



# CLIMATE STORIES

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“Indigenous people are on the  
frontline of climate change.”  
Survival International

## Climate Stories

**How is climate change affecting global Indigenous communities?** Recent environmental changes brought on by climate change affect Indigenous people in a unique way, especially because of their relationships with the land, ocean, and natural resources.

Organized into four themes—**connections to the ocean, relationships with wildlife, the power of plants, and adapting tradition**—*Climate Stories* reveals a few of the world's many stories of community response and adaptation.

While there are many environmental issues affecting the world such as overpopulation, overfishing, and overconsumption, this exhibition focuses on the unique impacts of climate change.

Our actions can still make a difference. Join us to explore the climate conversation.

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# Land Acknowledgment

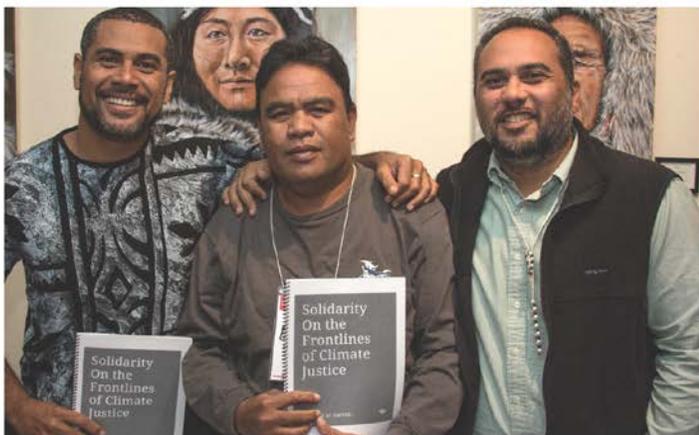
We acknowledge that we are located on the lands of the Ohlone people, the traditional stewards of the land on which the Global Museum resides. We show our respect for and acknowledge the enduring relationship that exists between the Ohlone people and their land and thank them for making space in their territories for us to share our knowledge, teaching, and learning. We pay respects to the elders past and present of the Ohlone people and extend that respect to other Indigenous peoples.



## Climate Change and Indigenous People

Indigenous communities are among the first to face the impacts of climate change. There are approximately 370 million Indigenous people in the world today in over 90 countries, making up about 5% of the world's population. Indigenous people are those from communities who originally lived in and stewarded their homeland. They also make up 15% of the world's extreme poor, and often face discrimination.

Worldviews of Indigenous peoples are tied to relationships with the environment. A few of the direct consequences of changing environmental conditions include loss of natural resources, restricted access to traditional gathering areas for food and medicine, and displacement from ancestral homelands. Despite these challenges, many communities are adapting traditional lifeways and taking action.



Three delegates from the South Pacific hold the Climate Justice document they helped craft after the **First Peoples' Convening on Climate Forced Displacement**, Girdwood Alaska, October 2018.

Image by Rob Stapleton

**“Our culture starts here on the land. It is how we are connected with the land and the sea. You wash away the land and it is like a piece of us you are taking away.”**

– Kabay Tamu of Warraber Island, Australia



Image by Rob Stapleton



Image courtesy of the Amah Mutsun Land Trust

# TEK

Across the world, Indigenous peoples have lived in their ancestral homelands for thousands of years, forming relationships with plant and animal life, water, the seasons and weather. **This knowledge is known as TEK, or Traditional Ecological Knowledge.** TEK can help us think about how we address climate change.



In California, tribal members of the **Amah Mutsun Land Trust**, whose ancestral territory extends from the Bay Area to Monterey, work to restore landscapes through traditional ecological knowledge (TEK). The Trust combines traditional resource and environmental management with contemporary approaches, partnering with educational institutions, government agencies, and conservation organizations.

Image courtesy of the Amah Mutsun Land Trust

## Cultural Connections

Aboriginal Australian art conveys knowledge of land and cultural traditions. This object symbolizes an ancient connection to the land which is starting to change due to drought, wildfires, and rising sea levels.

**Today, many Aboriginal and Torres Strait Islander people are advocating for policy change within the Australian government for climate change planning, including reducing carbon emissions and building emergency sea walls.**



### Double-sided painted slab

*Aboriginal Australian*

*(Yolngu community)*

Wood, ochre, mineral pigment

Early to mid 20th century

On backboard: reverse view





Entrance to the *Climate Stories* exhibition in the Global Museum

## Climate-Forced Displacement

Rising sea levels, increasing temperatures, and climate-related natural disasters are forcing communities across the globe to leave their homes—sometimes permanently. Climate-forced displacement is linked to poverty. Marginalized communities, including indigenous groups, are often the people most affected by devastating storms, flooding, or fires.

**The Carteret Islands in Papua New Guinea are the first place in the world to require population relocations due to climate change.** In 2006, the council of elders on the islands formed a relocation program to move the community to the mainland.

Many other islander and Sepik River communities have also moved inland due to flooding and rising sea levels.



