



## Lake, Mendocino, and Sonoma County Tribal Listening Session: Summary Indicators of Climate Change in California

May 18 and 19, 2021

### Participating Tribes:

1. Big Valley Band of Pomo Indians of the Big Valley Rancheria, California
2. Coyote Valley Band of Pomo Indians
3. Elem Indian Colony
4. Federated Indians of the Graton Rancheria
5. Kashia Band of Pomo Indians of the Stewarts Point Rancheria
6. Middletown Rancheria of Pomo Indians of California
7. Robinson Rancheria Pomo Indians of California
8. Round Valley Indian Tribes (survey only)
9. Scotts Valley Band of Pomo Indians of California
10. Sherwood Valley Band of Pomo Indians

A list of all participants is included in Appendix A.

*"We live off the land. It is the land that is being impacted by climate change. Unless we do something drastically, quickly, the land will not be salvageable. We are tied to the land. If the land goes away, we go away as a people."*

*~ Sally (hiin 'ónni) Peterson, Tribal Elder, Middletown Rancheria of Pomo Indians of California*

### Background

The Big Valley Band of Pomo Indians, the Middletown Rancheria of Pomo Indians of California, and the CalEPA Office of Environmental Health Hazard Assessment (OEHHA) jointly convened a listening session with Lake, Sonoma, and Mendocino County Tribes. The listening sessions had the following objectives:

1. Listen to perspectives from tribal communities in these counties on climate change impacts they are experiencing and identify common themes.

2. Collect tribal input to help the OEHHA *Indicators of Climate Change in California* report raise awareness about tribal-specific climate change impacts and increase recognition of the value of tribal knowledge in reporting climate change impacts.

The listening sessions were held virtually (via Zoom). Prior to the listening session, participants were invited to complete a survey to help OEHHA understand the issues the Lake, Sonoma, and Mendocino area Tribes are facing. Two survey responses were received prior to the session; one response was received after. The survey was available for four weeks after the listening session. General themes from the questionnaire are provided in Appendix B.

OEHHA respects the right of tribal nations to govern the collection, ownership, and application of their data. Participating tribes have reviewed and approved the information shared in this summary. Where permission was not granted, no information is shared.

### Welcome, Introductions, and Indicators of Climate Change Report Presentation

Michael Shaver, Environmental Director of the Middletown Rancheria of Pomo Indians of California, and Sarah Ryan, Deputy Tribal Administrator and Environmental Director for the Big Valley Band of Pomo Indians, welcomed participants to the listening session. Lauren Zeise, Director of OEHHA, welcomed the Tribes, and thanked the Big Valley and Middletown Tribes for organizing the listening sessions. Malinda Dumisani, Special Assistant for Environmental Justice and Tribal Affairs and Environmental Justice Small Grants Program Manager for CalEPA, thanked the Tribes for participating in the listening sessions and expressed that she was looking forward to hearing from tribes. Carmen Milanes of OEHHA expressed her gratitude for the Tribal Nations being willing to share information and improve our knowledge of the impacts of climate change. Laurie Monserrat of OEHHA gave a brief overview of the Climate Change Indicators report and OEHHA's work to include tribal perspectives in the report.

The Lake, Sonoma and Mendocino area Tribes are working to monitor drinking and surface waters, mitigate wildfire, control erosion, monitor fish spawning and conduct ocean monitoring along with many other efforts to protect the environment. These efforts benefit local, state, and federal government properties as well as the general public.

### Introductory Comments from Each Tribe: Background and Impacts

All participating tribes were invited to share introductory comments, which served as the starting point for further discussions. The introductory comments included background information and descriptions of some important climate change impacts. These introductions are summarized below.

#### Middletown Rancheria of Pomo Indians of California

Sally Peterson, Tribal Elder, Luya Rivera, Community Planning Assistant and Michael Shaver, Environmental Director

[Slides were presented by the Tribal representatives and are included below.]

The Middletown Rancheria of Pomo Indians of California is a federally recognized Tribe, established with the purchase of 108 acres of land, initiated by members of the small Tribe in July of 1910. The Tribe was appropriated by the Congressional Act for California Landless Indians in 1906. The original ancestors of the Middletown Rancheria, also known as Lake Miwok Indians, were forced into homelessness during the 1800's, as newcomers settled in the area of Middletown and Lake County. With the establishment of

the Middletown Rancheria at the turn of the century, members of other Tribal groups, such as Pomo, Wappo and Wintun, joined with the People of the Tribe, either through marriage or customary adoption.

The Middletown Rancheria is located in Lake County California, bordered on the south by Mt. St Helena, with Napa County Howell Mountain to the East, Sonoma and Mendocino Counties to the west, and the Mayacamas Mountains and Clear Lake to the North. The Tribe acknowledges all other Tribal communities in the area and has shared cultural resources and practices throughout time with established transportation routes within the four counties.

Figure 1. Map of Middletown Rancheria (left), view of Mayacamas Mountains and vineyards (top right), wildfire smoke impacts in Middletown (bottom right)

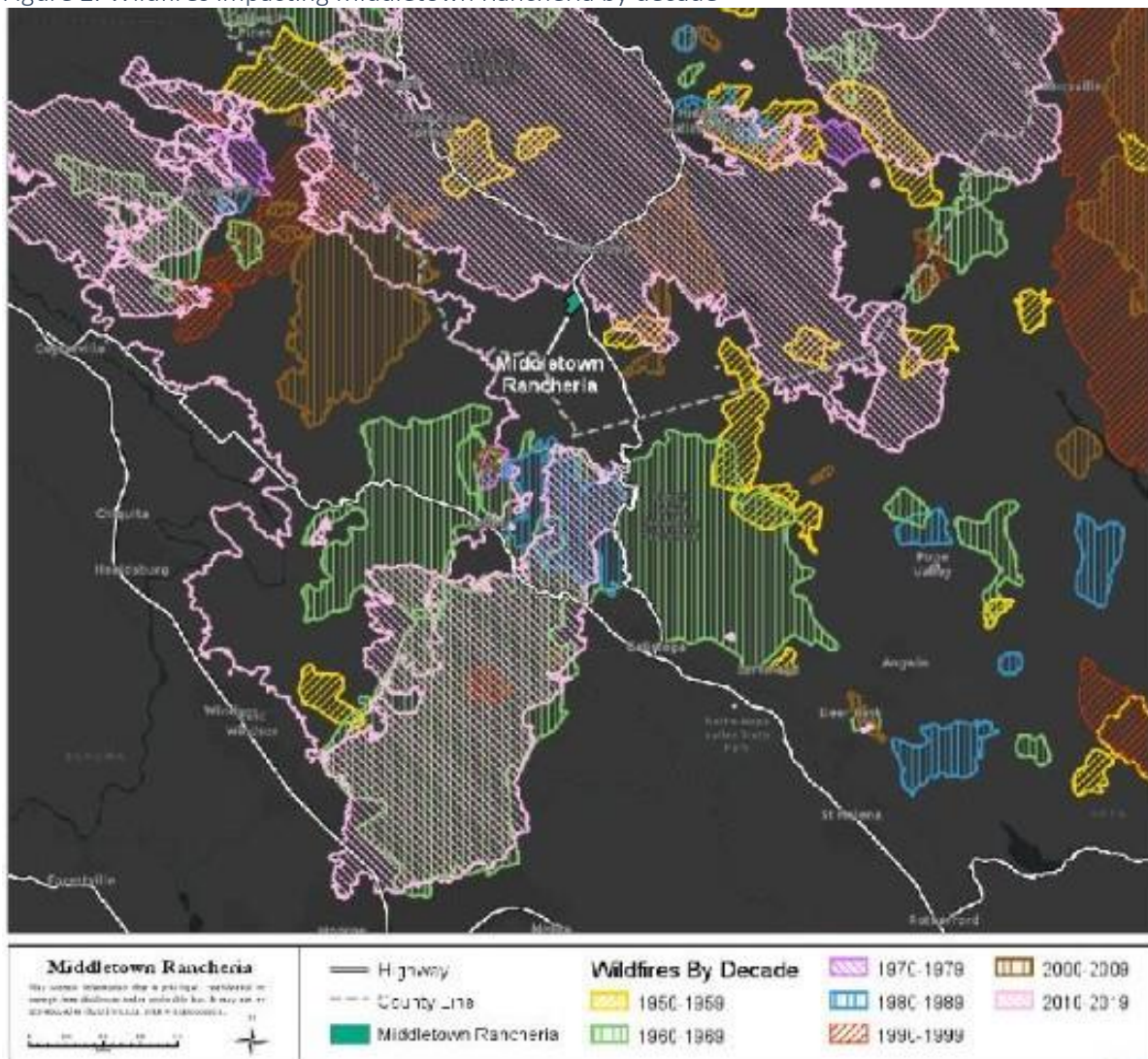


The Rancheria has three main vegetation types: Douglas fir/Ponderosa Pine, Montane Hardwood-Conifer, and Montane (mixed) Hardwood.

The Tribe has been impacted by climate change through wildfires, drought, increased water temperatures, and invasive species. Climate change has brought new challenges to the Tribe and created a greater need for planning and adaptation.



