

CLIMATE CHANGE ADAPTATION PLAN



July 2019

PALA BAND OF MISSION INDIANS



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Tribal Chairman's Message

The Pala people have a deep history of adapting to changes that have altered our traditional way of life. In recent years, our people have shared growing concern about a new set of threats, including more severe wildfire, drought, rising temperatures, and flooding. Our climate is changing. In response to these concerns, our tribal government has assessed the effects of climate change on our health, social, natural and built environments. The findings show that it is time to summon the same strength and resilience that the people of Pala have demonstrated for thousands of years as we adapted to disruptions to our lands, wellbeing, resources, and culture.

In fact, Pala is already on its way to becoming more resilient. We are implementing projects to secure our infrastructure and protect our people. We are expanding collaborations with tribes and other partners in our region that can leverage knowledge and resources to help us move faster.

We encourage all members of the Pala community to learn about the effects of climate change, not just on Pala, but throughout Mother Earth. We also hope you will join us as we move ahead to implement the solutions outlined in this report that will help us thrive in the face of new vulnerabilities and build upon our community's traditional strengths and ability to innovate. We can and will adapt again.



Executive Summary

This report synthesizes and presents the results of a planning process designed to help the Pala Band of Mission Indians more proactively prepare for and adapt to the impacts of climate change. Prior to this report, Pala assessed its vulnerability to climate change, which was summarized in its [Vulnerability Assessment](#). The Vulnerability Assessment concluded that **elevated temperature, wildfire, storms and flooding, and drought** present high-risk climate change exposures for Pala. Each of these exposures result in significant secondary exposures and impacts to Pala’s health, social, natural, and built environments, and is anticipated to threaten community assets and resources that are valued by tribal members and residents. The findings of the Vulnerability Assessment are summarized the section titled “Summary of Vulnerability Assessment Findings”.

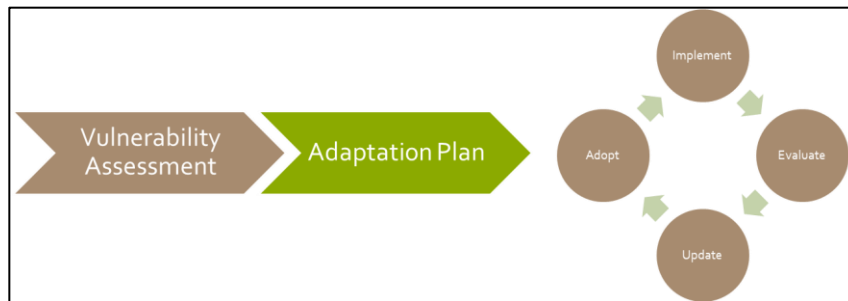


Figure 1: ADAPTATION PLANNING PROCESS

As illustrated in Figure 1, a vulnerability assessment is the first major step in a community’s climate change adaptation strategy. The next major step typically involves developing an adaptation plan to determine how to implement strategies that address the vulnerabilities identified, build upon the tribe’s strengths and increase overall resilience. Pala opted to pursue this step and was awarded funding from the National Indian Health Board (NIHB) to complete a climate adaptation plan. In line with NIHB priorities, Pala’s planning process engaged tribal community members and key partners in increasing tribal resilience to climate change, including a unique focus on health, psychosocial, and cultural wellbeing (see description in Appendix B). This report presents the results of a community-driven planning process to determine how to address Pala’s key climate vulnerabilities, build upon Pala’s strengths, and improve overall community resilience through interventions known as adaptation strategies.

This Adaptation Plan identifies and organizes selected adaptation strategies, so they can be effectively implemented at Pala in the short (1-5 years), medium (6-10 years) and long (11- 20 years) term. Selected adaptation strategies include 37 existing strategies and 39 strategies that are proposed to be expanded upon or newly developed, which fall into the following six categories.

- Policy, Planning, and Land Use
- Community Engagement, Education, and Notification
- Infrastructure Improvement
- Data and Information Technology
- Operations Management
- Cross-agency Collaborations

This plan also proposes that the Adaptation Plan be evaluated annually and updated every 5 years.

Introduction

“WE MUST COMMIT OURSELVES TO PROTECTING THE HEALTH AND SAFETY OF THE PEOPLE LIVING ON AND VISITING RESERVATIONS. WE MUST SEEK OUT RESOURCES TO ASSURE DELIVERY OF THE SERVICES AND ASSISTANCE THAT PEOPLE NEED. TOGETHER WE CAN MAKE POSITIVE IMPROVEMENTS FOR THE BETTERMENT OF THE DEPARTMENT AND THOSE ON THE RESERVATION.”

As Pala’s climate changes, the Pala community must become more resilient. Stories and

observations shared by Pala’s residents match the scientific evidence and latest literature. Climate change refers to long-term changes in usual or expected weather patterns resulting from an increase in greenhouse gases in the atmosphere. Much of the literature suggests that, as a tribal community, Pala is particularly vulnerable to climate change.¹ However, having overcome ecological and human changes on their lands for thousands of years, the people of Pala have also demonstrated exceptional strength, resourcefulness and resilience.

This report focuses on the actions Pala can take to protect its health, social, natural, and built environments from the climate effects identified in Pala’s Vulnerability Assessment.



Figure 2: Pala Reservation

Purpose

The purpose of an adaptation plan is to help a community identify viable, priority actions to respond to their immediate and forecasted climate change vulnerabilities and increase overall resilience. An adaptation plan can help Pala better understand its capacity to adapt, identify available resources, and determine how to cost-effectively build on its existing strengths. By completing a community-driven, comprehensive adaptation planning process, Pala aimed to improve preparedness and resilience to the health, wellbeing and other impacts of climate change that effect Pala’s livelihood within the Pala Reservation. The plan presents a blueprint for high priority adaptation strategies. Certain strategies can

¹ Jantarasami, L.C., R. Novak, R. Delgado, E. Marino, S. McNeeley, C. Narducci, J. Raymond-Yakoubian, L. Singletary, and K. Powys Whyte. Tribes and Indigenous Peoples. In Impacts, Risks, and Adaptation. In: *Fourth National Climate Assessment, Volume II* (U.S. Global Change Research Program, 2018), <https://nca2018.globalchange.gov/chapter/15/>

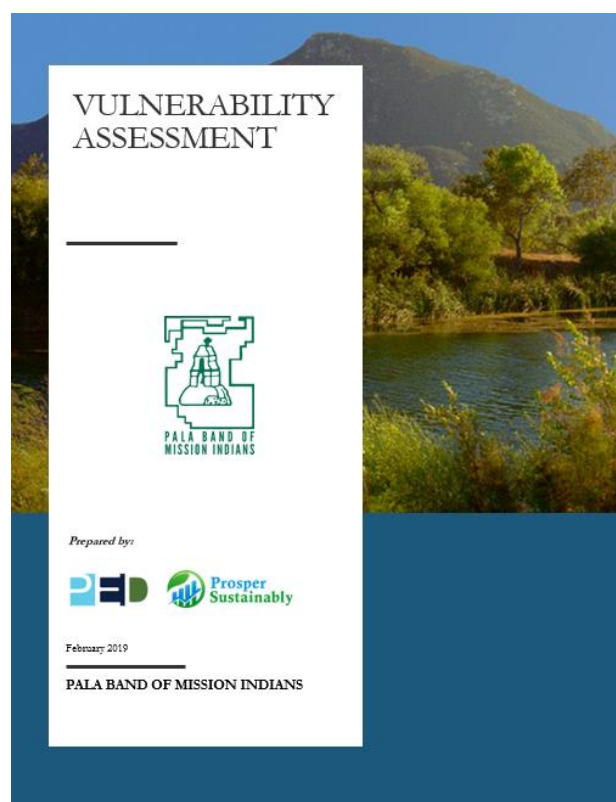
also help to reduce Pala's greenhouse gas emissions that contribute to climate change as well as achieve other co-benefits to Pala's health, fiscal condition, economy, and other areas of community concern.

Background

Building Upon the Vulnerability Assessment

In 2017 and 2018, Pala investigated its vulnerability to climate change to better understand the degree to which the community is susceptible to, and unable to cope with, adverse impacts of climate change. Evidence indicates that climate change is increasingly affecting many, if not all, aspects of life on Pala, from the natural environment to community health, economics, and tribal culture. Projections show that these changes will become more extreme in the coming decades. A complete background on the Pala community and the detailed findings of the vulnerability assessment can be found in the Vulnerability Assessment Report, released in February 2019. The findings of the Vulnerability Assessment are summarized in this report.

The Vulnerability Assessment was an important first step that enabled Pala to identify its most significant vulnerabilities, so it can make good decisions about how to avoid or reduce them through interventions known as adaptation strategies. That process also illuminated Pala's strengths which increase its adaptive capacity and can be built upon to increase the community's overall resilience. This Adaptation Plan identifies and organizes selected adaptation strategies, so they can be effectively implemented at Pala in the short, medium, and long term.



Adaptation Plan Vision and Goals

Like any planning exercise, it is important to center your efforts on what you hope to accomplish. The following goals and vision statement were agreed upon by members of the planning team.

Goals:

- To become a more adaptive community that can remain resilient and independent in the face of climate change impacts to Pala's health, social, natural, and built environments within the reservation
- To increase community and employee awareness of climate change impacts, risks, and preparedness opportunities
- To be a leader and provide an example for other communities

Vision statement:

Pala's wellbeing, prosperity, culture, lands, self-sufficiency, and sovereignty are protected against the impacts of climate change. Our community remains healthy, strong, and resilient

Adaptation Plan Process

To complete this Adaptation Plan, PED followed the planning framework it designed as the lead of the national, federally-funded Tribal Climate Health project. This framework is aligned with the US Center for Disease Control’s (CDC) Building Resilience Against Climate Effects (BRACE) and other leading tribal and non-tribal adaptation approaches that incorporate a focus on the health and social impacts of climate change (alongside natural and built environment impacts) ranging from heat-related illness, to food insecurity, to trauma and other psychosocial consequences.