Aerial view of the Carteret Islands, Papua New Guinea  
Image courtesy of NASA



### Mask

*Mwai community, Middle Sepik River*  
Wood, clay, cowrie shell, nassa shells,  
boar's tusk, fiber, cassowary feathers  
Mid to late 20th century



### Canoe paddle

*Gogodala community*  
Wood, feathers, seeds  
Mid to late 20th century



# Traditional Lifeways

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This section explores a few of the many ways that climate change has altered, threatened, and also inspired action among global Indigenous peoples.

Organized around themes of connections to the ocean, relationships with wildlife, the power of plants, and adapting tradition, stories from Hawai'i, Papua New Guinea, Alaska, and the Amazon Basin serve as case studies for communities affected by and responding to climate change.



## Feather crown

*Karajá (Iny) community,  
northeastern Brazil*

Feathers, twine, wood  
Mid-1900s





Image by Jlwad, Creative Commons

# Lungs of the World

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In addition to burning fossil fuels, other human activities have increased concentrations of greenhouse gases in the atmosphere, including clearing of land for agriculture and industry.

The Amazon Rainforest, known as the “lungs of the world,” produces more than 20% of the world’s oxygen. **Over 400 indigenous groups call the Amazon Basin home.**



River in the Amazon Rainforest  
Image by Jlwad, Creative Commons

Indigenous communities in the Amazon Basin are actively fighting to protect their homelands and this vital resource from deforestation and oil development. The recent fires in August 2019 have raised awareness about the important role the Amazon plays in the current climate crisis.

# Connections to the Ocean

**Climate change impacts not only ancestral lands, but also essential resources.** Many communities have strong ties with the waters that surround them and depend on local marine life for survival. Coastal and island communities are also faced with



Resurrection Bay in Seward, Alaska, 2019  
Image by Steve Deger, Creative Commons

the prospect of losing or leaving their homes permanently over the next century. Some are taking action and building new infrastructure, planning for relocation, and advocating for policy change through international networks.



The Nā Pali Coast on the island of Kauaʻi, Hawaiʻi 2018  
Image courtesy of the Global Museum



Image courtesy of the Global Museum



Image courtesy of the Global Museum

# Cultural Leadership

Native Hawaiian people are some of the global leaders in climate change policy, planning, and adaptation. In 2018, the Hawai'i legislature passed two bills pledging to make the state carbon neutral by 2045.

**Native Hawaiian ancestral knowledge stems from the relationship between humans and 'āina, meaning "that which nourishes us."**

Cultural items like those on display are still worn and used today as symbols of identity and to pass down traditional knowledge.



The sacred site of Pu'uuhonua O Hōnaunau National Historical Park on the Big Island of Hawai'i, 2018.

Image courtesy of The Global Museum



### Shark tooth club

*Native Hawaiian*

Wood, Oceanic white tip shark teeth,  
plant fiber cordage

1800s

Collection of the California Academy of Sciences



### Niho paloa (Chief's necklace)

*Native Hawaiian*

Sperm whale tooth, glass beads,  
cordage

Late 1800s to early 1900s

Collection of the California Academy of Sciences



### Whale tooth necklace

*Native Hawaiian*

Sperm whale tooth, string, ribbon

Late 1800s to early 1900s

Collection of the California Academy of Sciences



### Octopus lure

*Native Hawaiian*

Cowrie shell, stone, metal, string

Late 1800s (pre-1906)

Collection of the California Academy of Sciences





## Coastal Fish Ponds

Fishing continues to be an important part of life in Hawai'i, as a source of food and trade. For thousands of years, Native Hawaiians built fish ponds in coastal estuaries to produce millions of pounds of fish as a staple food source. **Rising temperatures are drying up these ancestral ponds.**

Community members today are moving nets, installing aeration systems, and using flexible harvest strategies in these ponds to adapt to warming ocean temperatures.

**What do you notice about the two images of fish ponds below, from 1836 and 2016?**

Over the past 180 years, water levels have gone down.



Fish ponds at Honolulu, Oahu, Hawai'i, 1836  
Public Domain



Kaloko-Honokohau fish pond on the Big Island of Hawai'i, 2016  
Public Domain



**Fish hook from Hanapepe salt ponds, Kaua'i**

*Native Hawaiian*

Bone

Date unknown

Collection of the California Academy of Sciences



**Fish hook from Hanapepe salt ponds, Kaua'i**

*Native Hawaiian*

Shell (likely abalone)

