Identify partner roles, project scope, and partner implementation.
- Identify additional funding and resource capacity needs for program projects.
- Establish coordination and monitoring mechanism associated with recovery priorities.

IN PROGRESS

See descriptions of project examples in the following section.

DESIRED OUTCOMES

- Funding/Financing at the Household Level - through adaptive financing* and support from the Financial Navigators Program, displaced and impacted families receive the financial and social support they require to address their household response, stabilization, and recovery needs.
- Funding at the Small Business, Farm & Community Levels - through adaptive financing*, impacted businesses, farms, and community-based organizations receive the funding/financing they require to stabilize, recover and/or develop increased resilience for their enterprises and community development initiatives. Additional outcomes include providing support to businesses to navigate the legal requirements for qualifying and maintaining a loan.
- Capacity Building - the community impact and benefit from community-based projects and community/public/private partnerships are maximized through capacity building and technical support initiatives that are directly linked to funding and financing products/mechanisms.

POTENTIAL FUNDING SOURCES

EDA, State, and COH

PROJECT LEAD

Recovery Team

PARTNERS

Refer to specific descriptions of project examples for partner organizations.

TIMELINE

Ongoing

*Adaptive Financing – is a type of financial product that is flexible enough to adapt to the needs of specific locations in the wake of disasters. It offers flexible products that can adapt to changes in customer situations. This adaptability depends on flexible underlying processes that allow for finance providers to make ongoing adjustments to products in response to changing client needs. This requires a redesigned product-development process and a new conception that a financial product is a service instead of a commodity. (Hammett, Laura M., and Mixter, Katy. (2017) "Adaptive Finance to Support Post-Disaster Recovery." Yale Center for Business and the Environment)

COMMUNITY-BASED DISASTER MANAGEMENT – CBRA PROJECT EXAMPLES

The Community-Based Disaster Management initiative will be supported by the Recovery Team and will include projects like the Community Recovery Action (CBRA) examples listed below that are either current ongoing initiatives or initiatives in development by partner organizations.

ADAPTIVE FINANCING

This program will provide post-disaster investments and financing through adaptive financing processes and other finance/investment models to advance post-disaster recovery, climate adaptation, resilience, and hazard mitigation. Funding and financing will be made available at the individual, household, small business, farm, and community and housing development levels. Existing projects that are exemplary components of this effort include:

- **Financial Empowerment Center (FEC)** – Individuals receive no-cost, one-on-one professional counselling assistance (i.e. money management, budgeting, reducing debt, establishing and improving credit, and building savings). The County offers FEC financial counselling as a free stand-alone public service through integration into other social services, including housing and foreclosure prevention services, workforce development, prisoner reentry, benefits access, domestic violence prevention, and more.
- **Kīlauea Hui** – provides financial assistance to disaster survivors to address their unmet needs in collaboration with the disaster case management program at Neighborhood Place of Puna.
- **Emergency Resilience Loan Program and Rent & Mortgage Assistance Program** – offers financial counselling, loans and grants to ALICE (asset limited, income constrained, employed) and other residents who reside on the Island of Hawai‘i and have lost income and/or face hardships due to COVID-19.
- **Financial Navigators Program** – Financial Navigators provide financial guidance, information, and referrals to residents to help them manage the economic impact of COVID-19.
- **Small Business Relief & Recovery Fund** – One-time reimbursement grants to businesses and nonprofit organizations for costs incurred from business interruption due to COVID-19.

PARTNERS: Hawaiian Community Assets, HOPE Services, HIHR, HFHH, HFFCU, Hawai‘i Community Foundation, Neighborhood Place of Puna, Catholic Charities, Salvation Army, Hawai‘i Alliance for Community-Based Economic Development, HCFCU, BIFCU, CUHFCU, HCEFCU, Hawai‘i USA FCU, HFSFCU, Hawai‘i Community College, Cities for Financial Empowerment, County of Hawai‘i (Mayor’s Office and R&D)

GRANTMAKING SUPPORT

This initiative provides a range of funding/grantmaking mechanisms to support community and housing development strategies for recovery/long term resilience. Examples of this include Hawai‘i Community Foundation’s Resilience Fund, Hawai‘i Island Strong Fund, the Community-Based Disaster Management Grant Program, and Kīlauea Recovery Grant Program which establishes standards for granting disaster relief funds to nonprofit organizations for purposes of providing relief, recovery, mitigation, and remediation assistance for impacts resulting from the 2018 Kīlauea Eruption.