Figure 2. Wildfires impacting Middletown Rancheria by decade



- Increased wildfire frequency and intensity
  - In 2015 the Valley Fire burned through timber, grass, and chaparral, burning over 20,000 acres within a 24-hr period. It devastated large areas of south Lake County, including the village of Middletown, and portions of the Hidden Valley community. However, the Rancheria survived untouched because the Tribe had completed fuels reduction work and established fire safe zones adjacent to the housing community; this enabled the responding agencies to effectively fight the wildfire.
  - Most recently the LNU Lightning Complex Fire in August of 2020 burned just east of the Tribal Lands, causing destruction to the natural environmental landscape.
  - Certain vegetation types have become more flammable due to drought, contributing to the frequency, duration, and most importantly the harsh impact of wildfires on the communities and environment (figure 2).
  - Large numbers of homes have been destroyed by local wildfires. Tribal members have had to evacuate residences for extended periods of time. This has resulted in local housing shortages and temporary job loss.



- The smoke from wildfires threatens the health and wellbeing of community members, often making it difficult for individuals to partake in daily activities, including cultural practices.
- Wildfires impact the native landscape with the large-scale destruction of forest and grassland habitats and the degradation of soils from extreme fire temperatures. The regional disruptions of ecosystems result in a loss of native biodiversity in the watersheds. Ash and other contaminants make their way into waterways, affecting the health of waterbodies and Tribal members' ability to engage in cultural practices.
- Wildlife are killed due to the extreme speed of fire advance; surviving wildlife are displaced to residential areas and have difficulty foraging in damaged and non-native plant communities.

Figure 3. Drought impacts. Dead and dying trees at Middletown Rancheria



- More frequent and extreme drought
  - Water stress has led to declining tree health and a significant increase in dead and dying trees on the Middletown Rancheria (figure 3).
    - The overall weakness and decline in tree health leaves native trees more susceptible to pests and fungus infestations.
    - The loss of forest trees has a tremendous effect on the ecosystem; it threatens the success and survival of the local ecology that depends on the trees.
    - Currently on the Rancheria, there is a retreat and loss of habitat dominated by Ponderosa Pine and Douglas Fir trees.
  - The stream corridors and lake marsh areas are narrowing and losing native species diversity and quantity due to shorter wet seasons and reduced water levels. The native plants in the streambed of the St. Helena Creek which passes through the Tribe's land are stressed and are being displaced by more drought tolerant nonnative species (figure 4). This loss of native plants in-stream habitats and lake shorelines results in reduced traditional food and basketry gathering areas available to Tribal members.

- Groundwater recharge is reduced or not occurring during annual wet cycles. Tribal drinking and agricultural water wells have reduced pumping rates, and wells have stopped pumping during dry seasons.
- The construction of new homes needed for Tribal residences has been delayed or limited due to insufficient supplies for drinking water and for fire suppression.

Figure 4. Streambed narrowed by drought and impacted by non-native species



- Invasive species
  - The loss of native habitat due to development and land conversion is now compounded by increased wildfire and drought, favoring invasive plants, which threaten and displace native species. Native species maintain critical roles and relationships within the local ecosystem.
  - The main invasive species observed on the Rancheria is a type of plant, called French broom (figure 4, above). The French broom has taken over areas where native biodiversity once flourished. These dense areas of broom increase the fire temperature to levels that destroy the soils; the high flammability increases risk to life and safety of the community during wildfires.
  - Pest species have moved north with warmer air temperatures, killing native plants – with little or no developed resistance to these nonnative pests – at alarming rates. The loss of native plant species means less foraging for native wildlife, and disruption of the habitats and micro-climates they depend on for nesting and rearing young.
  - Invasive species affect the health of the environment and daily lives, especially impacting Tribal cultural resources and practices that are tied to these native habitats.



- Increased water temperatures
  - In local lakes and streams, toxic blue-green algal blooms (“harmful algal blooms” or HABs) are occurring more frequently (figure 5). Increased air and water temperatures have created the perfect habitat for HABs to thrive. This results in an unsafe environment for all local ecology and affects the daily lives and cultural practices of community members. HABs can kill animals and cause serious illness in humans; local officials have issued environmental health warnings that local waterbodies are not safe to swim in or gather resources from.

Figure 5. Cyanobacteria (HABs) bloom at Clear Lake





- In local water bodies, increased water temperatures reduce dissolved oxygen to levels in which native fish species cannot survive and fish die-offs occur. These higher water temperatures also increase the occurrence of fish diseases and parasites that impact fish health and make native fish uneatable by community members.
- In marine ecosystems, the higher water temperatures have resulted in large-scale algal blooms in regional ocean shoreline environments, producing toxins that can concentrate to toxic levels in marine life, impacting native species health as well as cultural practices of the community.
- High marine water temperatures allow nonnative marine life, not tolerant of the colder North Coast temperatures, to invade local shoreline areas and displace native marine life, leading to disruption of marine ecosystems.

Figure 6. Sunrise at Mount Konocti (in Lake County)



Robinson Rancheria Pomo Indians of California  
 Karola Kennedy, Water Resources Manager

The Robinson Rancheria Pomo Indians of California is a federally recognized tribe of Eastern Pomo people in Lake County, California. The 800-acre reservation is located in Nice, California along the north end of Clear Lake.

The federal government terminated relations with the tribe in 1956. After the 1956 termination of the Old Robinson Reservation, tribal members moved to urban areas. Federal recognition for the tribe was restored in the 1960s.

The forests at Robinson Rancheria are mostly oak, including Valley Oak, and Knobcone pine, Gray pine, and Ponderosa pine. Bark beetle damage is increasing in pine species.

Robinson Rancheria has experienced all of the events described by Middletown Environmental staff, as well as the following:

- Public Safety Power Shutoffs (PSPS), which have become more frequent with the high winds driven by climate change, have impacted the health of Tribal members who need relief from the heat, drinking water pumping, wastewater processing, and everything requiring power.
- As with Middletown, Robinson sees wildfire impacts. They are working to remove the fuel loads and reduce ladder fuels. Invasive plants such as French and Scotch broom are blocking native vegetation and exacerbating fire hazards.
- Marijuana grown both legally and illegally on ancestral territories is impacting the lands, displacing native species, and using groundwater. Pesticides applied by growers are dispersed by wind and rain and impact the health of the Tribe.
- Increased erosion from flooding impacts the Tribe and exposes cultural sites.
- With drought, already low lake levels continue to get lower. Hatching spawning was virtually eliminated this year (2-3 weeks), as creeks dried up before spawning was finished.
- Drinking water exposure to microcystins produced by HABs is a concern for the Tribes in Lake County. Robinson Rancheria has worked with other Tribes to address this issue. For the past six years, the Tribes have been voluntarily monitoring both intake and finished waters for microcystins; the State Water Resources Control Board mandated the monitoring this year. Microcystins have already been detected in finished water, and 2021 is expected to be the worst year since monitoring started in 2014. A treatment methodology is needed.
- Cultural impacts similar to those seen by other local Tribes. This is the first year the Tribe has had to go outside of Lake County to gather tules for ceremonies.
- Much of the work that the Tribes are doing as far as drinking water monitoring, climate change planning, wildfire risk reduction, benefit both Tribal communities and the general public.

Kashia Band of Pomo Indians of the Stewarts Point Rancheria

Nina Hapner, Environmental Department Director

[Images were shared during the session]

The Kashia Band of Pomo Indians were the first inhabitants of the coastal Sonoma County area around Fort Ross. The Kashia lands extended from the Gualala River and Salmon Creek in the North to Duncan's Point south of the Russian River to Bodega. From the West, Kashia territory extended from the Pacific coast over coastal mountain ranges down the Warm Springs Creek to the confluence of Dry Creek (figure 7). The Tribe has bought additional lands and the reservation and now holds 1,230.05 acres (figures 8-11).

The Kashia Band of Pomo Indians has over 1,000 members. Most Tribal members reside in Sonoma, Mendocino, Lake and Napa Counties.