Late 1800s

Collection of the California Academy of Sciences



**Fish hook**

*Native Hawaiian*

Tortoiseshell

Mid 1900s

Collection of the California Academy of Sciences



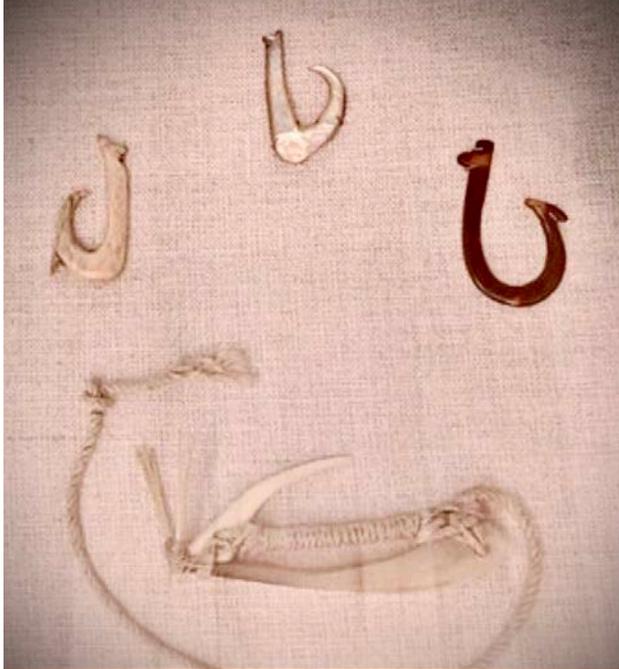
**Fishing hook and lure**

*Native Hawaiian*

Gold-lipped pearl oyster, sperm whale tooth, fin whale baleen, twine

Mid 1900s

Collection of the California Academy of Sciences





Many Native Alaskan tribes, which include Yupik, Inuit, Iñupiat, and Aleut communities, have lived in ancestral villages along the coast for thousands of years, relying on fishing and subsistence hunting of marine mammals for survival. Due to rapid sea ice melt, approximately 87 percent of Native Alaskan villages are experiencing erosion and forced displacement.



Aerial view of the remote Native village of Shaktoolik, located on Norton Sound in Western Alaska, 2018. Photo by Walter Halt Rose, Creative Commons



### Harpoon head

*Native Alaskan*

Ivory

Late 1800s to early 1900s

Collection of the California Academy of Sciences



### Ivory carving (seal)

*Native Alaskan*

Walrus tusk

Date unknown

Collection of the California Academy of Sciences

## The River Flows Back

In my mother's womb peace was mine  
But I said "moping"  
I greeted the light and came into the world  
Saluting it with a cry.  
I paddled downstream  
Drifting at ease  
Like Adam  
Before the fall.

But now  
A storm rises before me  
My canoe has swung round  
I paddle against the stream.  
The river my helper

Has become my enemy  
I fight the river  
Until my veins stand out  
Until the paddle blisters my palms.

Yet in this battle I gain glory  
I win fame  
I grow a name  
The true essence of it.  
One day I will reach the source again.  
There at my beginnings  
Another peace  
Will welcome me.

- Kumalau Tawali, in 'Modern Poetry' from Papua New Guinea

### ns to the Ocean

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any communities have strong ties with  
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action and building new  
infrastructure, planning for  
relocation, and advocating  
for policy change through  
international networks.



Alaska, 2019



Island of Kauai, Hawaii 2018

# I ka nānā no a 'ike.

## By observing, one learns.

- Native Hawaiian proverb, Mary Kawena Pukui



**Shark tooth club**  
Tropical Heterodont  
Wood. Ceramic white tip shark tooth,  
glass fiber cordage  
1800s  
Collection of the California Academy of Sciences

**Niho palao (Chief's necklace)**  
Tropical Heterodont  
Sperm whale tooth, glass beads,  
cordage  
Late 1800s to early 1900s  
Collection of the California Academy of Sciences

**Whale tooth necklace**  
Tropical Heterodont  
Sperm whale tooth, string, ribbon  
Late 1800s to early 1900s  
Collection of the California Academy of Sciences

**Octopus lure**  
Tropical Heterodont  
Cowrie shell, stone, metal, string  
Late 1800s to early 1900s  
Collection of the California Academy of Sciences



# Relationships with Wildlife

**Indigenous communities across the globe rely on wildlife for food and creating material culture.** In many cultures, relationships between humans and animals are built on a foundation of respect and spiritual significance. Through Traditional Ecological Knowledge (TEK), measures are taken to ensure species are not over-hunted or over-fished. As flooding, rising temperatures, and sea ice melt leads to increasing habitat loss, climate change has offset the balance between humans and important wildlife species.



Children from the Iñupiaq village of Selawik in northwest Alaska participate in summer camps to learn cultural traditions and gain a better understanding of natural resource issues impacting their lives.

Image from the US Fish and Wildlife Service



Relationships with Wildlife section of *Climate Stories*



Image by Steve Deger



Traditional Native Alaskan seal hunting, circa 1911. Public Domain

In Alaska, communities rely on traditional food sources to feed villages, and hunting practices ensure that species are not over-harvested.

Faced with declining populations of polar bear, walrus, and other arctic animals, many tribal members are adapting hunting strategies and working to protect these species.



Children from the Iñupiaq village of Selawik learn to cut and scale fish during their cultural and environmental summer program geared towards preserving traditional lifeways.

Image from the US Fish and Wildlife Service



### Carving

*Native Alaskan*

Ivory

Late 1800s to early 1900s

Collection of the California Academy of Sciences



### Rattle (fox)

*Native Alaskan*

Ivory

Date unknown

Collection of the California Academy of Sciences



### Bola used for hunting birds

*Native Alaskan*

Ivory, string, paper (substitute for missing ivory pieces)

Late 1800s to early 1900s

Collection of the California Academy of Sciences





Image by Charles J. Sharp



Image by Stanley Oluwand/AUSAid

## Culturally-Significant Animal Species

In Papua New Guinea, the crocodile and the critically endangered cassowary bird—two culturally significant species—are losing habitat due to rising sea levels and increasing temperatures. The crocodile is traditionally the metaphor for decision making and political discussions, and its image is often used as part of material culture related to policy and negotiation.