TECHNICAL & CAPACITY BUILDING SUPPORT FOR CBRAS

The Hawai‘i Island Community Resilience Support Program (HI-CRSP) will provide a range of capacity building and technical support services that are linked directly to funding and financing products or mechanisms, including support to CDP Action Committees and Community-Based Resilient Recovery Networks. HI-CRSP is currently piloted by the Hawai‘i Alliance for Community-Based Economic Development (a nonprofit intermediary) to support resilience hub/community development projects, responsible tourism related “hot spot” initiatives, other economic recovery projects, and CDP Action Committees.

PARTNERS: Hawai‘i Alliance for Community-Based Economic Development, University of Hawai‘i Office of Indigenous Innovation, Hawai‘i Tourism Authority, County of Hawai‘i (R&D and Planning)

PROJECT: **NETWORK OF RESILIENCE HUBS**

RECOVERY PRIORITIES

- Increase community and county capacity to prepare, respond and recover from hazard events.
- Support economic empowerment and self-reliance.
- Network of multifunctional community resilience hubs (community and place connections).

DESCRIPTION

Resilience Hubs are trusted, community-serving, and physical spaces that can house a range of programs and services that effectively work at the nexus of community resilience, emergency management, climate change mitigation, and social equity. In Puna, where 78% of households are ALICE (Asset Limited, Income Constrained, Employed) and/or in poverty, the Network of Resilience Hubs will help address socio-economic concerns facing the most vulnerable to affect increased resilience for the whole community.

Using a network approach will encourage collaboration across issues, sectors, and social conditions to address challenges and empower communities to become more self-determining, socially connected, and successful before, during, and after disruptions.

ACTION STEPS

- Identify partner roles, project scope, and partner implementation.
- Identify additional funding and resource capacity needs for program projects.
- Establish coordination and monitoring mechanisms associated with recovery priorities.

IN PROGRESS

Examples of community-based projects that will make up a network of coordinated and collaborative resilience hub initiatives in Puna/Kaʻū are described in the following section.

DESIRED OUTCOMES

- A coordinated network of resilience hubs is established that can provide supplies, communications, and resources in the event of an emergency and serve the community year-round as hubs for community-building and community revitalization.
- Increased community capacity to mobilize and take action to build disaster readiness and community resilience; coordinate and deliver rapid disaster relief and response; catalyze disaster recovery and stabilization; and strengthen resilience.
- Educational facilities are restored and improved to serve as multifunctional community hubs.
- Diversity of job types and entrepreneurial opportunities are generated in the community that spurs economic revitalization and resilience.

POTENTIAL FUNDING SOURCES

State and COH

PROJECT LEAD

Recovery Team

PARTNERS

Refer to specific descriptions of project examples for partner organizations.

TIMELINE

Ongoing

NETWORK OF RESILIENCE HUBS – CBRA PROJECT EXAMPLES

The following are examples of community-based projects that will comprise a network of coordinated and collaborative resilience hub initiatives in Puna/Kaʻū and eventually across the Island of Hawaiʻi.

ʻO MAKUʻU KE KAHUA COMMUNITY CENTER

This resilience hub project includes the construction of a community center, renovation of the Makuʻu Farmers Market, and expansion of the Māla Hoʻoulu ʻIke Program. ʻOMKKCC provides a permanent and safe foundation for fostering Native Hawaiian culture while addressing food production and processing needs, providing training and technical support to farmers and entrepreneurs, and supporting cultural and STEM education for youth.

PARTNERS: ʻO Makuʻu Ke Kahua Community Center, Makuʻu Farmers Association, Makuʻu Farmers Market

SACRED HEART RESILIENCE HUB

This project is located on 14 acres adjacent to Sacred Heart Catholic Church and is comprised of existing micro-unit homes and a community center on 3 acres and 11 acres that will hold housing, laundry/private room facilities, and agriculture/farming activities. Street Medicine services will also be co-located at this and other resilience hub facilities throughout Puna/Kaʻū.

PARTNERS: HOPE Services Hawaiʻi

KURTISTOWN RESILIENCE HUB

Building off of its existing feeding, outreach, and educational programs and services, Kurtistown Assembly of God and Christian Liberty School are developing a Community Reach Center on land they own to establish a resilience hub for the community.