The first step was to complete a Vulnerability Assessment to compile and analyze accessible information on possible harms and risks that are currently or expected to affect Pala. This analysis is typically completed before a climate change adaptation plan is developed. PED staff then worked with outside consultants (Prosper Sustainably) to determine objectives and scope the Adaptation Plan, and engage stakeholders in compiling, evaluating, and prioritizing potential adaptation strategies that would effectively reduce vulnerabilities identified in the Vulnerability Assessment. This information was organized within detailed Pala Adaptation Action Plan Worksheets, which are in the possession of PED. The Worksheets were used to gather input and rank strategies as described in the next section. To determine the highest priority strategies, stakeholders were encouraged to factor in the community assets (resources and values, see Figure 3) that were of greatest importance to Pala to protect, based on results of a community survey and input workshops involving tribal members (detailed in the Vulnerability Assessment and illustrated below). The strategies selected are synthesized and presented in this report.

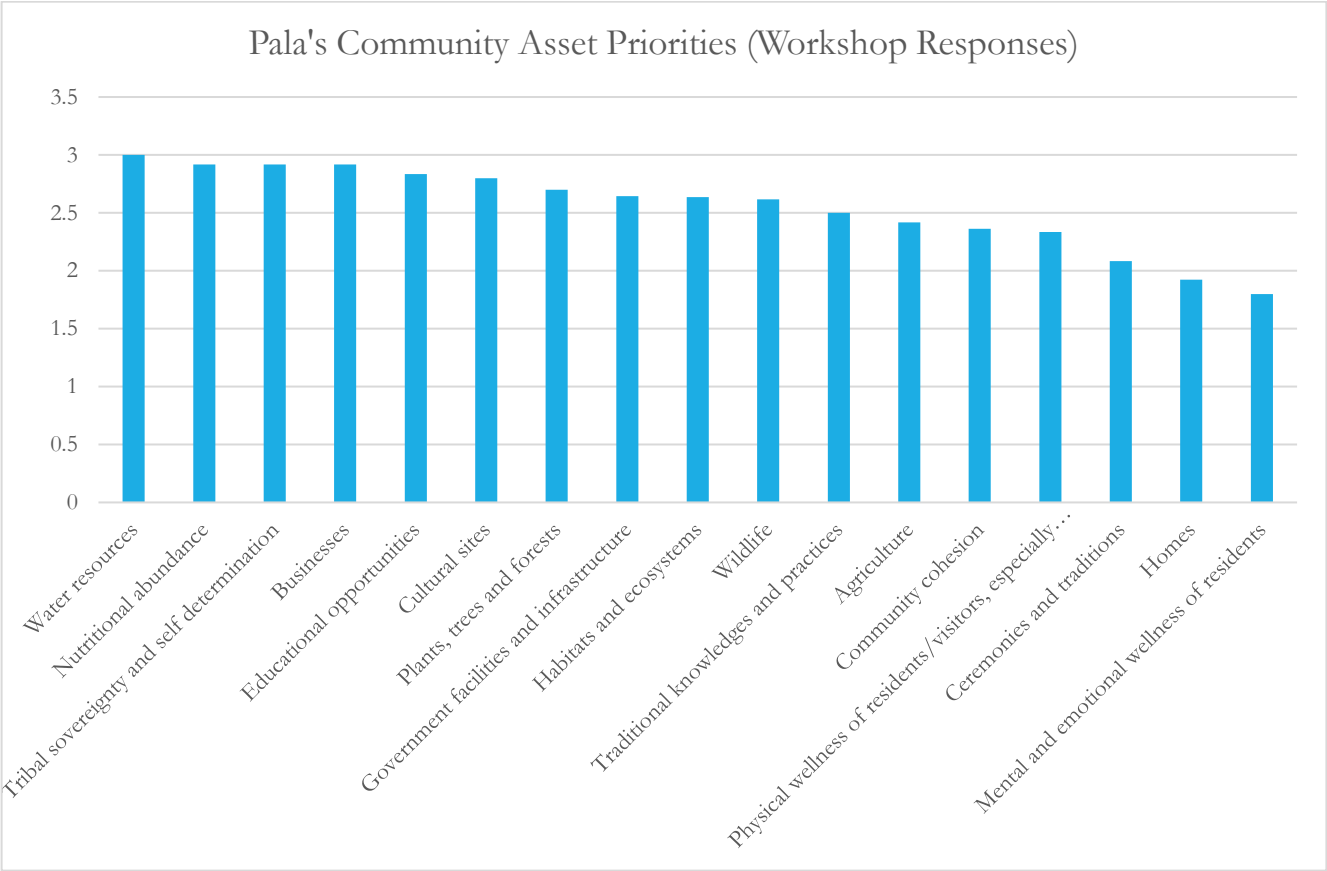


Figure 3: Pala's Community Asset Priorities

A more detailed inventory of Pala's 614 building assets is outlined in Pala's 2016 Hazard Mitigation Plan², including 44 critical facilities (shown in Figure 4), such as the Tribal Administration Building, the Fire Station and the Pala Casino Spa & Resort. A list of critical facilities is provided in Appendix A.

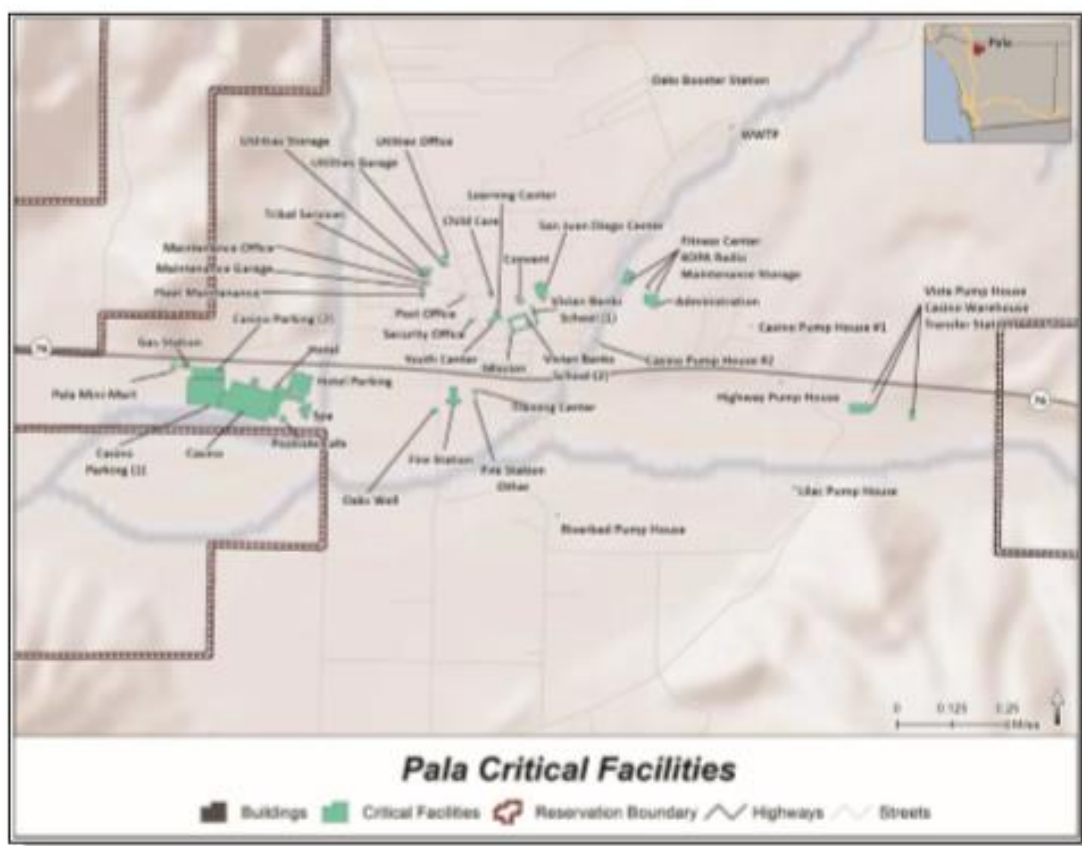


Figure 4: Pala Critical Facilities

Method for Selecting Strategies

The planning team used a systematic and inclusive process for identifying and prioritizing potential strategies. First, the planning team accelerated the process of identifying potential strategies by using the Exposures, Impacts, and Strategies Inventory (EISI) tool developed by Pala and Prosper Sustainably as part of the Tribal Climate Health Project. The tool presents a menu of over 130 possible adaptation strategies based on extensive review of adaptation activities in other communities. The team used this menu, conversations with departmental staff, and Pala documentation to identify strategies that were already underway at Pala and coded them as “Complete,” “In Progress,” “Ongoing,” or “Expand” if the strategy was underway but could be expanded upon. The team also coded strategies that it wished to consider as “New” strategies to address its specific vulnerability priorities.

Meetings were conducted with tribal members and stakeholders to invite brainstorming of additional new strategies, which were tracked and added to the EISI tool. Prosper Sustainably then filled in the strategies tab of the EISI tool to assist PED in evaluating potential strategies by need (e.g. anticipated cost of inaction and anticipated effectiveness) and

feasibility (e.g. anticipated resources and capacity needed for action and any major legal, political, natural or cultural constraints). Prosper Sustainably and PED drafted planning details including timeframe and responsible departments. Through an iterative process of input with staff, a shorter list was developed and presented at a Planet Pala meeting in February 2019, where attendees participated in an exercise to rank the strategies labeled “Expand” and “New.” PED then met with each department individually to confirm feasibility, revise planning details as needed, and ensure the department was comfortable with the list of strategies they would be responsible for. This process formed the basis of the Adaptation Action Plan (p. 39). The strategies that are included in the Adaptation Action Plan are described in the Adaptation Strategies section (p. 12).