The cassowary and other birds are seen as kin, and the use of their bones and feathers signifies relationships with ancestors.

One of the creation stories from the *latmul* community in Papua New Guinea describes a world engulfed by water. An ancestral crocodile came and scooped part of the submerged land onto its back, lifting it to the surface. It is said that when the crocodile moves the land shakes.



### Carved wooden pig

*Middle Sepik River, Papua New Guinea*

Wood, pigment

Date unknown



### Dagger

*Iatmul community, Papua New Guinea*

Carved cassowary bone, pigment

Date unknown



### Headrest with crocodile form

*Sepik River, Papua New Guinea*

Wood, pigment

1970s



An endangered cassowary bird in the Daintree Rainforest of Northern Australia. Cassowaries only live in Australia and Papua New Guinea, with about 2,000 left in the wild.

Image courtesy of the Global Museum



Global Museum collection



Preparing a pig for a wedding feast. image by Brian Ireland



Global Museum collection



### Carved Figure

*Papua New Guinea*

Feather, wood, pigment, fiber,  
boar's tusk, shell

1970s

Other culturally important species include pigs and boars, as they are part of ceremonial feasting and boar's tusks are still used for adornment today.

**Look for the boar's tusks on the figure's face.**

# The Power of Plants

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**Plants can serve as indicators of climate change.** Even subtle differences in weather patterns can lead to a decrease in biodiversity. Communities are having to adapt agricultural practices, which often serve as the main food source for a region, and are losing the ability to gather medicinal plants that they rely on for healing.



Biology students learn to gather medicinal plants in the Amazon Rainforest with a local elder, 2011.

Image by Glacierfanclub, Creative Commons



Image by Glacierfanclub, Creative Commons



Global Museum collection

This headdress is made of materials that were all gathered in the Amazon Rainforest. This region is home to over 80,000 plant species. Indigenous communities in the Amazon Basin have long relied on plants for medicinal purposes, many of which are also used in modern pharmaceuticals. Deforestation and land exploitation has made it more difficult to gather these species.

### Headdress

*Kajará (Iny) community, Northeastern Brazil*

Feathers, twine, wood

Mid-1900s



# Bio-Partnerships

Alongside plants, **fungi in Hawai'i are threatened by climate change** and human encroachment. As temperatures continue to increase, some species that live in delicate microclimates such as cloud forests and coastal forests may no longer survive.

**The Harry D. Thiers Herbarium at SF State** serves as an important repository for plant and fungi and center for biodiversity research. Professor Dennis Desjardin, Director of the SFSU Herbarium, has worked with local elders throughout his career to document fungi and plants and name newly discovered fungi species in Hawaiian-language names. He has discovered and described 49 new species from the Hawaiian Islands.





Harry D. Thiers Herbarium collection

## *Dubautia plantaginea*

On loan from the Harry D. Thiers Herbarium

This plant is one of many collected by SF State faculty and students. This specimen was collected from the Alaka'i Swamp area on the island of Kaua'i and is called *na'ena'e* in the Native Hawaiian language. It is a member of the Silversword alliance and is in the same family as an endangered species that only grows on Mt. Haleakala on Maui and Mauna Kea on the Big Island, whose unique habitats are threatened by rising temperatures.



Silversword bloom on Haleakala, Maui.

Image by Forest Starr and Kim Starr, Creative Commons



Assistant Professor of Biology Jason Cantley collects plant specimens, Hawai'i.

Image courtesy of Jason Cantley

Left: ***Hygrocybe noelokelani***

The species name of this fungi translates to “the pink rose in the mist.” These mushrooms are only found in high elevation native wet cloud forests on Maui, Molokai, and Hawai’i and are now on the endangered species list.



Center: ***Hygrocybe lamalama***

The Hawaiian name for this mushroom is “to glow as if touched by the sun.” It is found in native wet forests in the mountainous regions of all the major Hawaiian islands.



Right: ***Geastum lichiforme***

This earthstar mushroom resembles a lichi fruit. It grows in coastal Causarina (evergreen) forests on the Hawaiian islands.