PARTNERS: Kurtistown Assembly of God & Christian Liberty School

PĀHOA RESILIENCE HUB

Kanaka ʻO Puna is developing a resilience hub in direct response to the experienced needs of the community in the aftermath of 2014's Hurricane Iselle and the 2018 Kīlauea Eruption. A 7-acre farm in Pāhoa will serve as the hub that would meet the day-to-day needs of the community as well as meeting needs in times of disaster and recovery. This project includes: [a] refurbishing existing buildings into office and meeting rooms for classes and community engagement; [b] locating storage containers in partnership with Bodacious Women of Pāhoa to serve as a supplemental food distribution hub; [c] developing a solar park; [d] establishing an icehouse to serve fishers and hunters during normal times and the community during disasters. These efforts will also be integrated with KOP's Men of Paʻa Program, which provides rental housing and other support services for formerly incarcerated men.

PARTNERS: Kānaka O Puna / Men of Paʻa, Bodacious Women of Pāhoa, Going Home Hawaiʻi

HILINAʻI RESILIENCE HUB

This project involves building new and renovating existing facilities at Volcano School of Arts & Sciences, Cooper Center and Volcano Arts Center to house a range of coordinated services and programs that can respond to community needs during times of disaster while generating community development (educational, economic, recreational, other) and revitalization opportunities on a regular basis.

PARTNERS: Volcano School of Arts & Sciences, Cooper Center, Volcano Arts Center

ISLANDWIDE RESILIENCE HUBS

With CARES Act funding, Vibrant Hawaiʻi is working with a collaborative of more than 40 partners (formal and informal grassroots organizations) to establish an island-wide network of resilience hubs to increase access to digital connectivity; improve food security while supporting the local economy; and provide a suite of resilience and wellness programming. The network currently consists of 9 Keiki Hubs, 6 Drop-In Hubs & Programs, 15 Food Hubs, and 10 Resilience Programs.

PARTNERS: Vibrant Hawaiʻi and its 40+ partners.

PROJECT: **FOOD SECURITY & RESILIENCE AND AGRICULTURE DEVELOPMENT**

RECOVERY PRIORITIES

- Multi-use agricultural land and open space.
- Jobs relative to and complimentary to local resources, ecology, culture, demographics, and opportunities.
- Increase community and county capacity to prepare, respond and recover from hazard events.
- Support economic empowerment and self-reliance.

DESCRIPTION

Puna is primarily an agricultural district. Prior to the eruption, the area was the State's main producer of papaya and bananas. In spite of the inundation of 171 acres of agricultural land and impacts on at least 46 farms, the community still sees agriculture as its stabilizing industry. Simultaneously, as unemployment increases, food insecurity and community feeding needs have skyrocketed as families contend with the loss of employment. A robust agricultural sector is essential to enduring through and recovering from the impacts of disasters. Strengthening our food and agricultural system now is also critical to ensuring our readiness and resilience to future emergencies.

This initiative focuses on coordinated planning, support, and development of activities designed to address the challenges and opportunities to establishing Puna as a leading food producer in the State — issues such as access to capital and technical support for farmers, adequate processing facilities, marketing, and distribution, among other concerns.

ACTION STEPS

- ☐ Identify partner roles, project scope, and partner implementation.
- ☐ Identify additional funding and resource capacity needs for program projects.
- ☐ Establish coordination and monitoring mechanisms associated with recovery priorities.

IN PROGRESS

See descriptions of project examples in the following section.

DESIRED OUTCOMES

- Increased growth and resiliency of Puna's agriculture and community-based food systems.
- Increased resident access to nutritious, affordable, and locally produced food.
- Increased community self-reliance and resilience in providing for its own food needs.
- Increased numbers and diversity of jobs and economic opportunities in the community.

POTENTIAL FUNDING SOURCES

USDA, EDA, State, and COH

PROJECT LEAD

Recovery Team

PARTNERS

Refer to specific descriptions of project examples for partner organizations.

TIMELINE

Ongoing

FOOD SECURITY AND AGRICULTURE DEVELOPMENT – CBRA PROJECT EXAMPLES

The Food Security and Agriculture Development initiative will be supported by the Recovery Team and will include projects like the Community Recovery Action (CBRA) examples listed below that are either current ongoing initiatives or initiatives in development by partner organizations.