Community Engagement

Collaborations are vital to community planning, particularly when planning for future resilience to climate change. They help develop solutions that are grounded in shared values and understanding. By involving different perspectives, collaborations also increase the implementation viability of adaptation plans. This development of this Adaptation Plan involved the participation and input of the Pala community in the following ways:

- Oversight and key contributions by PED staff
- Review of materials and reports generated by a variety of Pala departments
- Meetings and workshops with community members and advisors including Pala staff from various departments including Pala Utilities Department, Pala Tribal Services, Pala Fire Department, Pala Business Office, Pala Casino Spa & Resort, and the Pala Executive Committee.
- Survey conducted to better understand the Pala tribal members’ perceptions, experiences, concerns and priorities related to climate change.³
- Online outreach (e.g. social media and a dedicated webpage) and in-person outreach (e.g. events and community meetings) to build awareness of Pala’s progress on climate change adaptation
- Review and prioritization of adaptation strategies by key internal stakeholders

³ The questionnaire was completed by 20 tribal members. Prosper Sustainably, *Pala Climate Vulnerability Experiences and Priorities Survey* (2018)

Summary of Vulnerability Assessment Findings and Priorities

Before detailing adaptation strategies, this report first provides a brief overview of Pala's key vulnerabilities. The Pala Band of Mission Indians assessed its vulnerability to climate change, which was presented in a detailed Vulnerability Assessment Report in February 2019 and is summarized below. To determine Pala's climate change vulnerability, this process entailed review of literature, data, staff knowledge, and community observations to determine the extent Pala may be exposed to various climate changes now and in the future. This report presented key climate exposure facts and concluded that the following exposures (and sub-bulleted secondary exposures) present the most significant risks for Pala and are interrelated.

1. **Elevated temperature**
 - a. Worsened ozone levels in air
 - b. Food insecurity
 - c. Vector changes
2. **Wildfire**
 - a. Worsened particulate matter in air (smoke)
 - b. Water insecurity
 - c. Vector changes
3. **Storms and Flooding**
 - a. Worsened indoor mold in air
 - b. Water insecurity
 - c. Vector changes
4. **Drought**
 - a. Water insecurity
 - b. Worsened dust and fungus particles and allergens in air

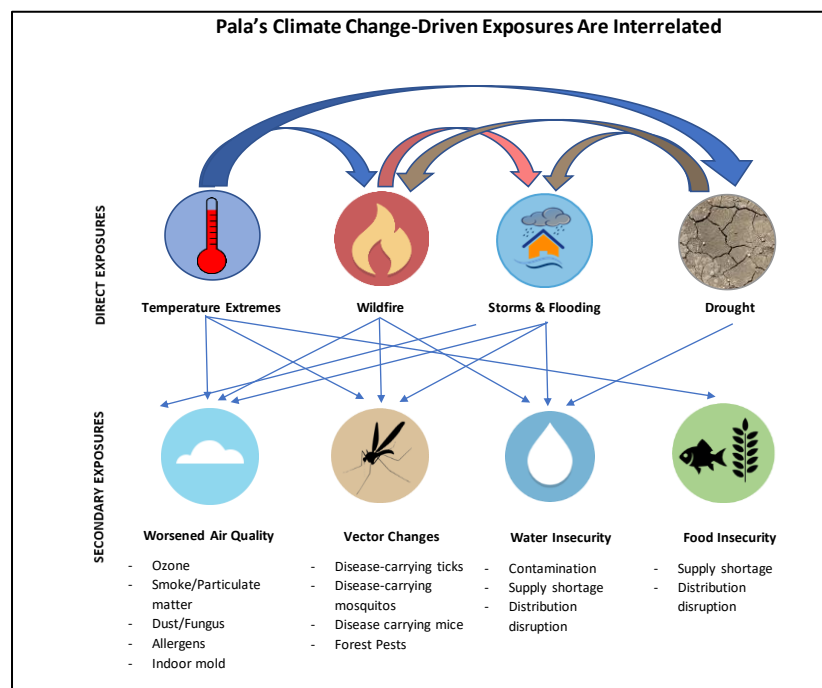


Figure 5: Pala's Climate Change-Driven Exposures

This assessment also evaluated the potential impacts resulting from such exposures, and the community characteristics that make Pala more sensitive or more adaptable to these impacts. These impacts are organized into three categories: 1) those that effect Pala's Health & Social Environment, 2) those that effect its Natural Environment, and 3) those that effect its Built Environment. The Vulnerability Assessment concluded that the following impacts are of highest concern for Pala in the foreseeable future. Please refer to the Vulnerability Assessment report for details about each of these impacts as they relate to each of the four exposure areas outlined above.

Health & Social Environment

Human Health

- Heat-related stress, illness, and death

-
- Traumatic injury or death from wildfire and storms and flooding
 - Mental health and psychosocial consequences associated with stress and trauma
 - Inability to access emergency or health services due to infrastructure and public service disruptions or failures (e.g. power, roads, communications, water treatment)
 - Respiratory illness due to higher levels of ozone, particulate matter (including smoke and dust), and indoor mold infestations
 - Decrease in fitness activity levels due to heat or unsafe outdoor conditions
 - Interruptions of drinking water supply
 - Infections due to contact with or ingestion of contaminated water
 - Infections due to tick or mosquito borne illness
 - Reduced access to affordable and nutritious food due to global crop changes
 - Carbon monoxide poisoning due to power outages and use of generators

Cultural and Spiritual Health

- Decline of culturally important plants and animals
- Disruption of community functions or ceremonies
- Loss of sacred or historical sites due to wildfire and storms and flooding
- Short- or long-term dislocation or relocation due to wildfire and storms and flooding

Socio-economic Health

- School closures or absences impacting educational opportunities
- Business closures or inability to travel to work impacting economic opportunities

Natural Environment

- Disruptions and stresses to habitats, waterways, and important or sensitive plant and wildlife species, including habitat loss and fragmentation, loss and migration of species, reduced riparian floodplain absorption, and increases in the presence and prevalence of invasive species

Built Environment

- Damage to homes and critical facilities
- Disruption to public services and infrastructure (e.g. power outages, roads, telecommunications, water systems)
- Disruption to agricultural operations

These impacts are anticipated to threaten a variety of Pala's community assets and values, ranging from water resources to human health and tribal sovereignty. Costs associated with these impacts were not analyzed as part of this report but are anticipated to vary widely and potentially become overwhelming. The findings presented in this report are intended to increase Pala's awareness of how the Tribe is likely to be affected by climate change. This information helped Pala consider actions to address or adapt to any of the threats posed by climate change, which was done through the development of this Adaptation Plan. Selected Adaptation Strategies are presented in the next section.

Adaptation Strategies

The following sections briefly describe the strategies Pala has selected to include in its Adaptation Action Plan.

ORGANIZATION OF STRATEGIES

Because many strategies can address more than one vulnerability, this section presents each strategy once under the applicable functional area (listed in the table below), rather than by exposure or impact area, which would have required strategies to be repeated many times.

Because it is important to build upon the efforts and strengths already underway at Pala as well as new ideas, this report presents both existing and new strategies under each functional area. Existing strategies are efforts that are already building resilience and adaptive capacity and are presented by status including “**Completed**,” “**In Progress**,” “**Ongoing**,” or those that Pala wishes to “**Expand**” upon. “**New**” strategies represent brand new efforts to build resilience and adaptive capacity. New and expanded strategies entail varying levels of resource investment. Figure 6 summarizes the number of strategies (by type) that are new or expanded and will require future investment. While departments were involved in evaluating whether selected strategies were both needed and feasible, upon adoption, responsible departments are encouraged to more thoroughly evaluate and plan for related costs and pursue external funding where possible.

Strategy Type	# of Complete, in Progress or Ongoing Strategies	# of New or Expanded Strategies
Policy, Planning, and Land Use	14	9
Community Engagement Education, and Notification	0	10
Infrastructure Improvement	3	9
Data and Information Technology	4	4
Operations Management	6	6
Cross-agency Collaborations	10	1
Total	37	39

Figure 6: Number of Strategies by Type and Status

The new strategies are presented in order of term: short, medium and long term. Departments assisted with decisions on the anticipated year that strategies could feasibly be implemented. Consultants provided recommendations on timing based on an understanding of Pala’s goals and priority assets as well as guidance in the latest literature. For example, the recently released Tribal Climate Adaptation Guidebook⁴ suggests to “start by implementing actions that have the fewest barriers, the highest chance of success, and the greatest resilience value.” Alternatively, the Intergovernmental Panel on Climate Change⁵ recommends that “the most effective measures to reduce vulnerability in the near term are programs

⁴ Tribal Climate Adaptation Guidebook Writing Team (Meghan Dalton, Samantha Chisholm Hatfield, and Alexander “Sascha” Petersen). Tribal Climate Adaptation Guidebook (Oregon State University, 2018), , <http://www.occni.net/projects/tribal-climate-adaptation-guidebook/>

⁵ Smith, K.R., A.Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch, B. Revich, and R. Sauerborn. Human health: impacts, adaptation, and co-benefits. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part*










that implement and improve basic public health measures such as provision of clean water and sanitation, secure essential health care including vaccination and child health services, increase capacity for disaster preparedness and response, and alleviate poverty (very high confidence). In addition, there has been progress since AR4 in targeted and climate-specific measures to protect health, including enhanced surveillance and early warning systems.” Other emerging research⁶ suggests “bonding, bridging and linking can be some of the most effective ways that a community can cope with the short and long-term stresses and effects of climate change.” Accordingly, this plan includes strategies to building social networks and psychosocial skills to help Pala residents cope and cooperate during and after traumatic climate events, which are also presented separately in Appendix B.

For each of the selected strategies described in this section, preliminary planning details such as timeframe, responsible departments, partner agencies and known resources are named. In addition, a table, like the one below, is provided to show which climate change exposures and impacts are being addressed by the strategy (see legend in Figure 7).

Exposures Addressed	       
Impacts Addressed	  

Figure 7: Exposures and Impacts Addressed by Strategy

This table is intended to help the reader understand why the strategy is important and to allow the reader to evaluate the plan to determine whether an exposure or impact is being sufficiently addressed (see Figure 8 for icon legend). A full worksheet of coded strategies is in the possession of PED and can be filtered and sorted to evaluate strategies by exposures, impacts, community assets, timeframe, responsible department, functional area, status and other strategy details.