Figure 7. Kasha Aboriginal Territory

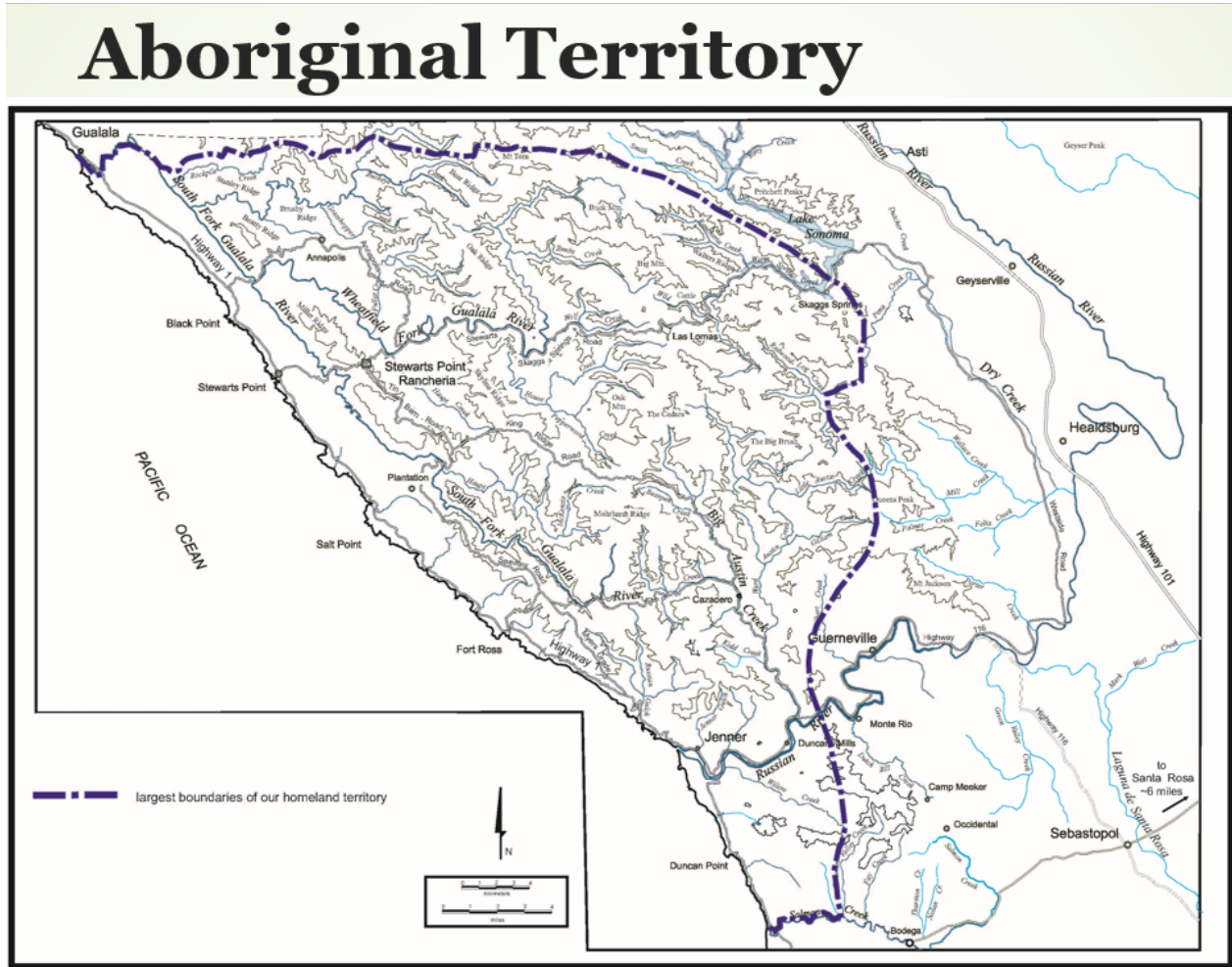


Figure 8. Original Rancheria lands

## Stewarts Point Rancheria - 1916



Figure 9. Kasha lands reacquired

## New Trust Lands - 2013/2015

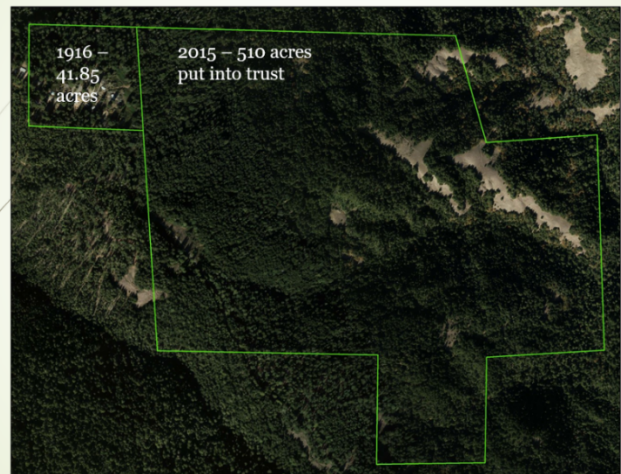
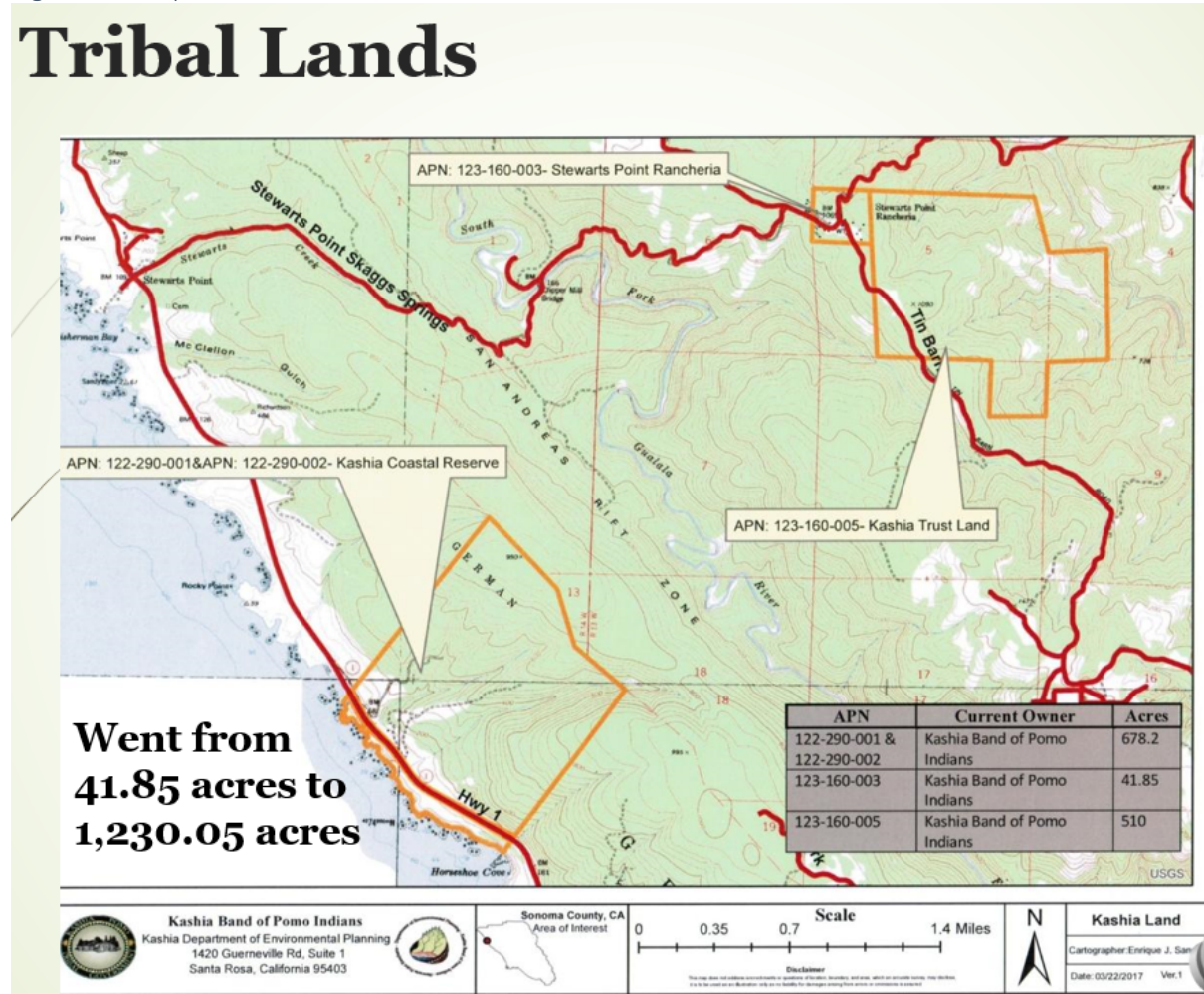




Figure 10. Kashia Coastal Reserve lands reacquired in 2016



Figure 11. Map of current Kashia lands



Kashia is in the process of documenting observed climate change impacts, including those listed below.

- Seaweed and seagrass harvests are down. Tribal members are unsure if this is from climate change, over-harvesting by non-tribal members, or due to increased populations of voracious purple urchins that have taken over along the coast.
- Abalone, a culturally important species, is suffering from both a lack of food and from Withering Syndrome.
- The Las Lomas Mountains used to have snow in the winters. They rarely get snow now and when they do, it melts quickly.
- Wildfire risk has increased: the Tribe is seeing more “match sticks” (dead trees) in the Tribal lands. Invasive plants such as French and Scotch broom are oily and burn easily; Himalayan blackberry burns more quickly than native Pacific blackberry. Recent fires include the Walbridge Fire, which went down to Lake Sonoma, and the Meyers Fire, which went all the way to the ocean, an area that normally would have high humidity and not be dry enough to burn.
- The Tribe relies on groundwater influenced by surface water from the Wheatfield Fork of the Gualala River. The level of intake was at 10 feet (low) in May. When water dips below 5 feet the Tribe no longer has access to water.