EAST HAWAIʻI AQUACULTURE PARK AND RECIRCULATING AQUACULTURE SYSTEMS (RAS) FOR SMALL BUSINESSES & FOOD SECURITY

Aquaculture can serve as a relatively rapid means of assisting victims of disasters to recover and develop supplemental or primary livelihoods. Most aquaculture crops are short-cycle crops, making recovery rapid, and if properly planned, minimal infrastructure can make aquaculture businesses some of the most resilient and least expensive to recover after a disaster. This project taps the expertise of the staff at the University of Hawaiʻi Hilo Pacific Aquaculture and Coastal Resources Center (PACRC) to build aquaculture systems and provide training for farmers to develop small- to large-scale aquaculture projects for disaster recovery. Initial phases of this effort are being funded by R&D.

PARTNERS: Pacific Aquaculture and Coastal Resources Center (PACRC) at the University of Hawaiʻi Hilo (UHH)

COOPERATIVE EXPANSION OF THE BIG ISLAND PORK INDUSTRY

This initiative targets expansion of the Big Island Pork Industry by increasing production through utilizing more efficient and effective pig farming methods, development of mobile slaughterhouses and alternative feeds, working with DPW to streamline permitting processes, and working with CDFIs to increase access to capital.

PARTNERS: Akamai Working Group, Hawaiʻi Homegrown Food Network, University of Hawaiʻi – CTAHR

HAWAIIAN ACRES FOOD HUB

This project capitalizes on existing capacity in the community to produce food, run a farmers market, and do value-added processing. Renovations to existing structures at the Hawaiian Acres Community Center will accommodate the food hub, which will support a range of programs including the expansion of the farmers market, produce and value-added food processing, food storage, education, and training, among other community-serving activities.

PARTNERS: Hawaiian Acres Community Association

HAWAIʻI ISLAND AGRICULTURE PLANNING

This project was initiated to build a collective understanding of the agricultural and food systems on the Island of Hawaiʻi and identify key opportunities for generating value-added agricultural growth and food sustainability. It engages key stakeholders in the mapping of and planning for strengthening Food Security and Agriculture Industry Systems.

PARTNERS: Hāmākua Institute, Hawaiʻi Island Agriculture Partnership, Hawaiʻi Island Food Alliance, Vibrant Hawaiʻi, Hawaiʻi Community College Alliance

PROJECT: **YOUTH DEVELOPMENT & RESILIENCE**

RECOVERY PRIORITIES

- Options of services and facilities that enhance physical, mental, emotional, and spiritual health and quality of life that meet needs of keiki to kūpuna.
- Support economic empowerment and self-reliance.
- Diversity of job types and entrepreneurial opportunities.

DESCRIPTION

During talk story sessions with more than 400 Puna youth about Kīlauea Eruption Recovery, the issue that students regularly mentioned was their lack of access to opportunities, activities, and an active lifestyle. They especially highlighted their desire for quality education in Puna, diverse career development and economic opportunities close to home, and access to ways that they can be involved to affect change within their community.

This initiative will increase opportunities for positive development and strengthening resilience for Puna youth by identifying, coordinating and supporting a range of interrelated educational, cultural, economic and workforce development, and recreational actions to enable Puna communities, and the youth themselves, to take youth and development back into their hands through place based, culturally grounded, and engaged methods.

ACTION STEPS

- ☐ Identify partner roles, project scope, and partner implementation.
- ☐ Identify additional funding and resource capacity needs for program projects.
- ☐ Establish opportunities for internship programs that engage local youth in recovery efforts, and identify available funding sources.
- ☐ Establish coordination and monitoring mechanisms associated with recovery priorities.

IN PROGRESS

See descriptions of project examples in the following section.

DESIRED OUTCOMES

- Increased access to quality educational opportunities in Puna, including restoring Kua O Ka Lā Public Charter School, which was inundated with lava.
- Expanded options of services and facilities that enhance physical, mental, emotional, and spiritual health and quality of life for youth and the broader community.
- Increased number and diversity of jobs and entrepreneurial opportunities in Puna that is ʻāina based and Science, Technology, Engineering, Arts, and Math (STEAM) based.
- Expanded opportunities generated by community-based organizations, DOE educational institutions, outreach programs, community college, and university for visitor industry-related education that integrates both place-based and culturally grounded practices as well as the incorporation of STEM fields.

POTENTIAL FUNDING SOURCES

EDA, State, and COH

PROJECT LEAD

Recovery Team

PARTNERS

Refer to specific descriptions of project examples for partner organizations.