Primary Exposures	Secondary Exposures
 Elevated Temperature	 Water Insecurity
 Storms & Flooding	 Worsened Air Quality
 Wildfire	 Vector Changes
 Drought	 Food Insecurity
Impacts	
 Health and Social Environment	

A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press, 2014), https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap11_FINAL.pdf

⁶ Saiyot, S., and Matsuyuki, M. Study on Process of Building Adaptive Capacity to Climate Change through Social Capital in Low-Income Communities: A Case Study of Nakhon Sawan Municipality in Thailand (Urban and Regional Planning Review, 2016), https://www.jstage.jst.go.jp/article/urpr/3/0/3_146/_pdf/-char/en



	Natural Environment (plants, trees, wildlife, habitat and waterways)
	Built Environment (homes, business, transportation, agriculture)

Figure 8: Legend of Exposure and Impact Icons

A unique but essential part of safeguarding the tribe’s health and wellbeing is strengthening “psychosocial resilience.” Emerging research indicates that strategies that aim to protect and build mental, psychological, social, and spiritual wellbeing can be some of the most effective ways to adapt to growing stressors and trauma associated with climate change. Pala’s approach to psychosocial resilience, including literature review, expert advice, and its selected strategies are incorporated within this plan, and also described separately within Appendix B.

Top Strategies

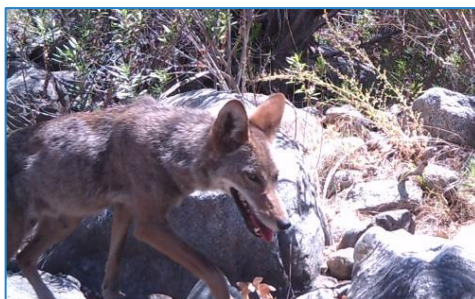
Attendees at the February 20, 2019 workshop voted for their top priority new or expanded strategies, and the five strategies listed below in Figure 9 received the most votes.

1. Provide early, real-time warnings and clear emergency notifications before and during exposure event
2. Build alternative power supplies e.g. building or community-scale battery storage and microgrids incorporating renewables to avoid power outages for critical facilities during exposure-event
3. Increase water storage capacity
4. Conduct education to encourage community members to prepare for exposure
5. Develop an emergency, disaster response and/or health management plan to anticipate and prepare public services and evacuation plans for exposure risks.

Figure 9: Pala's Top Strategies










Policy, Planning, and Land Use

This plan includes 23 existing (“Completed,” “In Progress,” “Ongoing,” and “Expand”) or “New” policy, planning, and land use strategies as detailed below.




Completed (2)

1. **Conduct a vulnerability analysis** to identify risks and develop an adaptation plan to protect important assets. PED worked with Pala departments and the Pala Casino and used EPA, BIA, NIHB and tribal funds to complete this strategy in 2019.


Exposures Addressed	       
Impacts Addressed	  

2. **Create Source Water Protection and/or Drought Contingency Plans.** PED worked with the Pala Utilities Department and used EPA and tribal funds to complete a Drought Contingency Plan in 2017.

Exposures Addressed	 
Impacts Addressed	  

In Progress (9)

3. **Update integrated pest management plan** to include protocols for standing water, mosquito abatement, etc. and to incorporate projections for climate change. PED is working with Tribal Services and Agriculture Operators using tribal and EPA funds to complete this strategy in 2019.







Exposures Addressed	   
Impacts Addressed	  

4. **Establish or update adaptive fire management plans**, including periodic forest assessments and traditional forest management practices to prevent high intensity wildfires (e.g. prescribed burning, introduction of resilient








vegetation), and formalization of chain of command roles. Tribes can pursue management initiatives through the Tribal Forest Protection Act. This action gives tribes the opportunity to initiate projects on Federal lands adjacent to tribal trust lands for the purpose of managing threats to forest resources, such as wildfire, pests, erosion, or disease. The Pala Fire Department is working with PED, BIA, CalFire and Intertribal Long Term Recovery Foundation using FEMA and tribal funds to complete this strategy by 2021.

Exposures Addressed	    
Impacts Addressed	  

5. **Develop a pollution prevention plan** to identify opportunities for toxic use reduction and safer chemical storage to reduce potential for chemical release. PED is using EPA Pollution Prevention funds to complete this strategy by 2021.

Exposures Addressed	  
Impacts Addressed	  

6. **Map drainage routes to identify flood mitigation routes.** The GIS Department is working with PED and Stetson consultants using FEMA and tribal funds to complete this strategy by 2021.

Exposures Addressed	   
Impacts Addressed	  

7. **Develop an Integrated Resource Management Plan.** PED is working with Pala Casino, Pala Administration, and Rocks Biological Consulting using tribal funds to complete this strategy by 2021.

Exposures Addressed	       
Impacts Addressed	  

8. **Complete Tribal Habitat Conservation Plan,** including management, monitoring, and conservation efforts (e.g. conservation easements for protected species). PED is using BIA and tribal funds, and pursuing additional grant funds, to complete this strategy by 2021.

Exposures Addressed	       
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Impacts Addressed	
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9. **Assert or renegotiate water-related rights** to quantify and set claim on water that rightfully belongs to the tribe. Pala Legal is working with San Luis Rey Indian Water Authority using tribal funds to complete this strategy.

Exposures Addressed	    
Impacts Addressed	  

10. **Mapping, conservation and protection of wildlife connectivity and movement corridors** (land and aquatic), as a way to protect the dispersal ability of one or more species of conservation interest. Riparian areas and other natural movement corridors are generally thought to be of particularly high value in promoting natural species movements in response to climate change. PED is partnering with various grant-funded academic and scientific research projects and using tribal funds to complete this strategy by 2022.







Exposures Addressed	   
Impacts Addressed	

11. **Install or upgrade sewage system** (phase out septic, expand wastewater treatment capacity). The Utilities Department is working with Pala Casino, Tribal Housing, and PED using EPA and Indian Health Service funds to complete this strategy by 2029.

Exposures Addressed	  
Impacts Addressed	  

Ongoing (3)

12. **Update and implement non-point source management plans.** PED is using EPA funds to conduct this strategy every 5 years. Recent accomplishments include streambed restoration, soil lead mitigation measures, and erosion control projects.

Exposures Addressed	  
Impacts Addressed	  

13. **Develop or promote weatherization and energy efficiency improvement programs** for tribal houses and businesses to better withstand exposure events (and lower air pollution caused by energy generation). PED is working with Housing using a combination of grant and tribal funds to conduct this strategy on an ongoing basis. Recent accomplishments include distributing compact fluorescent and LED lightbulbs to tribal households and providing information on household weatherization strategies.



Exposures Addressed	     
Impacts Addressed	 

14. **Develop or update Hazard Mitigation Plan** to include climate change risks and projections. PED is using FEMA funds to conduct this strategy every 5 years.


Exposures Addressed	       
Impacts Addressed	  

Expand (2)

15. **Develop a Tribal Transportation Safety and Resilience Plan.** The Business Office is working with PED and consultants using BIA funds to supplement the existing TTSP by 2022. PED has been awarded SB-1 funding from Caltrans to expand this project to more deeply evaluate, strengthen, and expand infrastructure (roads, bridges, etc.) and systems (transit) and build transportation resilience in preparation for extreme events. Such a plan can increase Pala's capacity to integrate climate change considerations into material requirements, infrastructure design, and improvements, as recommended by the CA Fourth Climate Assessment: San Diego Report.

Exposures Addressed	 
Impacts Addressed	 







16. **Update air quality improvement plans** to include climate exposures. PED will use EPA funds to complete this strategy by 2022.

Exposures Addressed	    
Impacts Addressed	

New (7)

Near-term: 1-5 years (7)

17. **Develop a water resources management plan** to assess climate change impacts, quantify tribal water rights, evaluate water infrastructure deficiencies, and develop strategies for adaption and water allocation. The EPA and other federal agencies can engage with tribes on water resource planning. PED will work with the Utilities Department and Stetson consultants using a combination of grant and tribal funds to complete this strategy by 2022.

Exposures Addressed	  
Impacts Addressed	  





18. **Develop a health safety plan and map** to identify and assist those at greatest vulnerability or risk e.g. increase medical personnel, provide homeless intervention services, and create ambassador programs comprised of community members that can check on the safety of vulnerable populations. TLE will work with Senior and PED using a combination of grant and tribal funds to complete this strategy by 2022.

Exposures Addressed	       
Impacts Addressed	

19. **Establish, update and enforce building codes** including passive cooling, cool roofs, cool paving materials, fire resistance, energy and water efficiency, solar readiness, development restrictions in high risk areas. The Executive Council will work with Housing and the Utilities Department using tribal funds to complete this strategy by 2022.

Exposures Addressed	     
Impacts Addressed	 

20. **Develop plan and partnerships to safeguard tribal cultural resources.** The Pala THPO will use National Park Service funds to complete this strategy by 2022.

Exposures Addressed	 
Impacts Addressed	 

21. **Integrate climate considerations into community health assessments (CHAs)**, community health improvement plans (CHIPs) and other community and environmental health assessments. PED will work with the Indian Health Service using a combination of grant and tribal funds to complete this strategy by 2022.

Exposures Addressed	       
Impacts Addressed	

22. **Develop or update capital improvement plans** to account for exposure projections and support needed adaptation infrastructure and projects. The Executive Council will work with the Business Office and Pala Casino using tribal funds to complete this strategy by 2022.

Exposures Addressed	       
Impacts Addressed	  

23. **Develop an emergency, disaster response, and/or health management plan** to anticipate and prepare public services and evacuation plans for exposure risks. Include procedures for post-disaster repairs and needs, pre-health incident access to health services, and post-health incident continuity of care. Identify existing community assets (e.g. fire stations, businesses, faith-based organizations) that can play a role in preparedness and recovery. The Fire Department will work with the Business Office and the Utilities Department using a combination of grant and tribal funds to complete this strategy by 2023.

Exposures Addressed	       
Impacts Addressed	  

Medium-term: 6-10 years (0)

Long-term: 10-20 years (0)

Community Engagement, Education, and Notification

This plan includes 10 existing (“Completed,” “In Progress,” “Ongoing,” and “Expand”) or “New” community engagement, education, and notification strategies as detailed below.



Completed (0)

In Progress (0)

Ongoing (0)

Expand (3)

- Provide early, real-time warnings and clear emergency notifications before and during exposure events** via website, text, social media, TV, radio, and other media. Notifications should include relevant safety tips (e.g. limit outdoor activities, don't drive through flooded roads, limit water usage, evacuation zones, boil advisories, etc.) and how to access additional information or help. Implement emergency communications to provide realistic recovery timeline and plan to set reasonable expectations given likely post-event challenges to avoid greater mental health impacts. The Fire Department is working with Pala Rez Radio and PED using NIHB and other funding to expand and complete this strategy by 2021.