Harry D. Thiers Herbarium collection

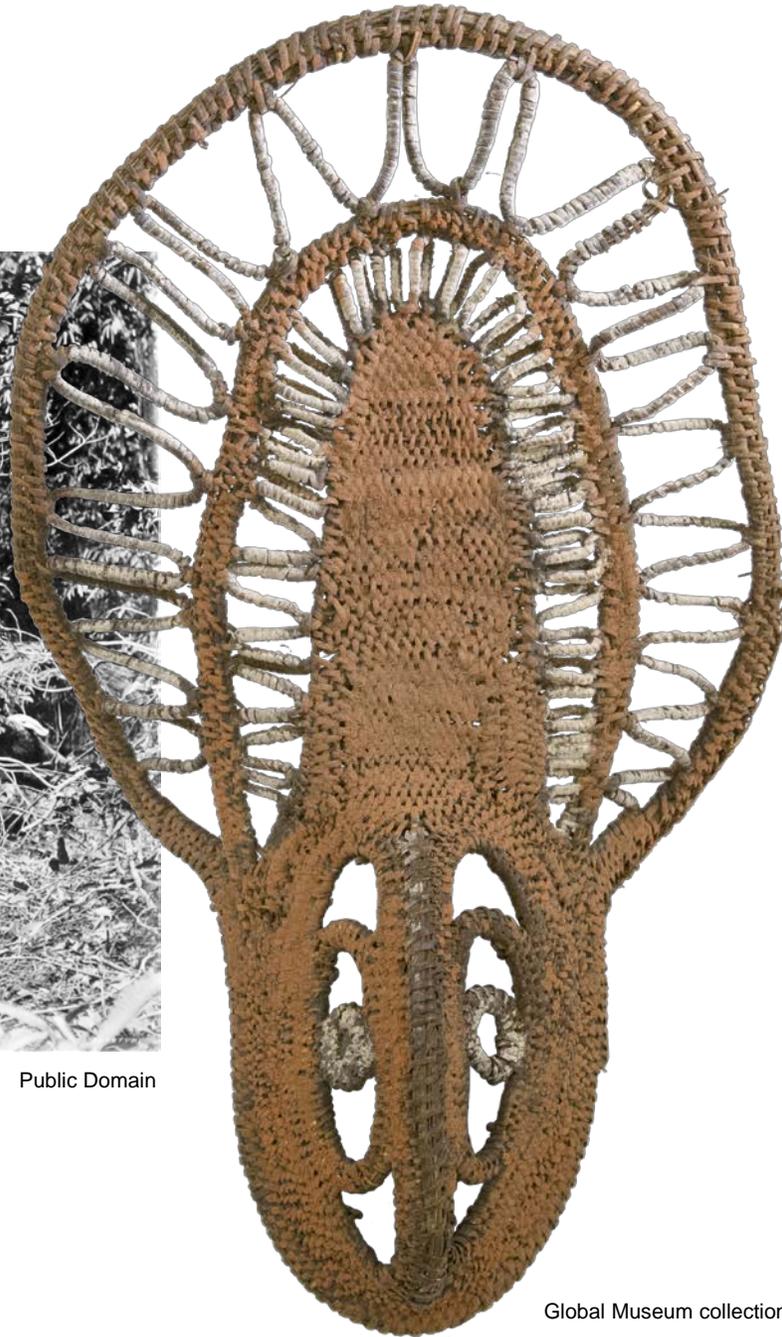
On loan from the Harry D. Thiers Herbarium

Images courtesy of Dennis Desjardin, Professor of Biology and Director of the Harry D. Thiers Herbarium at SF State





Public Domain



Global Museum collection



## Yam mask

*Abelam community, East Sepik River*

Fiber, pigment

1970s

The yam is a symbol of birth and life in the Sepik River region of Papua New Guinea and an important ceremonial crop. Yam masks are worn during annual harvest festivals. Taro and sago (palm starch) are also common foods in the highland regions. Across the country, 85% of the population relies on subsistence farming, which is the practice of growing food to solely feed family, clan, or community.



Community members in Papua New Guinea have long relied on yams as a food source. This photo of a yam harvest was taken in 1885. Public Domain

# Health Risks and Climate Change

Increased exposure to infectious diseases poses a climate-related health risk.

**In tropical areas, increasing temperatures and changing water levels have altered mosquito populations, leading to a rise in malaria.** High rainfall and humidity enhance mosquito breeding and survival. Rainfall and weather events can also contaminate water systems, especially when paired with human activities like improper sewage disposal.



Widespread increases in mosquito populations are a global health concern.

Image by Alvesgaspar, Creative Commons



A community in Uganda learn how prevent malaria with mosquito nets.

Image by Sallyforthwit, Creative Commons



Image by Alvesgaspar, Creative Commons

## Adapting Tradition

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Indigenous communities are now faced with changes to longstanding cultural traditions. **Traditional practices such as dance, ceremonies, and material culture are often tied to relationships with the natural world.**

Across the globe, people are using new technologies for hunting and subsistence strategies. Many communities are now actively engaged in policy discussions with local governments and organizations such as the United Nations.

Community members today often use cultural items such as headdresses, face paint, and bows for protests and political action in addition to traditional use.



Indigenous people, fisherman, and climate activists protest during an oil and gas auction in Rio de Janeiro, Brazil in 2017. Image by Juliana Colussi, Creative Commons



### Headdress

*Xavante community, Amazon Basin*

Feathers, reed, thread

Date unknown



### Bow with string

*Probably Jívaro people*

*(Peruvian/Ecuadorian Amazon)*

Wood, hide, beads, leather

Date unknown



### Bow

*Amazon Basin*

Wood

Date unknown



### Bow

*Campa community*

*(Peruvian Amazon)*

Wood

Date unknown



Global Museum collection



## Carved walrus tusk depicting hunting scene

*Native Alaskan*

Walrus tusk (ivory)

Early 20th century

Collection of the California Academy of Sciences

Pacific walrus depend on sea ice for survival, and are culturally and spiritually significant for many Native Alaskan tribes. They provide vital nutrition, as well as hide and ivory for clothing and material culture.