TIMELINE

Ongoing

YOUTH DEVELOPMENT AND RESILIENCE – CBRA PROJECT EXAMPLES

The following are examples of community-based projects that will comprise a network of coordinated and collaborative youth development and resilience-building initiatives.

HOʻOULU HOU COMMUNITY RESILIENCE HUB

This project involves securing a 22-acre facility at Nani Mau Gardens by Hoʻoulu Lāhui to reestablish Kua O Ka Lā Public Charter School and serve as a resilience hub to address disaster response and community resilience capacity needs. This collaborative effort is designed to meet the education, job creation, workforce training, college-ready, and internship/mentorship aspirations of the community. It is intended to be inclusive in educating and empowering people across the lifespan through the integration of traditional and modern practices, programs, and facilities that enhance community resiliency.

PARTNERS: Hoʻoulu Lāhui, Kua O Ka Lā Public Charter School, EA Ecoversity, Kū-A-Kanaka, Mindful Living

HAWAIʻI ACADEMY OF ARTS & SCIENCES

This project includes the expansion and renovation of the School's campus and facilities to enhance educational, entrepreneurial, and other community development opportunities in Puna.

PARTNERS: Art & Science Center (ASC), Mindful Living, Hawaiʻi Academy of Arts & Sciences

HAWAIʻI ISLAND CLIMATE ADAPTATION & RESILIENCE ENGAGEMENT (HI-CARE)

This project will engage communities through the Resilience & Environmental Action Research Model (REARM) and Design Thinking Process. It will enhance the environmental literacy of K-12 students and their families in the Keaʻau, Kaʻū, and Pāhoa Complex Area while simultaneously enhancing the capacity of communities to be resilient. An outcome of HI-CARE will be the establishment of sustainable Resilience Hubs in areas of high vulnerability and susceptibility to climate change and weather hazards.

PARTNERS: Hawaiʻi Alliance for Community-Based Economic Development, Liliʻuokalani Trust, DOE/KKP School Complex Area and the 15 Schools in the Complex Area, Kamehameha Schools, Hawaiʻi Community College, Partners in Development, Makuʻu Farmers Market, Friends of Hawaiʻi Volcanoes National Park, Hana Laulima Lahui O Kaʻū, Kaʻū Rural Health Association, Mokupāpapa Discovery Center, Imiloa Astronomy Center

FAITH-BASED YOUTH DEVELOPMENT SUPPORT SERVICES

This project builds on the existing work of faith-based organizations in Puna by establishing permanent facilities and expanding programs that support youth development, including mentoring and internship programs, education and cultural development activities, recreational and art programs, support to foster youth, among other programs.

PARTNERS: Connect Point Church, Puna Baptist Church, Sure Foundation

PROJECT: **ACCESS TO SOCIAL, HEALTH & MEDICAL SERVICES**

RECOVERY PRIORITIES

- Improve access to quality health services.

DESCRIPTION

Following the eruption, health clinics, mental health professionals, and educators saw an increase in post-traumatic stress disorder, acute trauma disorder, depression, anxiety, panic attacks, night terrors, and other mood disorders. This pointed to not only the need for increased access to mental health services but the need for improved medical and social service support in Puna. Respondents (88%) in the Community Impact & Opportunity Assessment Survey agreed that expanded physical, mental, and social health services are critical in the aftermath of the eruption.

This initiative increases coordination and collaboration among health care and social service providers to better serve Puna residents in times of disaster and to strengthen longer-term resilience in the community.

ACTION STEPS

- ☐ Identify partner roles, project scope, and partner implementation.
- ☐ Identify additional funding and resource capacity needs for program projects.
- ☐ Establish coordination and monitoring mechanisms associated with recovery priorities.

IN PROGRESS

See descriptions of project examples in the following section.

DESIRED OUTCOMES

- Improved access to quality, community-based, and culturally relevant health services in Puna.
- Increased options of services and facilities that enhance physical, mental, emotional, and spiritual health and quality of life, especially for the most vulnerable.
- Increased access to wrap-around social services in Puna.

POTENTIAL FUNDING SOURCES

EDA, State, and COH

PROJECT LEAD

HI-DARRT (Hawai‘i Island Disaster Assistance Response and Recovery Team)

PARTNERS

Refer to specific descriptions of project examples for partner organizations.