Exposures Addressed	       
Impacts Addressed	 

- Conduct outreach to encourage community members to prepare for exposures.** Topics may include home improvements and equipment checks, energy and water conservation, mold remediation, listing family/friends and neighbors who may need assistance, knowing closest evacuation/cooling centers, personal cooling strategies, personal resilience and coping strategies, developing family emergency plans, subscribing to alert systems, and vector-borne disease prevention. PED is working with the Fire Department, Learning Center, Youth Center, and Social Services , departments using NIHB and other funds to expand and complete this strategy by 2021.

Exposures Addressed	       
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Impacts Addressed	 
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3. **Develop or promote water conservation or efficiency policies or programs** to help households, businesses, and agricultural operations replace irrigation systems and install drought resistant landscaping and water recycling systems. PED is working with Housing and was awarded EPA Pollution Prevention funds to expand and complete this strategy by 2022, which will then operate on an ongoing basis.

Exposures Addressed	   
Impacts Addressed	  

New (7)

Near-term: 1-5 years (6)

4. **Develop and implement emergency communication resources.** The Fire and TLE Departments will work with Pala Rez Radio and other departments as well as IHS using a combination of grant and tribal funds to complete this strategy by 2020.

Exposures Addressed	       
Impacts Addressed	 

5. **Develop collaborative referral system** to ensure residents can access available resources and services (e.g. health care, crisis counseling, shelters) during and after climate events. The TLE Department will work with the Pala Rez Radio, PED, and Fire Department and IHS using NIHB and other funds to complete this strategy by 2020.

Exposures Addressed	       
Impacts Addressed	



6. **Develop a Planet Pala** committee to provide input on environmental issues including collaborative climate resilience. This committee can 1) build initiatives to help residents during and after disasters to cope with psychosocial spiritual stresses, reconnect with purpose and hope, and achieve post-traumatic personal growth, and 2) develop preventative initiatives before the next disaster to build human resilience skills (e.g. education) and increase social support networks (e.g. learning groups, community mapping). PED will use NIHB and other funds to complete this strategy by 2020.

Exposures Addressed	       
Impacts Addressed	  

7. **Assess the location and robustness of social networks**, with attention to which community organizations will serve as lead agencies in disseminating risk information and resources to constituents for response and recovery. The Business Office will work with the Fire, Police, GIS and IT departments and identify funds to complete this strategy by 2021.

Exposures Addressed	  
Impacts Addressed	

8. **Set up kiosk/signs for emergency notifications**, fire danger, etc. The Business Office will work with the Pala Casino and PED using tribal funds to complete this strategy by 2022.






Exposures Addressed	   
Impacts Addressed	 

9. **Conduct education to help residents recognize symptoms, avoid risks, and psychologically cope with climate exposure-related illness** (including those related to food/water). Tailor health-related risk messages, materials, and social media/webpages to at-risk individuals with consideration to culture, trusted individuals, and health knowledge. Involve advocacy organizations, service entities and support groups representing at-risk individuals in the design and dissemination of health-related information. PED will work with the Youth, Seniors, and Fire Department using NIHB and other funds to complete this strategy by 2025.

Exposures Addressed	       
Impacts Addressed	

Medium-term: 6-10 years (1)

10. **Mobilize "emergency ambassadors"** and social contacts of vulnerable individuals. The TLE Department will work with the Senior and Fire Departments using tribal funds to complete this strategy by 2029.

Exposures Addressed	   
Impacts Addressed	

Long-term: 10-20 years (0)






Infrastructure Improvement Strategies

This plan includes 12 existing (“Completed,” “In Progress,” “Ongoing,” and “Expand”) or “New” infrastructure improvement strategies as detailed below.



Complete (1)

1. **Install back up power diesel generators** to protect critical facilities (administration building, radio station, lift stations, pumps, etc) from short term power outages. The Utilities Department worked with Pala Resort and Casino using tribal funds to complete this strategy.

Exposures Addressed	  
Impacts Addressed	 








In Progress (1)

2. **Install automated irrigation systems on agricultural lands** that utilize soil moisture monitors that can track when crops need water. Agriculture operators are working with PED and Natural Resources Conservation Service (NRCS) using NRCS, EPA, and Bureau of Reclamation funds to complete this strategy by 2022.

Exposures Addressed	   
Impacts Addressed	 






Ongoing (1)

3. **Install, reengineer or conduct preventative maintenance** on retaining walls, drainage systems, water storage tanks, stormwater retention basins, culverts, storm systems, porous surfaces, etc. The Utilities Department is working with Pala Casino Spa & Resort, PED, and the Tribal Services and Housing Departments using tribal and partner funds to conduct this strategy on an ongoing basis. Recent accomplishments include working with San Diego County to install several culverts along Pala Temecula Road to avoiding flooding which has closed the road in the past and working with Caltrans to widen the old SR-76 bridge. Additional needs are outlined in Pala’s 2016 Hazard Mitigation Plan.

Exposures Addressed	   
Impacts Addressed	  

Expand (6)

4. **Build flood and water intrusion barriers** to protect assets (e.g. fortify SLR floodwall, diking, aquifer recharge). Tribal Services is working with PED, the Business Office, the Housing Department, and the Pala Casino using a combination of grant and tribal funds to complete this strategy by 2022. PED was awarded FEMA funds to plan additional flood mitigation infrastructure improvements by 2021.

Exposures Addressed	  
Impacts Addressed	  

5. **Increase water storage capacity.** PED is working with the Utilities Department using Bureau of Reclamation funds to expand and complete this strategy by 2022. Recent accomplishments include constructing new storage tanks in 2018 and drilling additional wells in 2017.

Exposures Addressed	   
Impacts Addressed	 










6. **Retrofit critical facilities** to reduce resource burden during exposure events (e.g. passive or efficient HVAC and water systems, structural reinforcements, pump updates to avoid backflow). Pala's critical facilities include its wastewater treatment plant, gaming, hospitality, and agricultural operations. A full list of critical facilities is provided in Appendix A. The Utilities Department is working with the GIS and Housing Departments using tribal funds to expand and complete this strategy by 2024.

Exposures Addressed	    
Impacts Addressed	  






7. **Build alternative power supplies** such as building or community-scale battery storage and microgrids incorporating renewables to avoid power outages for critical facilities during exposure-event and related de-energization events. The Business Office is working with PED, Pala Casino, Utilities and Housing to pursue several opportunities to continuously expand this strategy over the next 10 years. Recent accomplishments include solar installations on the Fire Station.

Exposures Addressed	   
Impacts Addressed	 

8. **Increase urban forestry, trees, landscapes and other green infrastructure** to reduce stormwater runoff and increase heat resilience and tree canopy. Expansion and management of Pala’s natural infrastructure such as healthy watersheds and soils can build local resilience by improving soil water-holding capacity and reducing flooding and erosion. PED is working with Tribal Services and Housing using grant funds to complete this strategy on an ongoing basis. Recent accomplishments include: habitat restoration, invasive plant abatement, and soil stabilization projects. PEDs will pursue additional grant funds to expand and complete this strategy.

Exposures Addressed	     
Impacts Addressed	  

9. **Develop and implement policies, plans, and projects to preserve or restore wetlands and floodplain connectivity, re-plant deforested riparian zones, and establish buffers along rivers and streams** to reduce flooding, runoff, and erosion. These measures can also increase habitat diversity and population resilience. PED is working with the Pala Casino and the Tribal Services and Utilities Departments using a combination of grant and tribal funds to continuously expand this strategy over the next 20 years. Recent accomplishments include new storage tanks in 2018.

Exposures Addressed	 
Impacts Addressed	  

New (3)

Near-term: 1-5 years (2)

10. **Conduct stress testing on existing public service systems** (e.g. wastewater treatment, flood barriers, roads, bridges) to assess tolerance to exposure. The Utilities Department will work with the Business Office and Pala Casino using tribal funds to complete this strategy by 2024.




Exposures Addressed	   
Impacts Addressed	 

11. **Build infrastructure needed for aquifer storage and recovery.** The Utilities Department will work with PED using a combination of grant and tribal funds to complete this strategy by 2025.

Exposures Addressed	   
Impacts Addressed	  

Medium-term: 6-10 years (1)

12. **Install fire resistant building and landscape features,** such as fire buffers (defensible space) for homes of vulnerable individuals. The Fire Department will work with the Pala Casino and PED, Tribal Services, and Housing Departments using a combination of grant and tribal funds to complete this strategy by 2029.

Exposures Addressed	
Impacts Addressed	 

Long-term: 10-20 years (0)





Data and Information Technology

This plan includes 8 existing (“Completed,” “In Progress,” “Ongoing,” and “Expand”) or “New” infrastructure improvement strategies as detailed below.



Complete (1)



1. **Install stream monitoring gages** for early flood warning. PED used BIA funds to complete this strategy in 2012.

Exposures Addressed	
Impacts Addressed	  



In Progress (0)

Ongoing (3)

2. **Model agricultural and irrigation water demand.** PED is working with Agricultural Operators and using tribal funds to conduct this strategy on an ongoing basis. Recent accomplishments include an updated analysis on the tribe’s practicably irrigable acreage.

Exposures Addressed	 
Impacts Addressed	  

3. **Monitor at-risk species and recovery efforts** for those species that have or can be hardest hit. PED is working with university researchers and the IT and GIS Departments using partner, USFWS, and tribal funds to conduct this strategy on an ongoing basis. For example, Pala conducted a survey of southwestern willow flycatchers in 2013 and a survey of yellow-billed cuckoos in 2015.

Exposures Addressed	   
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Impacts Addressed	
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- Identify or develop models to understand and forecast future water quality and quantity changes** (turbidity, organics, temperature, pH, flow, water level, pathogens). PED is working with the IT and GIS Departments using tribal, EPA, and BOR funds to conduct this strategy on an ongoing basis. Recent accomplishments include regular Pala Water Consumption and Water Quality Reports over the last decade, as well as regular storm logs.