In 2013, warmer weather and declining sea ice prevented hunters on St. Lawrence Island from accessing walrus herds, resulting in a record low harvest and food shortage. Native Alaskan hunters have tried new methods, including flying drones over ancestral hunting grounds, to track sea ice and walrus populations.

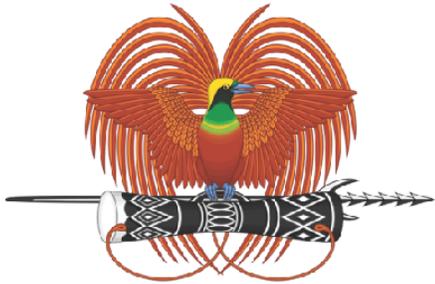


Group of Pacific walrus on ice, 2016

Image courtesy of the US Geological Survey

# National Climate Action Plans

In 2016, Papua New Guinea became the first country to formally submit a national climate action plan under the Paris Accord, the agreement with the United Nations Framework Convention on Climate Change. Papua New Guinea's national climate-compatible development policy includes institutional capacity building, migration policy, solar farms, and mangrove rehabilitation.



As government symbols, the Papua New Guinea flag and national emblem embody connections to nature. Both use an image of the Raggiana bird-of-paradise, the national bird, which clasps a traditional kundu drum on the emblem.



# COP21 MAJOR OUTCOMES

5 Key Elements of the Paris Agreement

Countries to **STRENGTHEN CLIMATE ACTIONS** every 5 years

**ADAPTATION** is a central pillar to help world's most vulnerable

**LONG-TERM GOAL** to achieve climate neutral world

**ENHANCED TRANSPARENCY** to ensure commitments are met

**FINANCE, CAPACITY BUILDING** will scale up support for least developed countries

The Paris climate negotiations prompted more than 10,000 new initiatives involving cities, regions, companies, investors and civil society organizations, including:

**186**

**COUNTRIES** shared national climate action plans, called INDCs

**127+**

**MILLION HECTARES** of degraded land in Africa and Latin America to be restored

**400+**

**CITIES SET TARGETS** avoiding over 740m tons of GHGs annually by 2030

**\$1T**

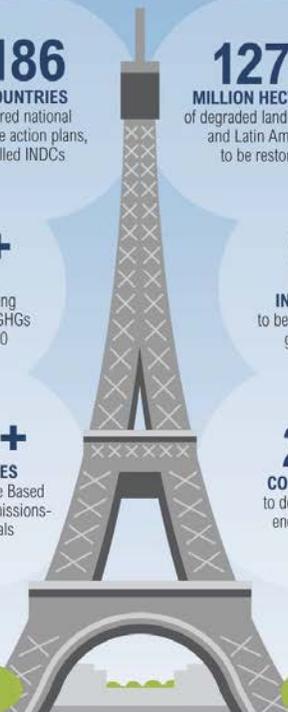
**IN SOLAR INVESTMENTS** to be mobilized by new global alliance

**114+**

**COMPANIES** will use Science Based Targets to set emissions-cutting goals

**20**

**COUNTRIES** to double clean energy R&D



These substantial climate actions will transform world and drive us toward a safer, climate-resilient future.

# Nations Unies

## Conférence sur les Changements Climatiques

COP21/CMP11

Paris France



Plenary session for the adoption of the Paris Accord, image by Arnaud Bouissou



Image by Pete Unseth



### Papua New Guinea flag

Printed cloth

2019



### Kundu drum

*Gogodala community*

Wood, snakeskin, pigment

Date unknown



# Action Now

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Despite these challenges, communities across the globe are rallying together to enact change. Climate change is now a global conversation, and one that we should all be a part of.

**At SF State, many students, staff, and faculty members are actively engaged in climate change research, projects, and programs.** Leaders include the Estuary & Ocean Science Center and numerous academic departments from the sciences and beyond. Learn about some of the resources right here on campus and ways to be involved!



SF State students in the field collecting plant specimens in Hawai'i  
Image courtesy of Dr. Jason Cantley, Assistant Professor of Biology at SF State



Image courtesy of the Global Museum



## Talking about Climate Change



A major new study from Yale University reveals that one of the most important things we can do about climate change is talk about it with friends and family, which leads to greater understanding and concern about the issue. So how do we talk about climate change? **To start, here are some definitions that can sometimes be confusing!**

### **What is climate change, anyway?**

The earth's average temperature increased by almost one degree Celsius in the past century. While the planet has experienced natural warming periods throughout history, there is no longer any doubt among the scientific community that recent human activity has increased the concentration of these heat-trapping gases (largely carbon dioxide, or CO<sub>2</sub>) in our atmosphere. Increasing heat melts reflective sea ice, meaning more sunlight is absorbed by the earth than ever before, leading to rising temperatures.

# Climate Change or Global Warming?

Climate change has a social impact. Seemingly small changes in global temperature have disrupted both ecosystems and livelihoods. Natural disasters and extreme weather—from drought to cold snaps—have been happening more than ever in recorded history.

Scientists use both **climate change** and **global warming**. However, climate change is becoming the preferred term as it also addresses rising sea levels, extreme weather, and other impacts.