Figure 12. Shoreline, Kashia Coastal Reserve



- The Tribe has seen an increase in plant disease such as *Fusarium circinatum* (pitch canker) and *Phytophthora ramorum* (Sudden Oak Death). However, part of the problem in dealing with this disease is having non-tribal governments understand the impact their management practices can have on the cultural landscape. For example, the Tribe was asked to cut down Bay Laurel to prevent Sudden Oak Death by agencies who themselves were not taking any mitigation measures to prevent spreading the disease. The cultural landscape and the stories the trees have to tell must be respected, not replaced.

- Wild hogs have become invasive in the area, and they impact the lands by digging, eating acorns, bringing disease to other species, and impacting native plants used for medicine or ceremony. Sows can have 12-15 piglets in a season; thus, there needs to be a reduction of 50% or more to impact populations. When the hog populations increase, so does the presence of mountain lions and other large predators.
- The Tribe is losing flora and fauna species and needs to work to restore the environment as a whole, not just preserve a single important species. When the land is not healthy, the community is not healthy. The Tribe needs to continue to teach our children about the natural food resources to keep them healthy.

It is important for the Tribe to be stewards of the environment. However, it has been their experience that their views are not always respected by government agencies. For example, when tribal members noticed changes in starfish they brought it to the attention of the California Department of Fish and Game (now CDFW), that department was unwilling to respect “citizen science” and nothing was done. Six months later starfish wasting disease was “discovered.” The disrespect of the people who are using the lands and observing changes is disheartening. In addition, the government often assumes that because someone works for a Tribe, they are not a “credible scientist,” in spite of the degrees they hold in biology or other relevant sciences.

The Kashia Coastal Reserve is a pristine area along the coast. The Tribe needs to be part of the ocean restoration process and will continue their efforts to monitor and improve the health of the ocean. The Tribe is also looking at impacts of creeks and nutrient loading on the coastal area. Not all Tribes are in the same position or have the same resources. For Kashia getting their coastal lands (figure 11) back allowed them to return home to the coast for the first time in 125 years.

When CDFW puts regulations in place they do so with “recreational use” in mind. These regulations do not necessarily protect the same indicator species that are of concern to the Tribe, so the Tribe needs to monitor and watch the species of concern to them.

The Tribe is looking to harvest timber and is using a plan to incorporate fire prevention, resiliency, and fuel loads. Instead of simply harvesting the biggest, most valuable trees the Tribe will look at multiple benefits. They would like to incorporate Tribal burns, but there is a concern there too and it is difficult to coordinate with non-tribal government agencies.

Scotts Valley Band of Pomo Indians of California  
Terre Logsdon, Environmental Director

Terre is not a Scotts Valley Tribal Member but works for the Tribe. The Scotts Valley Band of Pomo Indians’ aboriginal lands were in the area now known as Scotts Valley outside of Lakeport in Lake County, the mountains surrounding Clear Lake to the Pacific coast and down to San Pablo Bay. In 1911, the federal government purchased a 56-acre parcel near Lakeport, the Sugarbowl Rancheria, but the government terminated the Tribe's status in 1965 and parceled out the rancheria to members. In 1972, a federal task force concluded that the Scotts Valley Band of Pomo Indians should be entirely relocated to the Bay Area, primarily around Oakland, because the former rancheria lands still had no water or utilities.



The Tribe regained federal recognition in 1992, but trust land was not restored. Approximately half of the 350-member Tribe lives in Lake County, and most others live in Mendocino, Sonoma, Napa, Contra Costa, and Alameda counties. The Tribe purchased a 36-acre parcel outside of Kelseyville 30 years ago where they have dance grounds, public restrooms, and homes for several Tribal families. Although working to regain land held in trust, the Scotts Valley Band is still one of two federally recognized “landless” Tribes in CA without land in trust. They work to protect their Tribally owned and aboriginal lands and continue work to have land returned to them and be held in trust.

The impacts of climate change that members of the Tribe are experiencing include those summarized below. The Tribe networks with federal, state, county, and private groups to build connections and mitigate climate change.

- With extreme rain, drought and high winds, Tribal members are exposed to both currently used pesticides as well as legacy pesticides such as DDT from nearby high dollar vineyards. With climate change the Tribe has seen increased winds and increased dust. Dust devils, which used to be seen in late summer, are already happening (mid-May).
- The Tribe is concerned that the wells that currently provide the Tribe with drinking water will run dry or need to be dug deeper due to drought.
- Cultural resources (arrowheads, obsidian, pottery) have been exposed by flooding. The Tribe tries to get these cultural resources returned (or have them left on the land).
- Abalone and kelp harvests in traditional offshore Tribal lands are reduced.
- Cyanobacteria (HABs) levels are increasing; this is a human health concern for the Tribe.
- The tule at Clear Lake are not healthy. They are not growing normally and are thought to be contaminated by cyanobacteria and pesticides. The Tribe has partnered with the local water department to gather tule at a nearby spring-fed reservoir.
- Power outages due to Public Safety Power Shutoffs (PSPS) triggered by dry high winds impact drinking water and wastewater treatment. Additionally, without electricity for air conditioning in an increasingly warm area, Tribal members are at risk from exposures to heat.

It was devastating for the Tribe to be removed from the land and to have had those ties severed. However, the Environmental Department and Tribal leaders have done an amazing job working to both retain and build connection to the lands and pass on the knowledge while protecting the Tribe. It can be hard for Tribal members to adapt and build capacity to mitigate climate change without physical lands.

#### Federated Indians of the Graton Rancheria

Tim Campbell, Grants Administrator and Buffy McQuillen, Tribal Historic Preservation Officer

The Federated Indians of the Graton Rancheria (FIGR) is a federation of Coast Miwok and Southern Pomo groups recognized as a tribe by the US Congress. The Miwok of West Marin County and the Bodega Miwok traditionally lived in the area now known as Bodega Bay, while the Southern Pomo Sebastopol group lived just north and east of the Miwok. What is now Sebastopol is midway between the northern boundary of Miwok territory and the southern edge of Southern Pomo territory.

In 1920, the Bureau of Indian Affairs established a 15.45 acre tract of land in Graton, California for the “village home” of the Marshall, Bodega, Tomales, and Sebastopol Indians. The federal government thus consolidated these neighboring, traditionally interactive groups into one recognized entity, Graton Rancheria. In 1958 the federal government terminated the Graton Tribe. From 1960 until the Tribe was

reestablished in 2000, Tribal members continued to protect the cultural identity of their people by preserving tribal and other archeologically important sites throughout their aboriginal territory. Work during that time helped to pave the way for the environmental stewardship activities the Tribe is involved in today. In 2005 the Tribe purchased 254 acres of land for its reservation outside of Rohnert Park that are now tribal trust lands. The Tribe currently has over 1,000 members.

The Tribe has seen:

- Catastrophic fires
  - Loss of homes and displacement during evacuations
- Reduced rainfall and low relative humidity
- Unexpected and dramatic shifts in climate
- Lightning storms earlier in the year than is normal
- Dry/drying vegetation
- Sudden Oak death
- Loss of ability to bring traditional fire to the lands
- Loss of cultural resources
- Coastal erosion due to sea level rise at gathering sites in Marin County
- PSPS impacts
  - Causing Tribal members lose stored food

FIGR is working on both a climate adaptation plan and a hazard mitigation plan.

FIGR would like to be able to step in seamlessly to help co-manage the environment with non-tribal governments. They are working to restore Tribal values, customs and traditions, language, environmental stewardship, and environmental justice.

FIGR is monitoring in traditional territories to better understand the effects of climate change. The Tribe can help broaden the minds and visions of non-tribal members who are not thinking holistically. A cross spectrum approach is needed.

Tim mentioned that a report to be released in about six months will bring tribal voices forward, highlighting one important element: adding traditional knowledge to very narrow-minded approaches to managing resources. For example, instead of killing one species to save another, traditional approaches advocate for more thoughtful, holistic strategies. The Tribe had to convince non-tribal managers that cutting down bay laurel – which host the Sudden Oak Death agent but is important as food and medicine for the Tribe –was not the best way to address the infestation.

Non-tribal government agencies have no ties to the landscape. They have not invested in monitoring for all important species, and Tribes must step up to monitor, prove the changes and prove a need for restoration. FIGR has a vast amount (45 years' worth) of information that can inform restoration efforts.

Coyote Valley Band of Pomo Indians

Briana Merina, Administrative Assistant

The current Coyote Valley Reservation was established in 1977 and is located 150 miles north of San Francisco. The Tribe is experiencing many of the same impacts shared by other Tribes: Wildfire, drought, flooding, impacts to native foods and cultural sites.

The Coyote Valley Tribe recently received a US Environmental Protection Agency grant that will be used to develop a resiliency plan and to educate staff, leadership, and the broader community on mitigation of air and water pollution during disasters.

Big Valley Band of Pomo Indians of California

Ron Montez, Tribal Elder and Tribal Historic Preservation Officer and Sarah Ryan, Deputy Tribal Administrator and Environmental Director

[Slides were presented by the Tribal representatives and are included below.]

The Big Valley Band of Pomo Indians are located on the shores of Clear Lake, the largest natural freshwater lake in California.