Exposures Addressed	     
Impacts Addressed	  

Expand (1)

- Identify or implement advanced monitoring/surveillance equipment and processes** to allow for real time climate change and exposure detection and alerts (e.g. Airnow.gov, US Drought Monitor, water/food pathogens, ice changes, extreme heat, vector changes). PED is working with the IT and GIS Departments using a combination of grant and tribal funds to complete this strategy by 2022. Recent accomplishments include regular, on-site water and air quality monitoring. PED will pursue additional grant funds to expand and complete this strategy.

Exposures Addressed	       
Impacts Addressed	  

New (3)

Near-term: 1-5 years (3)

- Work with local epidemiology departments or Indian health consortia to track environmental health indicators.** PED will work with the IT and GIS Departments, IHS and the San Diego County Department of Public Health using a combination of partner, tribal, and grant funds to complete this strategy by 2024.

Exposures Addressed	       
Impacts Addressed	

- Develop natural environment surveillance systems** for pests, pathogens and invasive species to rapidly detect and respond to outbreaks. PED will work UCR using partner, grant, and tribal funds to complete this strategy by 2025.

Exposures Addressed	    
Impacts Addressed	

3. **Implement surveillance of disease in subsistence or harvest resources.** PED will work with the IT and GIS Departments using tribal funds to complete this strategy on an ongoing basis.

Exposures Addressed	    
Impacts Addressed	

Medium-term: 6-10 years (0)

Long-term: 10-20 years (0)

Operations Management

This plan includes 12 existing (“Completed,” “In Progress,” “Ongoing,” and “Expand”) or “New” operations management strategies as detailed below.



Completed (1)

- Establish disaster relocation centers and protocols.** Pala’s 2016 Hazard Mitigation Plan names the Pala Administration Building, Resort and Casino, Youth Center, and Fitness Center as a disaster relocation centers, and indicates that Tribal Law Enforcement will be instrumental in managing an evacuation.

Exposures Addressed	 
Impacts Addressed	

In Progress (1)

- Promote workforce training and development programs** that help businesses become more resilient to climate change and disasters and accelerate the creation of green jobs in fields such as brownfield cleanup and redevelopment, urban agriculture, installation and maintenance of green energy and technologies, energy efficiency weatherization and retrofitting, planting and maintenance of urban forestry and parks, and habitat restoration. PED is working with Human Resources and using tribal funds to conduct this strategy on an ongoing basis. Recent accomplishments include creating jobs with the local Urban Corps, River Partners, and other partners on invasive plant management and habitat restoration.

Exposures Addressed	       
Impacts Addressed	  

Ongoing (4)

- Pursue funding opportunities to conduct additional adaptation planning and strategy implementation**
PED and its consultants conduct this strategy on an ongoing basis. Recent accomplishments include successfully









awarded adaptation grant proposals in 2018 to the Bureau of Indian Affairs and the National Indian Health Board. Grant proposals for transportation resilience, flood mitigation and hazard mitigation planning were awarded from FEMA and Caltrans in 2019. Proposals to the BIA are pending.

Exposures Addressed	       
Impacts Addressed	  




4. **Clear natural stormwater channels of brush and debris.** The Tribal Services Department is using tribal funds to conduct this strategy on an ongoing basis. Future work is being done to develop a permitting agreement with the Army Corps of Engineers to allow Pala to conduct hazard mitigation and flood reduction work within Waters of the United States. Recent accomplishments include advanced response to protect housing developments from projected flooding events.

Exposures Addressed	   
Impacts Addressed	  

5. **Complete habitat restoration projects and removal of invasive species,** with an emphasis on ecosystem function and threatened and culturally important species. Utilize traditional knowledges where possible. PED is using a combination of grant funds to conduct this strategy on an ongoing basis. Recent accomplishments include invasive species removal within the bed and banks of the San Luis Rey River.

Exposures Addressed	       
Impacts Addressed	

6. **Conduct wildfire management strategies** in adjacent forest lands such as prescribed burns, interface clearance, fire safe landscaping, forest health treatment, fire safe building standards, and fuel breaks and thinning to reduce wildfire risk. Tribes can pursue management initiatives through the Tribal Forest Protection Act. This action gives tribes the opportunity to initiate projects on Federal lands adjacent to tribal trust lands for the purpose of managing threats to forest resources such as wildfire, pests, erosion or disease. The Fire Department is working with State CalFire and regional fire agencies to conduct this strategy on an ongoing basis.

Exposures Addressed	    
Impacts Addressed	  

Expand (2)

7. **Establish cooling centers** (designated, accessible, and air-conditioned buildings) and transportation to cooling centers to reduce heat related illness and death. The Fire Department is working with PED and the HR Department using tribal funds to expand and complete this strategy by 2022.

Exposures Addressed	
Impacts Addressed	

8. **Implement pilot program to harvest rainwater.** PED is working with Housing and the Pala Seniors Department using EPA funds to expand and complete this strategy by 2023.

Exposures Addressed	    
Impacts Addressed	 

New (4)

Near-term: 1-5 years (2)

9. **Make psychological first aid resources and services available** to support people suffering mental health consequences due to the emergencies and long term impacts caused by climate change, such as those outlined in the "Skills for Psychological Recovery" (SPR) guidance. Pala Social Services will work with PED using a combination of grand and tribal funds to complete this strategy by 2021.

Exposures Addressed	       
Impacts Addressed	

10. **Develop trainings for key staff to help community members increase local human emotional and mental resilience** before, during, and after climate impacts. Pala Social Services will work with the Environmental and HR Departments using tribal funds to complete this strategy by 2021.



Exposures Addressed	       
Impacts Addressed	

Medium-term: 6-10 years (3)

11. **Diversify options for water supply and expand current sources.** PED will work the Utilities Department using a combination of grants and tribal funds to complete this strategy by 2029.

Exposures Addressed	       
Impacts Addressed	 

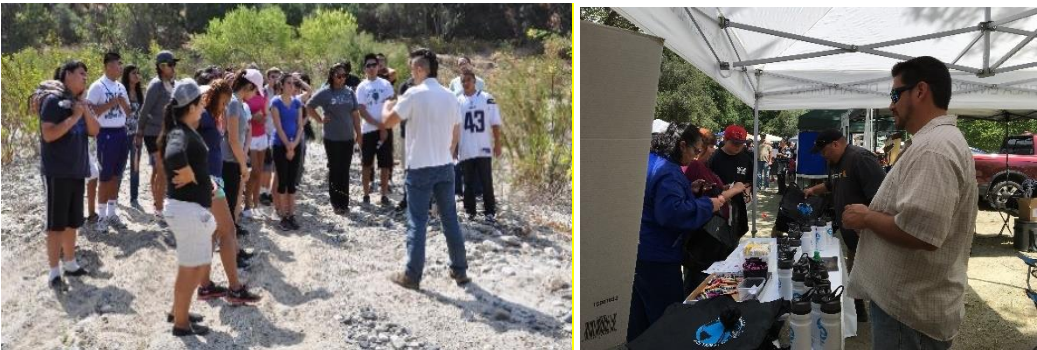
12. **Develop trainings to help nurses, coaches, etc. recognize exposures and related illness and mental health impacts.** The HR Department will work IHS to complete this strategy by 2029.

Exposures Addressed	       
Impacts Addressed	

Long-term: 10-20 years (0)











Cross-Agency Collaborations

This plan includes 11 existing (“Completed,” “In Progress,” “Ongoing,” and “Expand”) or “New” cross-agency collaboration strategies as detailed below.





Completed (2)

- 1. **Form intertribal emergency consortium** to assist each other during disasters. The Fire Department used tribal funds to complete this strategy in 2015.










Exposures Addressed	       
Impacts Addressed	  

- 2. **Establish cooperative agreements for fire management and response** with other local entities. The Fire Department has maintained cooperative agreements for several years.

Exposures Addressed	    
Impacts Addressed	  








In Progress (1)

- 13. **Work with regional utility to bury utility lines or replace wooden utility poles with fire resistant poles.**
The Business Office is working with the Utilities Department and SDG&E to complete this strategy by 2023.

Exposures Addressed	     
Impacts Addressed	  

Ongoing (7)

14. **Get assistance from the Bureau of Indian Affairs Branch of Wildland Fire Management** which works with Tribal Nations to develop forest management plans that include wildfire mitigation efforts and wildland fire management. The Fire Department is using BIA funds to conduct this strategy on an ongoing basis.

Exposures Addressed	   
Impacts Addressed	  

15. **Seek assistance, resources, grants, and loans from federal agencies for disaster and pre-disaster planning, emergency management, distressed communities, etc.** to protect critical facilities and assets. PED is using a combination of grant and tribal funds to conduct this strategy on an ongoing basis. Recent accomplishments include grant awards to FEMA for disaster and hazard planning and flood mitigation.

Exposures Addressed	       
Impacts Addressed	  

16. **Collaborate with neighboring tribes to enhance training and capacity of emergency tribal response teams.** The Fire Department is using tribal funds to conduct this strategy on an ongoing basis.

Exposures Addressed	     
Impacts Addressed	  

17. **Participate in regional fire readiness planning with other local agencies.** The Fire Department is working with CalFire and regional fire agencies to conduct this strategy on an ongoing basis.

Exposures Addressed	   
Impacts Addressed	  

18. **Participate in regional adaptation or resiliency consortia** to access and share information and best practices. PED is using NIHB and other grant and tribal funds to conduct this strategy on an ongoing basis. Recent accomplishments include the formation of a regional intertribal working group which will focus on climate change adaptation and resilience, amongst other environmental topics.

Exposures Addressed	       
Impacts Addressed	  

19. **Partner with local SGMA group on drought adaptations & groundwater management planning/adaptation strategies.** PED is working with Pala Legal to conduct this strategy on an ongoing basis.

Exposures Addressed	   
Impacts Addressed	  

20. **Participate in relevant land use decision making in the region.** PED and the Tribal Administration is working with all Departments using tribal funds to conduct this strategy on an ongoing basis. Recent accomplishments include the development of a draft Integrated Resource Management Plan.