## **One degree Celsius?**

A global increase of one degree Celsius—or 1.8 degrees Fahrenheit—may not sound like enough to cause problems. However, NASA studies reveal that even small differences create longer heat waves, heavier rainstorms, and more coral reef die-off.



# Sustainable SF State

Aims to educate students, faculty and staff to embrace the values and principles of sustainability by integrating them into the University's planning and policies, academics, operations, student activities, and community engagement.

## SFSU Initiatives include:

### People

- Food security (Basic Needs Initiative)
- Student success + graduation initiatives
- Promoting health + wellness
- Access to housing
- Water bottle filling stations

### Environment

- Gator Pass – use your pass on public transit!
- Zero waste + energy + water
- Climate adaptive landscape

### Financial

- Fossil fuel divestment
- Green fund investment

### Future State

- Decarbonization – no combustion
- Embodied energy – reuse
- Biophilic design – connection to nature
- Walkable neighborhoods
- Climate Neutral by 2030-2040
- Designing to achieve better energy + water performance

Visit <http://sustain.sfsu.edu>

or follow [@SustainSFState](https://twitter.com/SustainSFState) to learn more!

Looking for ways to be involved in a student group on campus? Check out the Associated Students Environmental Resource Center: <http://asi.sfsu.edu/asprograms/erc/>



Image courtesy of the Global Museum

# Understanding Climate Change

Learn about some of the current faculty and student research projects at SF State to understand climate change and its affects on our environment.

## A clearer view of past climate from tree rings

By **Patrick Monahan** Thursday, February 28, 2019



Credit: Garry Knight / Flickr (CC BY 2.0)

## A basic law of plant growth leads to big jumps in accuracy of climate records

### SF State team tests surprising new tools for slowing climate change

By **Patrick Monahan** Thursday, July 18, 2019



Professor of Geography & Environment Andrew Oliphant and Assistant Professor of Biology Kevin Simonin set up an instrument in Red Clover Valley.

### Climate change may turn important marine organisms into 'junk food'

By **Patrick Monahan** Thursday, June 13, 2019



A calanoid copepod, closely related to the species studied by San Francisco State University scientists (photo courtesy of Mike Stukel).

**Study shows that predicted future ocean conditions make tiny algae, vital to ocean food webs, less nutritious**

## How sea anemones feel the pinch of climate change

The climate crisis throws many things into disarray — in tidepools, a tiny yet crucial relationship is strained.

[COMMUNITY CONTRIBUTOR](#) / Sep. 14, 2019 5:00 p.m. / [FEATURES](#) / [NEWS COLUMNISTS](#)



If you've visited the rocky California coast at low tide, you've probably seen, stepped on, and stuck fingers into carpets of aggregating sea anemones, or sea flowers. These elegant and colorful masses of tentacles, ever-present in the intertidal, close up during low tide to present as dark green blobs.



**Science News** from research organizations

## Climate change puts coastal crabs in survival mode, study finds

Date: November 12, 2014

Source: San Francisco State University

Summary: Intertidal zone crabs can adapt to a warming climate, but will not have energy for much else besides basic survival, researchers have learned. In the first study to look at the combined effects of varying temperatures and ocean acidity levels on porcelain crabs, researchers found that as temperature rises and pH drops, the crabs' thermal tolerance increases but their metabolism slows.

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# THE FRAGILE FRAMEWORK

Can nations unite to save  
Earth's climate?



A COMIC BY  
RICHARD MONASTERSKY  
AND NICK SOUSANIS

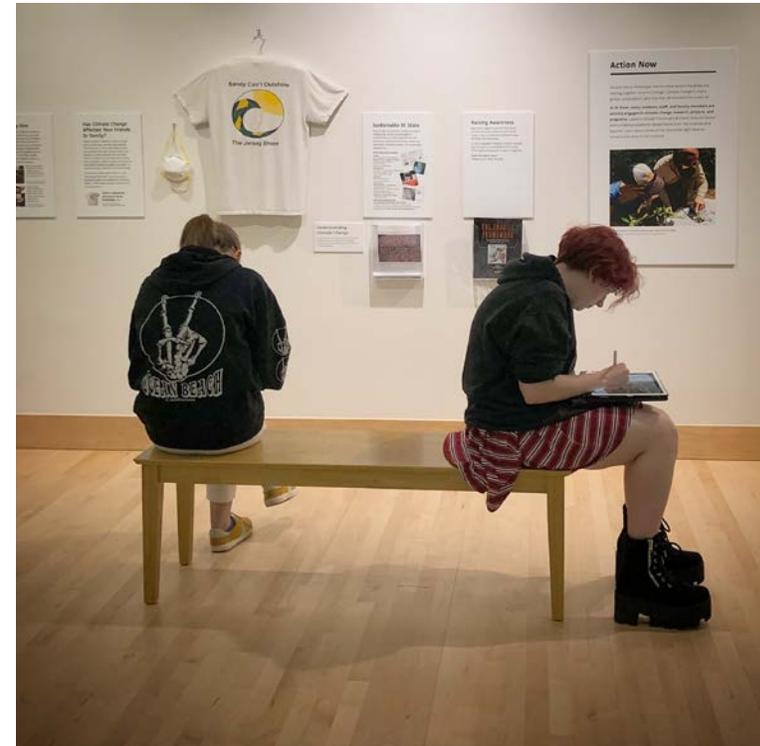


*The Fragile Framework*, courtesy of Nick Sousanis

## Raising Awareness

Many other departments and institutes at SF State—from art to documentary film to music—communicate about climate change and help raise awareness.