*“The Tule is part of our Traditional Tribal history, it was used for ceremony inside the Roundhouse as a ground cover and mat for the people to sit upon, The Big Head Dancers wore skirts made of Tule for our regalia, clothing for our women were made of Tule, Tule Mats were used as sleeping mats in our Hut made of a willow frame and a covering with Tules, men made a Tule Shirt worn in colder weather, we ate the Tule Roots for food, The health of the Tribe and the health of the Tules are interrelated. It is important to bring notice to and make others aware of the problems we are seeing in the quality of our lake waters and how it is affecting our cultural practices, our subsistence fishing, birds and loss of plant life (Tules) on the shores of our rancheria.”*  
~Ron Montez

Figure 13. Scenes from Big Valley. Left, child at Tule Boat Festival. Center, HABs impacts at Clear Lake. Right, a child fishing in the tules



The Big Valley Tribe has experienced:

- Water quality impacts on Clear Lake and tributary streams
  - Higher flows increase sedimentation and erosion (affect fish, increase cyanobacteria blooms, erosion of road along the lake).
  - Lower flows reduce dilution, concentrate pollutants, and reduce dissolved oxygen (which contribute to cyanobacteria or HABs).
  - Exposure to cyanotoxins is a human health concern (figure 13, 14). Tribal members have always used the lake for food, ceremony, and recreation; thus, potential exposures to HABs include

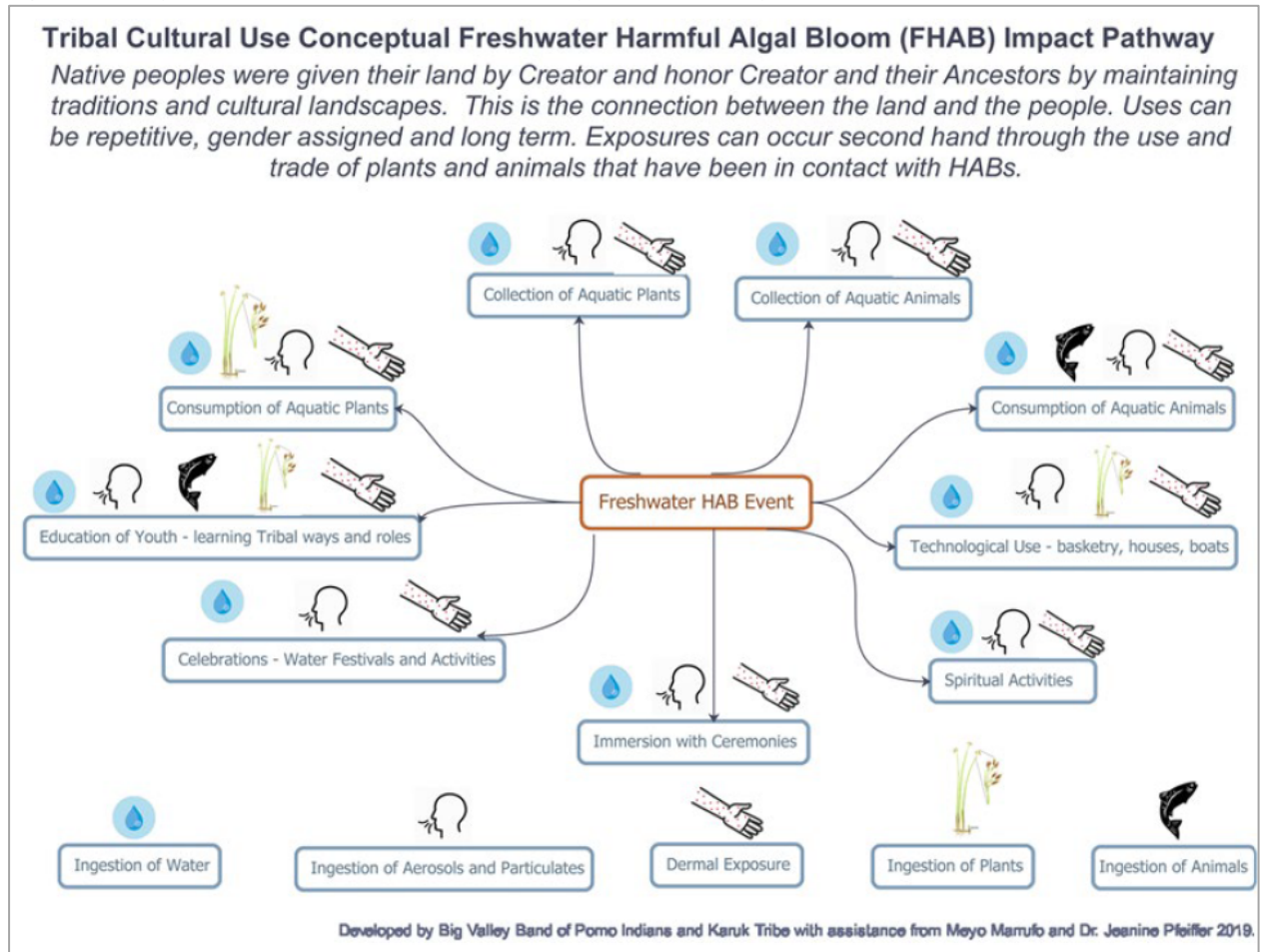


unique pathways that do not apply to non-tribal individuals (figure 15). The HABs need to be prevented so that Tribal members have access to the lake, an important cultural resource

Figure 14. HABs impacts to Tribal members



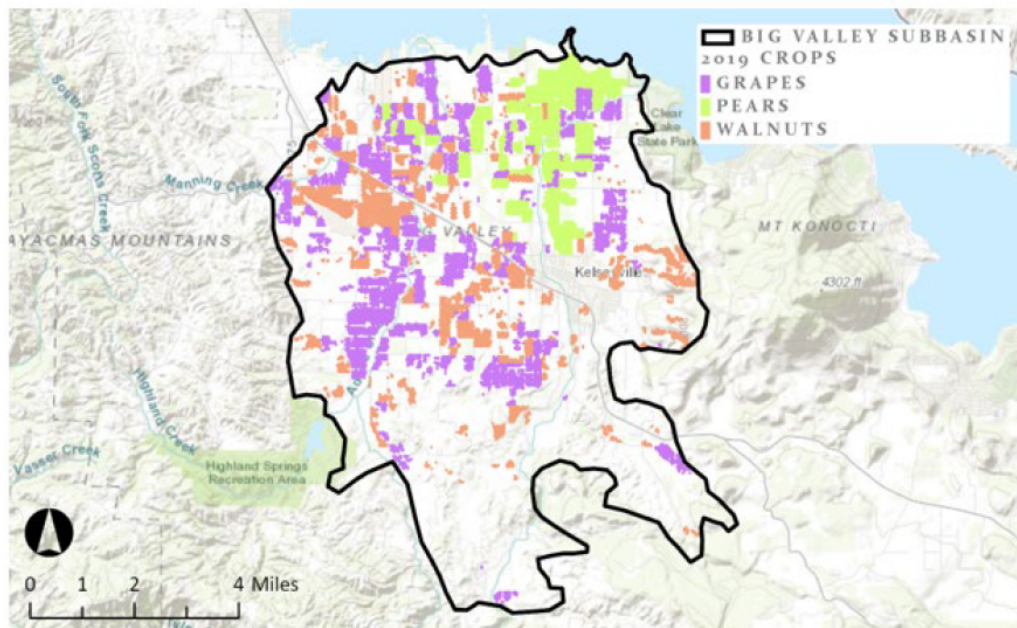
Figure 15. Impacts to Tribal members have multiple routes of exposure



- Monitoring by the Tribe has found several HABs blooms along the shore and throughout the lake. The Tribe has been conducting shoreline water monitoring for public health in collaboration with Elem and Robinson Tribes. Data from the Tribe’s cyanotoxin monitoring program is at [www.bvrancheria.com/clearlakecyanotoxins](http://www.bvrancheria.com/clearlakecyanotoxins)
- Drinking water sources could be impaired. Possible increase in microbes and pathogens in the environment can affect public health.
  - With 18 water purveyors pulling water from Clear Lake, the increased cost will be passed to the tribal consumers.
  - As part of Tracking California (a collaboration with the California Department of Public Health) Big Valley tests private drinking water systems for cyanotoxins, nitrates, coliform bacteria and herbicides, all contaminants of concern for private drinking water systems.
  - Cultural activities that require the use of the lake have had to be postponed or moved due to a lack of tule and other ceremonial material and poor lake water quality.
- Changing temperatures affect distribution and habitat of fish (especially warm water vs cold water species).
- Drought

- The lack of water is impacting local agriculture, stressing crops such as pears, walnuts, and grapes (figure 16). Increased groundwater pumping impacts water available in the streams for spawning Clear Lake Hitch.
- The Tribe is seeing decreases in surface and groundwater due to drought and weather extremes (little rainfall, then flooding), degrading water quality and impacting riparian areas and wetlands. The Tribe is developing a program to measure groundwater in local wells to have a better understanding of the variations in groundwater storage to ensure sustainability.
- Declining lake levels in Clear Lake have exposed cultural resources. This exacerbates the problem of Non-Natives actively searching for these resources to sell. These items are Tribal property. Taking them is disrespectful and disturbs the Tribe as a whole and the artifacts need to be honored and left in place or returned to the Tribes.