Exposures Addressed	       
Impacts Addressed	  

Expand (0)

New (1)

Near-term: 1-5 years (2)

21. **Coordinate with the local chapter of American Red Cross during emergency planning and response efforts.** The Fire Department will work with the American Red Cross to complete this strategy by 2021.

Exposures Addressed	      
Impacts Addressed	

Medium-term: 6-10 years (0)

Long-term: 10-20 years (0)

Adaptation Action Plan

This section discusses how the adaptation strategies will be implemented and monitored over time. Details on each strategy are provided in the previous section.

Implementing the Adaptation Plan

Pala's Adaptation Plan will be maintained by the Pala Adaptation Planning Team led by the Pala Environmental Department and comprised of representatives of all relevant tribal departments, including but not limited to the Fire, Utilities, Housing, Business, Legal, and Tribal Services Departments. The following table will serve as a high-level implementation plan to guide the responsibilities of Pala departments with respect to climate change adaptation. The table is sorted by status (excluding completed strategies). Responsible departments shall seek external resources and partnerships to the extent necessary to complete the strategy within the proposed timeframe. This plan is dynamic and should be revisited regularly.

Adaptation Strategy	Adaptation Strategy Type						Status	Timeframe (Years)							Resp Dep.
	Policy, Planning, Land Use	Community Eng., Ed., and Notification	Infrastructure Improvements	Data Information Technology	Operations and Management	Cross Agency Collaborations		1	2	3	4	5	6 to 10	11 to 20	
Install automated irrigation systems on agricultural lands			x				2. IN PROGRESS	x	x	x					Ag Operators
Work with regional utility to bury utility lines or replace wooden utility poles with fire resistant poles						x	2. IN PROGRESS	x	x	x	x				Business Office
Establish or update fire management plans	x						2. IN PROGRESS	x	x						Fire
Map drainage routes to identify flood mitigation routes	x						2. IN PROGRESS	x	x						GIS
Assert or renegotiate water-related rights	x						2. IN PROGRESS	x	x	x	x	x	x	x	Pala Legal
Mapping, conservation and protection of wildlife connectivity and movement corridors	x						2. IN PROGRESS	x	x	x					PED
Develop an Integrated Resource Management Plan	x						2. IN PROGRESS	x	x						PED
Update integrated pest management plan	x						2. IN PROGRESS	x							PED
Complete Tribal Habitat Conservation Plan	x						2. IN PROGRESS	x	x						PED
Develop a pollution prevention plan	x						2. IN PROGRESS	x	x						PED
Install or upgrade sewage system	x						2. IN PROGRESS			x	x	x	x		Utilities
Promote workforce training and development programs that help businesses become more resilient to climate change and disasters and accelerate the creation of green jobs in fields					x		2. IN PROGRESS	x	x	x	x	x	x	x	PED
Participate in relevant land use decision making in the region						x	3. ONGOING	x	x	x	x	x	x	x	PED/Tribal Admin
Conduct wildfire management strategies			x				3. ONGOING	x	x	x	x	x	x	x	Fire

Get assistance from the Bureau of Indian Affairs Branch of Wildland Fire Management						x	3. ONGOING	x	x	x	x	x	x	x	Fire
Collaborate with neighboring tribes to enhance training and capacity of emergency tribal response teams						x	3. ONGOING	x	x	x	x	x	x	x	Fire
Participate in regional fire readiness planning with other local agencies						x	3. ONGOING	x	x	x	x	x	x	x	Fire
Model agricultural and irrigation water demand				x			3. ONGOING	x	x	x	x	x	x	x	PED
Pursue funding opportunities to conduct additional adaptation planning and strategy implementation					x		3. ONGOING	x	x	x	x	x	x	x	PED
Monitor at-risk species and recovery efforts				x			3. ONGOING	x	x	x	x	x	x	x	PED
Seek assistance, resources, grants and loans from federal agencies for disaster planning, emergency management, distressed communities, etc						x	3. ONGOING	x	x	x	x	x	x	x	PED
Participate in regional adaptation or resiliency consortia						x	3. ONGOING	x	x	x	x	x	x	x	PED
Partner with local SGMA group on drought adaptations & groundwater management planning/adaptation strategies						x	3. ONGOING	x	x	x	x	x	x	x	PED
Complete habitat restoration projects and removal of invasive species					x		3. ONGOING	x	x	x	x	x	x	x	PED
Identify or develop models to understand potential water quality and quantity changes				x			3. ONGOING	x	x	x	x	x	x	x	PED
Develop or update Hazard Mitigation Plan to include climate change risks and projections	x						3. ONGOING	x		x		x	x	x	PED
Update and implement non-point source management plans	x						3. ONGOING	x	x	x	x	x	x	x	PED
Clear natural stormwater channels of brush and debris					x		3. ONGOING	x	x	x	x	x	x	x	Tribal Services

Develop or promote weatherization and energy efficiency improvement programs	x						3. ONGOING	x	x	x	x	x	x	x	PED
Install, reengineer or conduct preventative maintenance			x				3. ONGOING	x	x	x	x	x	x	x	Utilities
Develop a tribal transportation safety plan	x						4. EXPAND	x	x	x					Business Office
Update air quality improvement plans	x						4. EXPAND		x	x					PED
Build alternative power supplies			x				4. EXPAND	x	x	x	x	x	x		Business Office
Establish cooling centers					x		4. EXPAND	x	x						Fire
Provide early, real-time warnings and clear emergency notifications before and during exposure events		x					4. EXPAND	x	x						Fire
Identify or implement advanced monitoring/surveillance equipment and processes				x			4. EXPAND	x	x	x					PED
Implement pilot program to harvest rainwater					x		4. EXPAND	x	x	x	x				PED
Develop and implement policies, plans, and projects to preserve or restore wetlands and establish vegetated buffers along rivers and streams			x				4. EXPAND	x	x	x	x	x	x	x	PED
Increase water storage capacity			x				4. EXPAND	x	x	x					PED
Increase urban forestry, trees, landscapes and other green infrastructure			x				4. EXPAND		x	x	x	x	x	x	PED
Conduct outreach to encourage community members to prepare for exposure		x					4. EXPAND	x	x						PED
Develop or promote water conservation or efficiency policies or programs		x					4. EXPAND	x	x	x	x	x	x	x	PED
Build flood and water intrusion barriers to protect assets			x				4. EXPAND		x						Tribal Services
Retrofit critical facilities			x				4. EXPAND				x	x	x		Utilities
Assess the location and robustness of social networks		x					5. NEW		x						Business Office
Set up kiosk/signs for emergency notifications		x					5. NEW			x					Business Office

Develop a Planet Pala committee		x					5. NEW	x							PED
Install fire resistant building and landscape features			x				5. NEW				x	x	x		Fire
Coordinate with the local chapter of American Red Cross during emergency planning and response efforts						x	5. NEW	x	x						Fire
Seek FEMA assistance to ensure community has access to basic supplies like food and water during and after emergency						x	5. NEW	x	x	x	x	x	x	x	Fire
Develop and implement emergency communication resources		x					5. NEW	x							Fire
Develop trainings to help nurses, coaches, etc recognize exposures and related illness and mental health impacts					x		5. NEW						x		HR
Develop trainings for key staff to help community members increase local human emotional and mental resilience					x		5. NEW		x						Pala Soc
Make psychological first aid resources and services available					x		5. NEW	x	x						Pala Soc
Develop or update capital improvement plans	x						5. NEW		x	x					EC
Establish, update and enforce building codes	x						5. NEW	x	x	x					EC
Work with local epidemiology departments or Indian health consortia to track environmental health indicators				x			5. NEW	x	x	x	x	x			PED
Develop an emergency, disaster response and/or health management plan	x						5. NEW			x	x				Fire
Implement surveillance of disease in subsistence or harvest resources				x			5. NEW	x	x	x	x	x	x	x	PED
Develop natural environment surveillance systems				x			5. NEW				x	x	x		PED
Diversify options for water supply and expand current sources					x		5. NEW						x		PED

Integrate climate considerations into community health assessments	x						5. NEW		x	x					PED
Develop a water resources management plan	x						5. NEW		x	x					PED
Develop plan and partnerships to safeguard cultural resources	x						5. NEW		x	x					THPO
Develop a health safety plan and map	x						5. NEW		x	x					TLE
Conduct education to help residents recognize symptoms, avoid risks, and psychologically cope with climate exposure-related illness		x					5. NEW	x	x	x	x	x			PED
Mobilize "emergency ambassadors"		x					5. NEW						x		TLE
Develop collaborative referral system		x					5. NEW	x							TLE
Conduct stress testing on existing public service systems			x				5. NEW			x	x				Utilities
Build infrastructure needed for aquifer storage and recovery			x				5. NEW			x	x	x			Utilities

Figure 10: Adaptation Action Plan Table

Monitoring, Evaluating and Updating the Adaptation Plan

The Pala Adaptation Plan shall be evaluated annually with the participation of the Pala Adaptation Planning Team, which will measure and monitor progress on all adaptation strategies outlined in Figure 10 against the proposed timeline. The Planning Team will also measure and monitor impact trends to evaluate the effectiveness of the strategies in reducing threats. The Planning Team will use Impact Indicators and data sources outlined in the Pala Vulnerability Worksheets, which were provided to the Pala Environmental Department, including but not limited to those outlined in Appendix C. These worksheets can be used to track exposures and impacts on an ongoing basis. The Pala Adaptation Planning team will share progress annually with the Pala community.

Pala shall update this Adaptation Plan every five years to account for changing climate conditions, new opportunities, and adaptation successes.

Conclusion

This report presents the purpose, process, and results of a climate change adaptation plan for the Pala Band of Mission Indians. This planning process elicited 76 adaptation strategies, 37 of which are already complete, in progress or ongoing, that can help Pala prepare for and address the significant climate change threats outlined in its Vulnerability Assessment. Adaptation strategies selected for this plan range widely from community engagement, to better data monitoring, to major infrastructural improvements, which entail varying levels of resource investment.

An adaptation plan is the second major step in a community's climate change adaptation strategy. However, it only signals the beginning of the tribe's effort to adapt to climate change. The next major step involves implementing the strategies outlined in this plan. On an ongoing and regular basis, Pala will track and share its adaptation progress and update this plan.