TIMELINE

Ongoing

ACCESS TO SOCIAL, HEALTH & MEDICAL SERVICES – CBRA PROJECT EXAMPLES

The initiative to improve access to social, health, and medical services will be supported by the Recovery Team and will include projects like the Community Recovery Action (CBRA) examples listed below that are either current ongoing initiatives or initiatives in development by partner organizations.

PRIMARY & PREVENTIVE HEALTH SERVICES

This project will renovate existing and develop new facilities to serve as health and medical focused resilience hubs at a 10 acre Community Health Center to be (developed) in Keaʻau and the Kaʻū Family & Dental Health Center in Nāʻālehu.

PARTNERS: Bay Clinic, Inc.

RADIOLOGY SERVICES IN PUNA

This project will expand medical and health outreach services in Puna. Radiology equipment will be acquired and alternative energy systems secured to ensure uninterrupted delivery of services, including in times of disaster.

PARTNERS: Puna Community Medical Center, PCMC Foundation

STREET MEDICINE PROGRAM

This project builds on the demonstrated efficacy of Street Medicine programs in providing high quality, low-cost health care to vulnerable populations, including limited-mobility persons, persons experiencing unsheltered homelessness, and other transient populations.

PARTNERS: HOPE Services Hawaiʻi

IMPLEMENTATION

LESSONS LEARNED FROM THE PLANNING PROCESS

One characteristic of a resilient community is the willingness to document and learn from its experiences and apply lessons toward future endeavors. The 2018 Kīlauea eruption was a complex and prolonged event. The recovery planning process was adapted to this context.

The 2018 Kīlauea eruption, Hurricane Lane, and the ongoing COVID-19 pandemic have demonstrated that the impacts of "shock" events can have similar effects to a community's safety and livelihood. The ability to evaluate and operationalize lessons learned from a disaster will build capacity toward resilience. Each event will present unique challenges, and our readiness to respond and recover should be able to rise to meet each challenge.

Kuleana. In the response to a natural disaster communities come together to provide mutual aid; voluntary organizations, faith-based groups and not-for-profit organizations bring services and support; and government agencies at the local, state and federal levels coordinate activities to protect life and property and and deliver resources that offer immediate relief. As communities transition to long-term recovery it is critical to define and lift up the respective kuleana that impacted communities and local government have around leading recovery efforts and decision-making, and where there is collective kuleana across all aspects of communities in the implementation of recovery.

Response Capacity. The County relies heavily on existing staff and volunteer organizations to execute emergency response, notifications, incident command support, dispensing emergency supplies, shelter operations, and food and meal services. The County's response capacity would be greatly enhanced by establishing roles and building capabilities to surge staffing and volunteers during a disaster. This capability will benefit from ensuring that staff and volunteers are prepared and trained in advance to stand up in the next disaster.

Temporary Building Moratorium. A temporary moratorium on redevelopment and reconstruction after a disaster allows time to assess land use and structural vulnerabilities, clear debris, stabilize hazardous buildings and other life safety risks, repair damaged infrastructure, and explore hazard mitigation, disaster recovery, and climate change adaptation opportunities. A six-month moratorium was established for the 2018 Kīlauea eruption to allow County officials and communities to address environmental issues and future hazards in recovery projects and activities to improve long-term community resilience. One important lesson was to extend the temporary moratorium until key recovery and resilience policies have been developed and vetted with the community. One challenge in implementing a temporary building moratorium following a disaster is the way in which it can impact the ability to address the immediate housing needs of disaster survivors.

Plan Integration. Plan integration is the process by which state or local government looks critically at their existing planning and implementation framework and align policies and projects to support the overall goal of reducing risk to natural hazards and building community resilience (U.S. Department of Homeland Security 2017). As County plans are updated on different schedules and by different departments, plan integration can be challenging. Recovery from the 2018 Kīlauea eruption provided an opportunity to align the development of the Kīlauea Recovery and Resilience Plan with the update of the County General Plan and County's Multi-Hazard Mitigation Plan. The County has a unique opportunity to integrate policies and projects from the Recovery and Resilience Plan into the County's overall planning and implementation framework. While this is an ideal approach, it was not necessarily an easy undertaking. Each plan must meet specific and distinct legal, funding, and public engagement requirements. These distinct requirements were identified and used to develop a community outreach strategy and GIS and project databases that could be used by all three planning efforts. One key challenge was

to plan public outreach in such a way that clarified how community input would inform various planning products and provided for cycles of feedback that demonstrate how community input furthers government decision-making.