Figure 16. Agricultural demand for both surface and groundwater impacted by drought



- Extreme rain events have led to flooding, erosion, and deterioration in Tribal homes, including an increase in mold.
- Increase in invasive species and impacts on native species
  - Warmer, dryer winters lead to less weather control over invasive species, which then have a longer time to increase their foothold. The Pine Bark beetle is affecting the native pines of Lake County and causing large areas of dead trees. This leads to an increase in the fuel loading in the county (this could also affect Pinon trees, a food source).
  - Tules are at risk: Water primrose (*Ludwigia spp.*) has taken over where many tules used to grow on Clear Lake's shoreline. Warmer winters allow the plants to flourish. 85% of the shoreline tules have been lost. (Documented by California Department of Fish and Wildlife in their review of the Clear Lake Hitch.)
  - Manzanita, a culturally important plant, is now seen as a fire risk and has been cleared by non-tribal members for fire mitigation and for vineyards. Removal of manzanita is a loss of medicine, habitat, and food for other species.

- The invasive Star Thistle and other non-native plants have taken hold, increasing the use of herbicides which also poison native species. This increases the pesticide/herbicide exposure from dust and runoff from nearby agricultural operations that impact the health of Tribal members.
- Basketry materials are impacted (Willow, Redbud, Dogbane). Traditional gathering areas are reduced because of vegetation changes, wildfire, and the privatization of lands. Tribal members gathering basketry materials and making baskets are exposed to a greater level of contaminants than non-Natives.
- Angelica root is another culturally important plant that has been impacted by drought and erosion from flooding. The Tribe has tried to harvest Angelica from areas where it may no longer thrive in order to propagate it in areas where it might grow better or be more accessible to the Tribe.
- Clear Lake Hitch populations have declined. This fish, a culturally important species, is an important year-round food for the Tribe. The species, now listed by the state as threatened, were plentiful in the area. The loss of this fish impacts the community, the history, and the culture of the Pomo people.
  - Hitch typically spawn during periods when creek and groundwater levels are lower as a result of agricultural irrigation and frost protection (figure 17). These low levels are impacting overall Hitch numbers. Additionally, lower water flows are blocking Hitch passages (figure 18; exact minimum flow requirements are unknown. Big Valley and Robinson Rancheria are working together to rescue Hitch. Area Tribes are working with non-tribal agencies to help with Hitch recovery efforts (figures 19, 20), but to date these efforts have no teeth, and may not effectively restore Hitch populations.

Figure 17. Hitch spawning period, grape and pear crop water demand and wet and dry year hydrology for Kelsey Creek

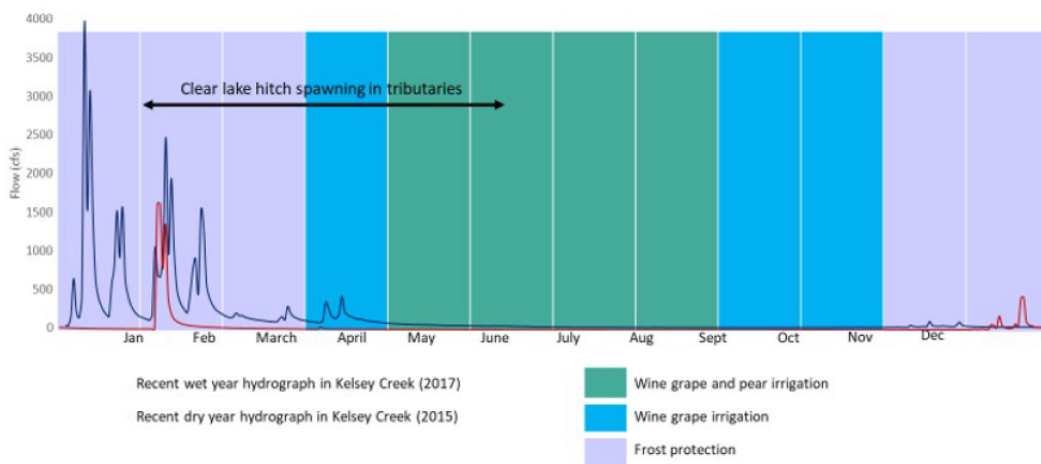




Figure 18. Hitch passage suitability decreases with lower stream flows, 34 cubic feet per second (CFS) compared to 11 CFS (red dots indicate point in the stream at which flows are not suitable for hitch passage)

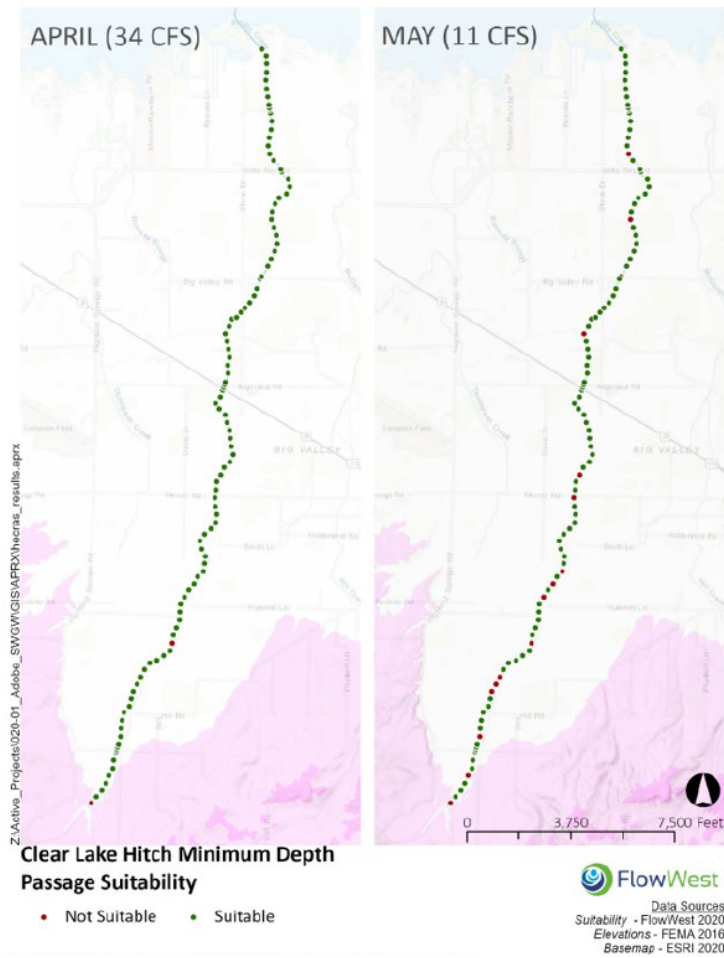
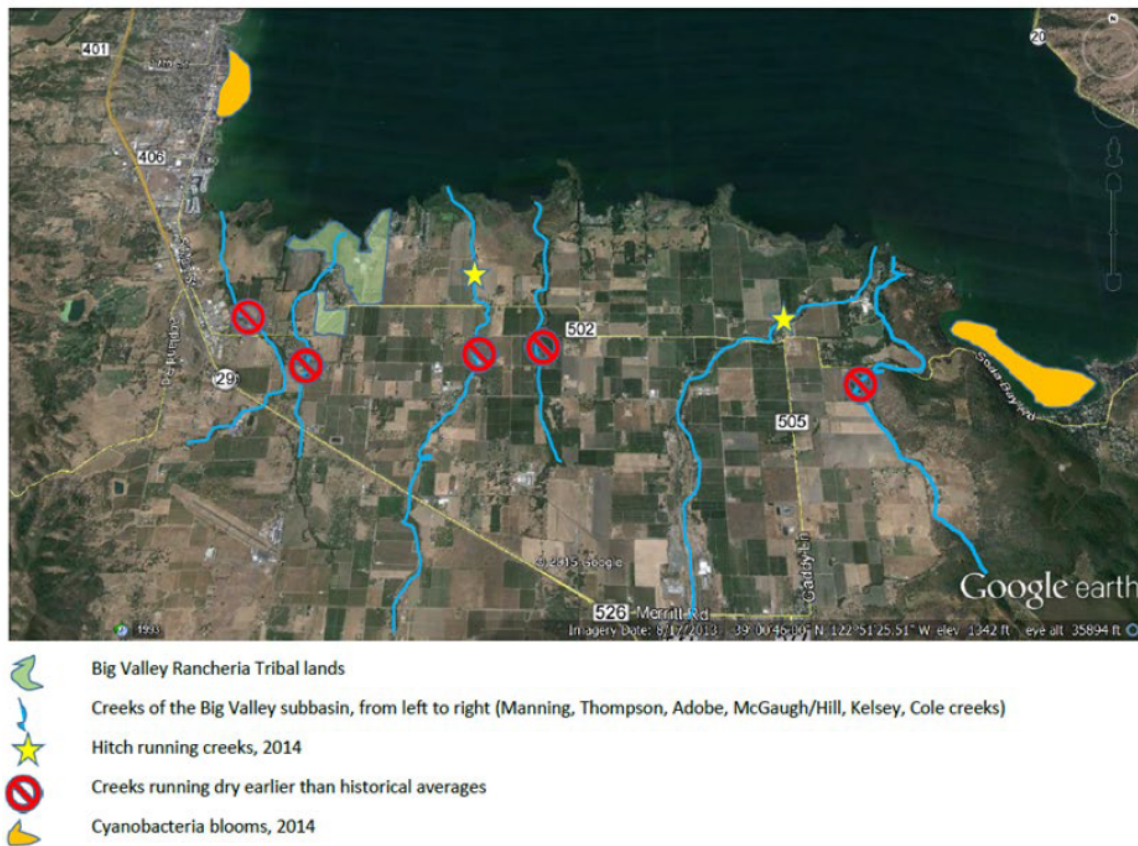