It is recommended that further adaptation activities continue to involve community stakeholders with different perspectives because collaboration can substantially increase the implementation viability of adaptation strategies.

Acknowledgements

Thank you to the Pala staff, tribal members, and external advisers that contributed to this plan and to the Pala Band of Mission Indians Executive Committee for their continued leadership and stewardship of Pala's valued assets and resources. Special thanks to the National Indian Health Board for the Climate Ready Tribes Grant award that made completion of the plan possible.

Appendix A – Critical Facilities

Table 2 Pala
Reservation Critical
Facilities ³

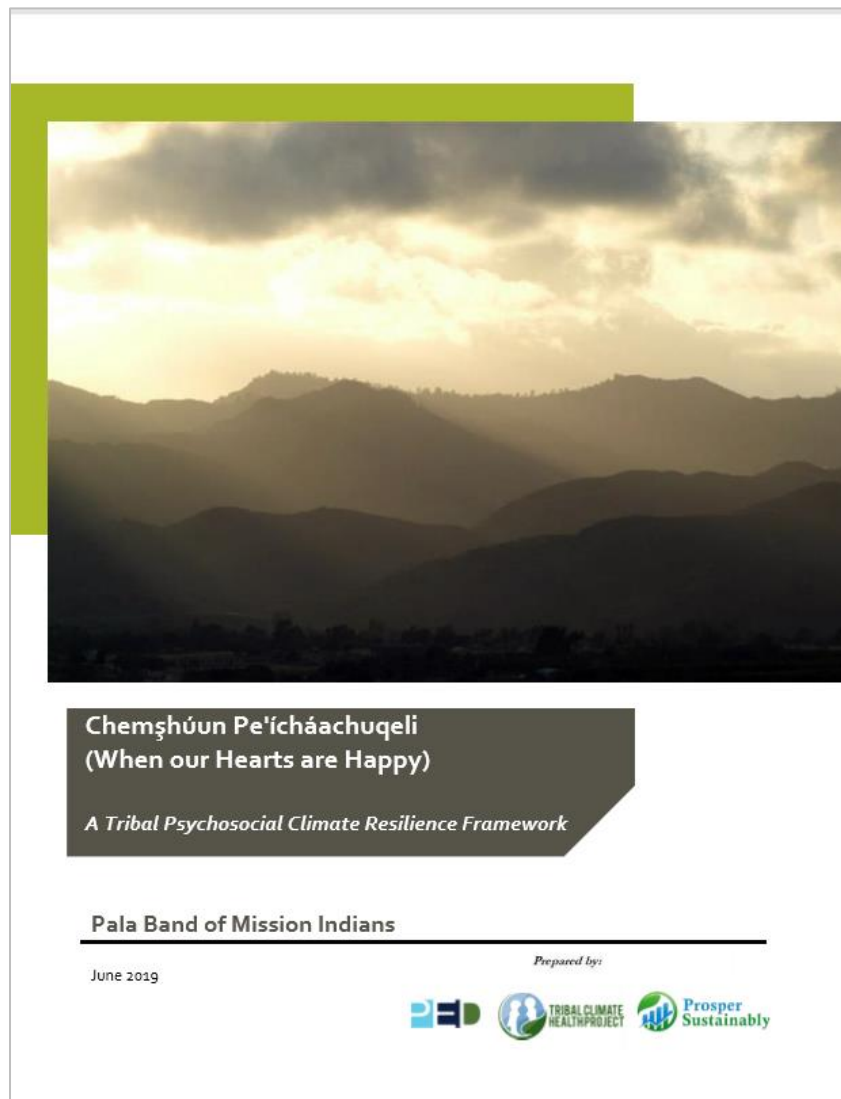
Name	Building Number	Construction Type	Justification
Pala Casino	530	Concrete/ Steel	The Pala Casino Spa & Resort is a complex comprised of several buildings. The Casino is the major economic asset providing revenue and employment to the tribe. The facility also serves as a shelter.
Casino Hotel	578	Concrete/ Steel	Part of the Casino Complex; the facility also serves as a shelter in disaster situations.
Pala Casino Warehouse	177	Metal Outbuilding	Storage area for Casino supplies.
Casino Poolside Cafe	527	Concrete/ Steel	Part of the Casino Complex

Name	Building Number	Construction Type	Justification
Casino Spa	529	Concrete/ Steel	Part of the Casino Complex
Casino Parking (1)	576	Concrete/ Steel	Part of the Casino Complex; this structure ensures parking for visitors, employees, and potential evacuees.
Casino Parking (2)	573	Concrete/ Steel	Part of the Casino Complex; this structure ensures parking for visitors, employees, and potential evacuees.
Casino Hotel Parking	577	Concrete/ Steel	Part of the Casino Complex; this structure ensures parking for visitors, employees, and potential evacuees.
Casino Well #1 Pump House	667	Concrete/ Steel	Part of Casino Well #1 facility; this structure ensures parking for visitors, employees, and potential evacuees.
Casino #2 Well Pump House	654	Concrete/ Steel	Part of Casino Well #2 facility
Convent	252	Wood Frame/ Stucco	Part of the Pala Mission facility
Fleet Maintenance	542	Metal Outbuilding	Part of the Pala Tribal Yard
Gas Station	566	Wood Frame/ Stucco	Fuel and groceries owned and operated by the Casino.
Highway Well Pump House	655	Concrete/ Steel	Part of the Highway Well facility
KOPA Radio Station	499	Aluminum/ Stucco	Provides radio communication during disaster and non-disaster situations (new)
Lilac Well Pump House	653	Concrete/ Steel	Part of the Lilac Wells #1 and #2 facility
Maintenance Garage	543	Metal Outbuilding	Part of the Pala Tribal Yard
Maintenance Office	544	Metal Outbuilding	Part of the Pala Tribal Yard
Maintenance Storage	500	Metal Outbuilding	Part of the Pala Tribal Yard
Mission	539	Adobe	Cultural Asset
Oaks Booster Station	652	Concrete/ Steel	Part of the Oaks Well facility
Oaks Well Pump House	699	Concrete/ Steel	Part of the Oaks Well facility
Pala Administration Building	245	Concrete/ Steel	Critical records and administration of tribal services and activities

Name	Building Number	Construction Type	Justification
Pala Child Care	261	Wood Frame/ Stucco	Daycare center which hosts children during business hours
Pala Fire Station	464	ICF/Steel	Critical to training for emergency response, firefighting, and medical services functions.
Fire Station (Training Burn Tower)		Unknown (not defined in data)	Critical emergency response function for firefighting and medical services
Pala Fitness Center	246	Concrete/ Steel	Fitness facility with available memberships for the community
Pala Learning Center	549	Wood Frame/ Stucco	Library, computer lab, educational programs etc.
Pala Mini-Mart	567	Wood Frame/ Stucco	Community asset for food as well as a commercial and economic asset for the Tribe
Pala Post Office	270	Mobile	Provides a mechanism of communications
Pala Tribal Law Enforcement Office	95	Wood Frame/ Stucco	Provides safety to the reservation
Pala Training Center	463	Aluminum/ Stucco	Training facility for first responders
Pala Transfer Station	165	Metal Out Building	Waste removal and recycling center
Pala Tribal Services	545	Metal Out Building	Part of the Pala Tribal Yard
Pala Wastewater Treatment Plant	144	Concrete/ Steel	Water and sewer treatment plant
Pala Youth Center	265	Wood Frame/ Stucco	Community Center / Youth activities
Riverbed Well Pump House	668	Concrete/ Steel	Part of the Riverbed Well facility
San Juan Diego Center	536	Concrete/ Steel	Religious hall (cultural assets)
Utilities Garage	540	Metal Out Building	Houses equipment and vehicles
Utilities Office	541	Metal Out Building	Office for Pala Utilities Department and other utility staff
Utilities Storage	546	Metal Out Building	Houses equipment for utility maintenance
Vista Well Pump House	666	Concrete/ Steel	Part of the Vista Well facility
Vivian Banks School (1)	251	Wood Frame/Stucco	Charter school that hosts children (privately owned). The school has 2 structures
Vivian Banks School (2)	593	Wood Frame/Stucco	Charter school that hosts children (privately owned). The school has 2 structures

Appendix B – Pala’s Psychosocial Climate Resilience Framework

Pala published a separate report entitled “Chemshúun Pe’icháachuqeli (When our Hearts are Happy): A Tribal Psychosocial Climate Resilience Framework,” which outlines a framework and detailed information supporting the psychosocial climate resilience strategies included in this Adaptation Plan. This report is to be incorporated by reference into this Adaptation Plan and can be found at http://tribalclimatehealth.org/wp-content/uploads/2019/07/Psychosocial-Climate-Resilience-Framework_Pala-Final.pdf.



Appendix C – Key Impact Indicators for Ongoing Evaluation of Adaptation Strategies

The following is a non-exhaustive list of measurable indicators, organized by impact area, that can provide evidence of how well Pala is adapting to climate change over time. Data sources may be qualitative or quantitative and should be as location-specific as possible.

Health and Social Environment

- Emergency department visits due to climate events (e.g. heat, wildfire, storms, flooding)
- Emergency department visits for respiratory illness
- Hospitalizations due to climate events
- Hospitalizations for carbon monoxide poisoning
- Hospitalizations for gastrointestinal illnesses
- Deaths due to climate events
- Cases of West Nile
- Cases of Lyme disease
- Cases of Zika
- Cultural functions or events disrupted due to climate events
- School days disrupted due to climate events
- Business closure days due to climate events
- Residents evacuated or dislocated due to climate events

Natural Environment

- Groundwater levels
- Streamflow rates
- Production rates of important threatened wildlife species
- Production rates important threatened plant and tree species
- Production rates of invasive species
- Riparian habitat levels
- Native grassland habitat levels

Built Environment

- Domestic/well water levels
- Agricultural crop productivity
- Sacred or historical buildings damaged by climate events
- Houses damaged by climate events
- Critical facilities damaged by climate events
- Road closures due to climate events
- Communication infrastructure disruptions due to climate events
- Wastewater infrastructure disruptions due to climate events
- Power outages due to climate events
- Cost of infrastructure repairs due to climate events