Pre-disaster Recovery Framework. Another key lesson learned from recovery planning from the 2018 Kīlauea eruption was the need to have had in place a pre-disaster recovery framework. Few counties nationwide and no counties in the State of Hawai‘i currently have this type of framework. A county-wide recovery framework would have enabled the County and communities to more easily transition from response to recovery by having developed in advance of a disaster: (1) a recovery governance structure and decision-making framework led by the County but composed of federal, state, and community stakeholders, (2) policies that would be activated to seize opportunities to build resilience to future disasters, and (3) a communication and community engagement strategy to support recovery. Of course, recovery activities and needs will vary based on the type and extent of a disaster event, but many activities can be thought through in advance. The County is in the process of developing a pre-disaster recovery framework by ordinance that can be activated during future events. This framework is informed by applying the lessons of the 2018 Kīlauea eruption, as well as the Hurricane Lane and the ongoing COVID-19 pandemic.

Disaster Recovery Team. The establishment of a Disaster Recovery Team was a critical decision that introduced lines of accountability and clear organization into the recovery process. The Disaster Recovery Team, led by the Disaster Recovery Officer, enabled County staff to be solely dedicated to coordination and collaboration across all stakeholders through the recovery process. The Disaster Recovery Officer serves a significant role in facilitating decision-making across the County Leadership Team and key stakeholders. Continued support of the Disaster Recovery Team positions will ensure continued efficiency and functionality to support the implementation of the Recovery and Resilience Plan as well as ensure essential support in the event of a future disaster. It is important to recognize the timing of the establishment of the Disaster Recovery Team as a lesson learned, as the team was not established at the onset of the recovery process. It is recommended that for any future disaster events the Disaster Recovery Team is incorporated into the response phase and is in place to lead the recovery process at the onset of the event to ensure efficiency and consistency throughout the process.

IMPLEMENTATION

This Recovery and Resilience Plan serves as a strategic plan to address recovery from the 2018 Kīlauea eruption from a comprehensive perspective and provides direction on fostering resilience in the Puna communities that were impacted by the eruption. Many of the projects and community-based recovery actions can proceed with available funding and full participation among partners. Recovery efforts specific to the economy and infrastructure often require specific studies or feasibility assessments to build consensus on goals and objectives, identify or refine actions, design a project, and secure funding for implementation. The implementation of long-term recovery and building resilience also require mechanisms such as the development of codes, regulations, design standards, programs, and policies or procedures to move from planning to action. These mechanisms can also help to institutionalize the lessons learned and successes of long-term recovery which in turn build resilience within the County and community to be better prepared for natural disasters in the future.

This Recovery and Resilience Plan does not describe the entire universe of recovery and resilience projects and actions; but rather invites all sectors of the community to act collaboratively to advance recovery, readiness, and resilience strategies included here. The Recovery Team, a division of the County's Planning Department, will be responsible for coordinating the implementation of the Recovery and Resilience Plan. The Recovery Team will work closely with County departments, state and federal partners, and the community to implement recovery projects that are feasible and consistent with the Recovery Plan, General Plan, and other local and County efforts. The Recovery Team will also work with the sector-based Recovery Working Groups to foster collaboration and build partnerships in support of project implementation.

IMPLEMENTATION STRATEGY COMPONENTS

1. **Resources and Capacity**
   - Secure federal and state funding allocated for long-term recovery.
   - Leverage public funding with philanthropic, private, and community dollars and resources.
   - Invest resources in public, private and community partnerships that act on implementing the Recovery and Resilience Plan.
   - Build the capacity of the community and the County to recover, be disaster ready and more resilient to future disruptive events.
2. **Complementary Plans, Assessments and Studies**
   - Applications for securing federal and other sources of recovery funding.
   - Guiding documents that serve as recovery implementation tools.
3. **Momentum around Community-Based Recovery and Resilience Actions**
   - Build on the current momentum generated from community-based actions for recovery and resilience driven by Kīlauea eruption recovery, COVID-19 response and CDP implementation.
   - Identify opportunities to leverage ongoing investments in the community and coordinated actions underway.
4. **Implementation Structure**
   - Develop inclusive working groups around Island Resilience Capabilities to focus and carry through implementation actions.
   - Build implementation structures into guiding documents and focused or programmatic plans.
   - Develop systems and resources to sustain coordinated efforts long-term.