Figure 19. Clear Lake Hitch rescue by Tribal staff and CDFW



Figure 20. Impacts to Hitch from climate change. Spawning habitat denoted by yellow stars



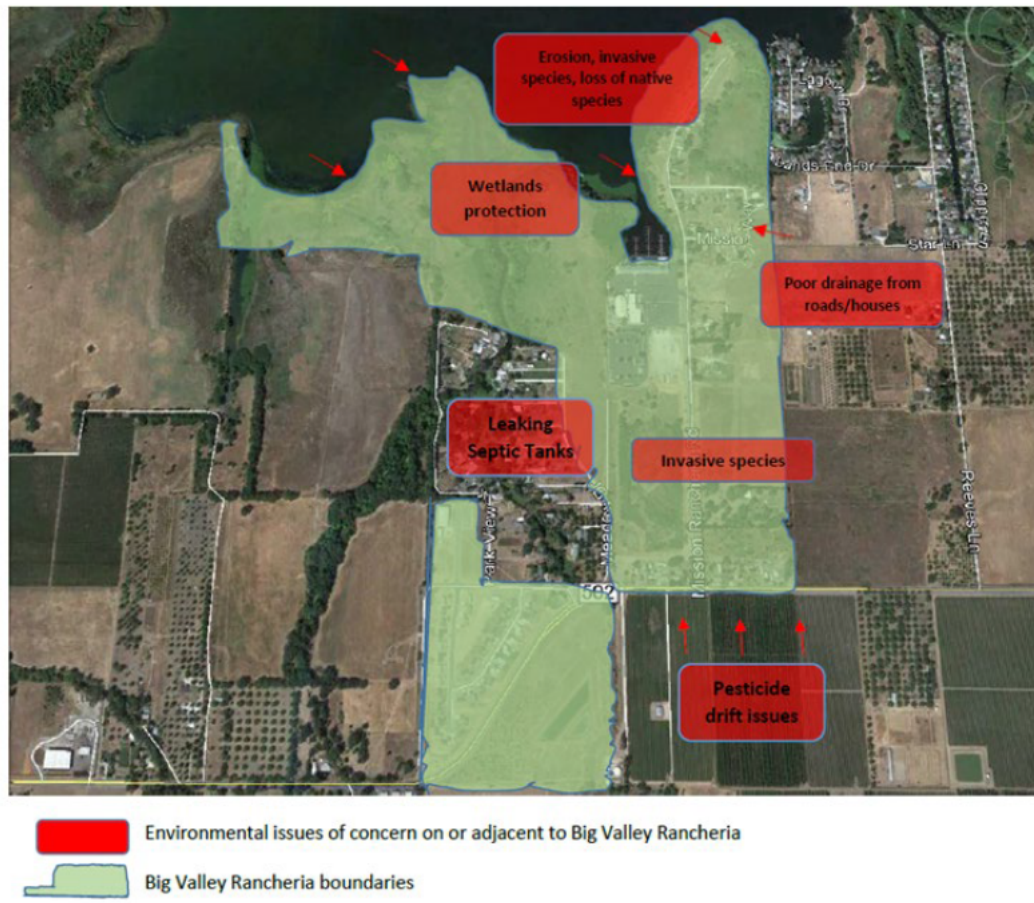
- Invasive species frequently take advantage of unoccupied niches within ecosystems. These niches can exist either as naturally unfilled roles in the ecosystem, or as the products of external pressures. In some cases, invading species will create the conditions for their own survival by disrupting existing food webs.

- Climate change has created shifting conditions for species and created new opportunities for invasive species in what were previously unfavorable climatic regions. However, of greater significance are human activities responsible for habitat and biodiversity loss.
- Climate change has exacerbated food insecurity for the Tribe. There are fewer native wildlife species and nourishing foods such as Indian potato, clover, acorn, pine nuts, Hitch, clams, prickly sculpin, crayfish, and tules.

In 2017 the Big Valley Tribe conducted a climate change survey during the Annual Tule Boat Festival. The 82 respondents from 13 Tribes answered questions about their familiarity with climate change, their sources of information, and first- and second-hand information of past and present conditions as they related to climate change. Though responses varied, the overall trend was a reported decline in the availability of natural resources and observed warming and changes in weather compared to previous conditions. Specifically, many respondents reported seeing less wildlife than in previous years, as well as changing wildlife. Changes in water flow and water quality in Clear Lake and surrounding creeks were also noted. Respondents also viewed lake and water conditions as being worse than in the past.

Concerned about the impacts of climate change and other stressors, the Tribe has been taking action to protect natural resources. Figure 21 shows some environmental issues at Big Valley.

Figure 20 Environmental issues at Big Valley





## Elem Indian Colony

Thomas Brown, Cultural Director and Tribal Elder

The Elem Indian Colony of Pomo Indians is currently on 50 acres near Clearlake Oaks, California along the eastern shore of Clear Lake. Rattlesnake Island, a culturally important site, was taken from the Elem Tribe. The Tribe was placed by the federal government next to an established mercury mine called the Sulphur Bank Mine. The lands upon which the reservation was established were covered with soil and mine waste from this mine. The Elem reservation is now part of a Superfund site and to minimize exposures to mercury and arsenic, members are no longer allowed to garden or disturb the soil around their homes. At one point a few years ago, cleanup was done by the federal government on the reservation. New trailers were brought in, sidewalks were poured, and new soils were brought to cover the contaminated land (at a depth of 6 inches). Sadly, mercury contamination still remains, as only a surface cleanup has been done.

During extreme rain events the Herman Impoundment which was built to stop waste from the Sulphur Bank Mine from flowing into Clear Lake would overflow, washing additional mine waste into Clear Lake. Recently, additional holding ponds have been built above the impoundment to try to stop the flood waters from topping the impoundment, however with extreme rain events this contamination is still entering Clear Lake and impacting the health of all the Tribes who use the Lake.

Due to contamination from the Sulphur Bank Mine the Tribe can no longer access their traditional foods such as fish, clams, tule and other foods Clear Lake used to provide. Cultural ceremonies must be done on other lands. Gathering must be done remotely to avoid known human health hazards.

Very few families are left because of the ongoing concerns about contamination. With the fire danger brought on by climate change, residents are in a zone where they do not get public assistance, and any public entity has to be escorted onto Tribal lands by the Lake County Sheriff.

## Closing thoughts

*“There is no way to separate one indicator from the other. They are all related in one way or another.”*

*~Listening Session participant*

*“The earth is our mother. Whatever befalls the earth befalls the sons and daughters of the earth. This we know. All things are connected, like the blood which unites one family. All things are connected. We did not weave the web of life, we are merely strands in it. We are not poor people. We are happy with what we have and content to take only what we need.”*

*~Listening Session Participant*

## Summary of Open Discussion and Dialogue on Climate Change Impacts

Following the introductory comments from the participating tribes, the participants discussed some of the themes that emerged and shared additional climate change impacts they have been experiencing. The impacts discussed are summarized below, organized into themes. In addition to impacts specifically tied to climate change, the participants described how climate change compounds the many other anthropogenic changes to ecology that challenge their traditional ways of life.

Resources are dwindling. There is a lack of respect for Tribal observations and knowledge. It is hard to collaborate when Tribal knowledge is not valued. Tribal knowledge and the expertise of tribal members



will be critical in recognizing and addressing the impacts of climate change – along with other stressors – on the tribal landscape, resources, and people. For example, during a Hitch rescue some non-tribal agency people could not tell the difference between a larval Hitch and a sucker fish, however Tribal members could see this from their experience with the Hitch.

Indicator species for Tribes are different from those selected based on a non-tribal perspective. Tribes have an understanding of the value and role of species, informed by knowledge acquired about these species over many generations.

Participants shared:

### Changes in Climate

- Drought
  - Wells running dry
  - Lack of water on landscape
  - Increase in water temperatures, impacting fish species, promoting harmful algal blooms (HABs)
  - Lack of water for traditional cultural uses and traditional cultural materials
  - Impact on cultural species: dogbane, angelica, tule, pepperwood (Bay Laurel), willow
    - Impacts on cultural sites as water levels recede
- Changes to the seasons
  - Impacts on gathering traditional materials, food sovereignty
  - Impacts on the availability and quality of basketry materials
- Extreme rain events
  - Scouring, erosion
  - Flooding
    - Cultural artifacts exposed
    - Changes in ecosystem
  - Mold in homes
  - Threat to safety when Tribal members are stranded
  - Impacts on transportation systems
    - Flooding impact on roads and highways
  - Impacts on area levees
  - Tribes experiencing increases in extreme weather alerts
  - Cultural sites exposed and destroyed
- Extreme heat and cold impact health of elders
- Changes in high wind events
  - Earlier in the year
  - More frequent events increase the movement of pesticides from nearby agricultural and wine-growing areas
  - More frequent public safety power shutdowns triggered by these events adversely impact Tribal members

## Impacts on Physical Systems

### Mountains

- Reduced snowpack

### Coastal

- Decrease in seaweed, seagrass, abalone
- Invasive (native) species – purple urchin
- Exposure of cultural sites from erosion

### Freshwater

- More frequent HABs: adverse impacts on drinking water supply, recreation, cultural activities, impacts on other species, ecosystem, microcystin levels
- Reduced flow rates in Hitch spawning habitat, especially with competition for irrigation water from agricultural and wine-growing areas
- Exposure of cultural sites due to erosion

### Contaminated sites

- Heavy rainfall events mobilize contamination, thus increasing the likelihood of human and ecological exposures

## Impacts on Biological Systems

- Decrease in culturally important fish: Hitch, prickly sculpin, freshwater eels
- Decrease in Clear Lake species: freshwater clams, crawdads
- Decrease in native foods
  - impacts the health of the tribal members, food sovereignty
- Decrease in quantity and quality of tules
- Decrease in: Indian potato, clover, willow, dogbane, angelica root, sedge, pine nuts, acorn, Bishop Pine, Douglas Fir, Western Gray Pine
- Decrease in native pollinators
- Change in the taste of acorn (Black Oak, Tan Oak)
- Quantity and quality of acorns is lower
- Increase in pesticide use (often to “control” invasive species)
- Pesticide-ready crops (*i.e.* Roundup Ready® alfalfa) lead to an increase in pesticide use which ends up in the environment as a result of dust storms, flooding, drift
- Pollen from genetically modified crops have the potential to cross over to native species; no one has the right to desecrate native plants with sacred uses.
- Increases in plant diseases such as pitch canker, sudden oak death.
- Dwindling resources
  - basketry from climate change and lack of access
- Thoughtless management practices: Tribes asked to remove Bay Laurel because it carries sudden oak death, but forestry folks tromp around without care
- Wildfire
  - Fires are getting larger over time
  - Need to deal with fuel management
  - Lack of traditional burning impacts fuel loads
  - Flashy fuels, high oil (French broom)
  - Impact of smoke and ash on communities, watersheds, human health

- Human impacts: displacement, home loss, trauma, destruction, and exposure of cultural sites
- Impacts on wildlife

### Challenges in Managing Resources

- Lack of respect for Tribal observations and knowledge
- Dueling jurisdictions
- Tribes without a large land-base are not able to replant and adapt
  - Getting land back is critical
- Native foods cannot be grown on small lands. Need to reestablish the lands to nourish the Tribes. Food reliance is unhealthy.
- How to share information without having non-tribal members take the resource? Protection of Tribal knowledge
- Tribal members being questioned / harassed when gathering resources such as seaweed.
- Zoning of reservation lands (*i.e.*, Elem is “red-zoned” and as a result, before the Fire department or other help can respond they must be escorted by the Sheriff)
- Seeming lack of planning for restoration in the area
- Need to look at the big picture and all stressors when planning for mitigation efforts and in Tribal responses to climate change
- Need for additional mitigation measures for Tribes such as Elem who are situated on a Superfund site and are also at risk of climate change impacts (fire, flooding, wildfire, etc.).

### Next Steps and Closing

OEHHA discussed next steps in their work incorporating tribal perspectives into the climate change indicators report. OEHHA will continue working with tribes around the State to inform future reports. Participants were invited to remain in communication with OEHHA, sharing any additional thoughts as well as connecting OEHHA with others whose perspectives should be included.

## Appendix A. List of Attendees

### Tribal Attendees

<b>Name</b>	<b>Position</b>	<b>Tribe</b>
Ronald Montez	Tribal Historic Preservation Officer, Tribal Elder	Big Valley Band of Pomo Indians of California
Sarah Ryan	Deputy Tribal Administrator and Environmental Director	Big Valley Band of Pomo Indians of California
Briana Merina	Administrative Assistant	Coyote Valley Band of Pomo Indians
Thomas Brown	Cultural Director, Tribal Elder	Elem Indian Colony
Buffy McQuillen	Tribal Historic Preservation Officer, Native American Graves Protection and Repatriation Act Officer	Federated Indians of the Graton Rancheria
Tim Campbell	Grants Administrator	Federated Indians of the Graton Rancheria
Nina Hapner	Director of Environmental Planning	Kashia Band of Pomo Indians
Cristian Viveros Cardenas	Geographic Information Systems Coordinator	Middletown Rancheria of Pomo Indians of California
James Rivera	Tribal Vice Chairman	Middletown Rancheria of Pomo Indians of California
Kim Cole	Tribal Administrator	Middletown Rancheria of Pomo Indians of California
Luya Rivera	Tribal Community Planning Assistant	Middletown Rancheria of Pomo Indians of California
Michael Shaver	Environmental Director	Middletown Rancheria of Pomo Indians of California
Pauline Beltran	Environmental Technician	Middletown Rancheria of Pomo Indians of California
Sally Peterson	Tribal Elder	Middletown Rancheria of Pomo Indians of California
Adrien Malicay	Tribal member	Robinson Rancheria Pomo Indians of California
Karola Kennedy	Water Resources Manager	Robinson Rancheria Pomo Indians of California
Michelle Downey	Tribal Environmental Program Manager	Round Valley Indian Tribes
Terre Logsdon	Environmental Director	Scotts Valley Band of Pomo Indians of California
Rocky James	Water Operator	Sherwood Valley Band of Pomo
Capri Jacobs	Environmental Protection Department Assistant	Sherwood Valley Band of Pomo Indians



Non Tribal Attendees

<b>Name</b>	<b>Position, Affiliation</b>
Alex Cole-Wiess	Lead Facilitator/Mediator, CSUS
Amanda Mattes	Climate Change Advisor, CalEPA
Carmen Milanes	Chief, Climate Indicators and Site Assessment Section, OEHHA
Julia Van Horn	Associate Facilitator/Mediator, CSUS
Laura August	Chief, Community Assessment and Research Section, OEHHA
Lauren Zeise	Director, OEHHA
Bennett Lock	Environmental Scientist, Climate Indicators and Site Assessment Section, OEHHA
Laurie Monserrat	Senior Environmental Scientist, Tribal Liaison, Climate Indicators and Site Assessment Section, OEHHA
Malinda Dumisani	Manager, Climate Policy and Programs, Environmental Justice Small Grants Program, & Tribal Affairs, CalEPA

## Appendix B. Themes from survey

### Wildfire

- Loss of homes resulting in housing shortages
- Temporary employment stoppages and permanent loss of jobs due to business closures
- Displacement from homes during evacuations
- Reduction in native biodiversity and increased non-native species occurrence
- Damage to watershed soils resulting in erosion loss and slower regrowth postfire
- Health impacting levels of smoke particulate matter for extended periods of time
- Displacement and death of wildlife caused by fire or lack of foraging postfire
- Loss of a quality of life that has been customary in our rural location
- Inability to conduct cultural practices and recreational activities during wildfire events
- Loss of use of Tribal lands

### Drought

- Die-off of trees on Tribal lands and adjoining properties
- Decline in forest health and increase of tree pests
- Loss of Ponderosa and Douglas Fir dominated habitat area
- Reduced water flow in streams impacting native fish, eels, and plants
- Loss of native plant diversity due to shorter wet season
- Less stream and lake shoreline plants available for traditional uses by Tribal members
- Groundwater recharge less during annual cycles resulting in dry wells
- Increased groundwater pumping which reduces surface water flow
- Lower pumping rates from wells
- Agricultural production reduced due to extended dry periods and reduced water supplies
- Delay in development of new homes due to insufficient water supplies

### Increased water temperatures

- Toxic blue-green algal/cyanobacteria blooms in freshwater and marine environments
- Native fish species die-offs due to reduced dissolved oxygen
- Habitats without sufficient dissolved oxygen to support aquatic life
- Inability of community members to swim or eat the fish
- Nonnative marine life moving north and disruption of marine ecosystems resulting in impacts to marine resources traditionally used by community members
- Decreased water quality

### Invasive species

- Loss of native plants by displacement of invasive colonizing plants
- Habitat loss of diversity and less support of dependent wildlife
- Non-native insect and fungal pests significantly impacting native flora and fauna
- Disruption of native habitats that are integral to cultural resources and practices

## Other

- Loss of use of Tribal lands
- Pandemic (COVID-19) Strained wastewater system
  - floats failed, pumps failed, increased cost to operate



Appendix C. Additional information shared during the meeting or via email.

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