ISLAND RESILIENCE CAPABILITIES

The National Disaster Recovery Framework identifies six sector-based Recovery Support Function areas to lend structure and alignment to short-term and long-term recovery efforts at the local, state and federal levels: community planning and capacity building; health and social services; economic recovery; housing recovery; natural and cultural resources; and infrastructure systems.

To support the implementation of this Recovery and Resilience Plan the County proposes collaboration through six Recovery Working Groups organized around Island Resilience Capabilities which are described here. This structure has been informed by the National Disaster Recovery Framework and adapted from comparable models from island places such as Aotearoa (New Zealand). Lessons learned from the structure and mode of operation for network-based and collaborative approaches to community, public and private collaboration and action on the Island of Hawai'i were evaluated in developing this working group structure.

The responsibility of the Recovery Working Groups is to take collaborative actions that build on existing and new investments in community-based actions to implement the three strategies in this Recovery and Resilience Plan: Kīlauea recovery; disaster readiness; and community resilience. Recovery Working Groups have a role in convening partners, prioritizing projects, and following through on actions. The composition of the Recovery Working Groups may include public, private and community partners actively engaged in programs, projects and actions related to each of the Island Resilience Capabilities.

Coordination among the Recovery Working Groups is led by co-chairs that represent the community and County and make up an Advisory Group across the six working groups.

Social Resilience

- Promotes social connectedness and cohesion.
- Ensures the effectiveness of key social support functions, for example health, education, human services, recreation, justice.
- Protects and strengthens our social and human capital.

Culutral Resilience

- Sustain our cultural values, places, instutions, and practices.
- Nurture our identity as islanders - our root and local culture.
- Preserve and promote our history and heritage.

Economic Resilience

- Develop local economic networks.
- Strengthen nā 'ohana and sustainable local economies, for example livelihoods, social entrepreneurship, food systems.
- Provide equitable opportunities for housing affordability, flexibility, and mobility.
- Protect our financial capital.

Resilience of the Natural Environment

- Sustainable management of natural resources and land use.
- Steward our indigenous ecosystems and biodiversty.
- Improve understanding of how hazards impact the environment and how the environment protects us from hazards.
- Adapt towards long-term climate resilience.

Resilience of the Built Environment

- Promote resilience of critial infrastructure and buildings.
- Effectiveness in planning, engineering and construction.
- Protection of our physical capital.

Governance of Risk and Resilience

- Strengthen our leadership, policies, investments, and security.
- Effectiveness of oversight, coordination, collabroation and coherence of resilience activities.

LEARNING AND EVALUATION

Plan and project implementation will be monitored to track progress and evaluated to determine project effectiveness and impacts. The Recovery Team will serve as the coordinating body supporting regular engagement with County and community project leads to monitor and evaluate projects. Recovery projects will be reviewed considering a series evaluation of criteria which address plan integration, feasibility, capability, and impacts. Applicable performance and impact indicators will be identified for each project aligned with the County's network of plans, especially the County General Plan. In addition, lessons will be documented and used to support feedback and learning as part of an adaptive management process. A monitoring, evaluation, and learning strategy will be developed to guide these efforts. The strategy will incorporate tools, such as a project database, to identify and track proposed and funded projects. The Recovery Team will work with the Recovery Working Groups to serve as venues for sharing progress and lessons from both County-led and community-led projects.

PROJECT REVIEW CRITERIA

1. **Plan Integration**
   - Directly supports vision, goals and strategies of the Kīlauea Recovery and Resilience Plan.
   - Consistent with General Plan long-range goals, policies, standards, and courses of action for the entire county.
   - Aligned with Community Development Plan goals, objectives, policies and strategies.
   - Performance indicators and outcomes are identified and aligned within the County's network of plans.
2. **Feasibility**
   - Funding is identified or secured.
   - Activities are aligned with specific funding requirements and project characteristics (e.g., type or location of activity, timelines).
   - Immediate costs and program uses are identified (e.g., studies, site acquisition, construction).
   - Long-term costs and program uses are identified (e.g., personnel, operations, and maintenance, financing).
3. **Capability**
   - Implementation partners are identified: community; businesses; institutions; county, state and federal agencies.
   - Activities are aligned with agency priorities and staff capacity.
   - Activities are aligned with community priorities.
   - Project timelines and milestones are established.
4. **Impacts**
   - Benefits to the community, both direct and indirect, are identified.
   - Benefits to County government operations and expenditures, both direct and indirect, are identified.
   - Co-benefits from project activities are identified.

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