In 2015, Assistant Professor of Comic Studies Nick Sousanis co-published a comic titled “The Fragile Framework” in *Nature* magazine.



# Has Climate Change Affected Your Friends Or Family?

Natural disasters related to climate change such as hurricanes and fires have become more common. In the United States, entire communities have been forced to leave their homes as a result of events like Hurricane Katrina in 2005 and more recently the Camp Fire in Paradise, California. Many architects are now finding methods to design and build in a responsive way in the face of climate change.

Communities often raise money for local rebuilding efforts after natural disasters. A graduate student purchased this t-shirt at a bakery in New Jersey during a fundraiser for Hurricane Sandy.



## T-shirt created for Hurricane Sandy fundraiser, 2012

On loan from Sara Roberts,  
Museum Studies graduate student



Flooding following Hurricane Sandy, image by Beth Carey



2018 Camp Fire smoke at SF State, image courtesy of Sreang Hok

# 2018 Camp Fire

For over a week in 2018, Bay Area residents were advised to stay indoors due to smoke from the devastating Camp Fire in Paradise, almost 200 miles away. Events like this are difficult for all communities but especially for those with chronic illnesses or people with disabilities, who may have mobility issues or no access to masks. The SF State Health Center provided free ventilation masks to those who needed them on campus.



Many SF State students shared stories of family and friends who lost their homes in the Camp Fire in November 2018.

Image courtesy of Victoria Lambertson, Museum Studies graduate student



Museum Studies graduate student Sara Roberts (right) and her mother wear masks in Fairfax, California during the Camp Fire, in November 2018.

Image courtesy of Sara Roberts, Museum Studies graduate student

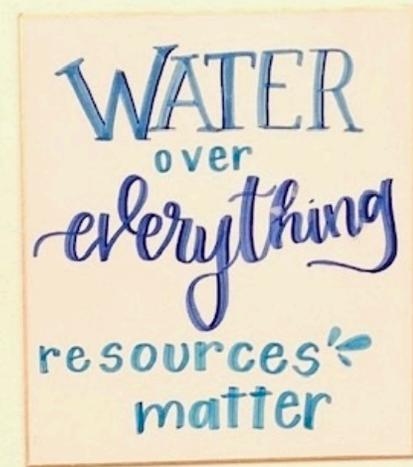
## Climate Justice Protest Signs, 2019

On loan from SF State Students

On September 26, 2019 hundreds of SF State students banded together for a climate justice rally. These protest posters are a few of the many created for the event for students to make their voices heard.



Image courtesy of Global Museum



Climate protest signs on display in the exhibition, courtesy of SFSU students

## Take Action

While we cannot stop climate change outright, our actions still matter. Larger decisions need to be made at the policy level. If possible, get involved with your local government! However, even small actions help lend our voices to the climate conversation and raise awareness.

Choose an action card of a  
you will take, snap a photo  
@GlobalMuseumSFSU.

**VOTE!**

CLIMATE  
JUSTICE

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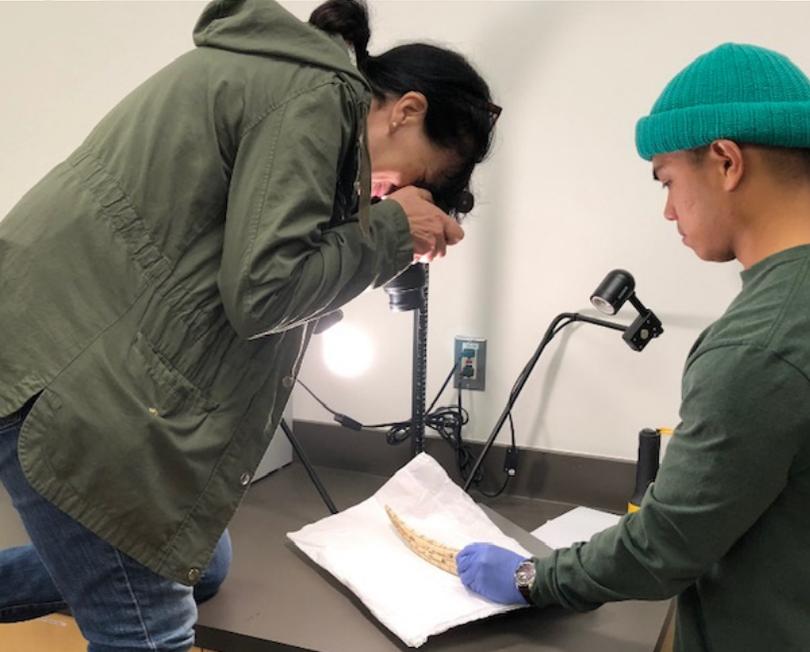
# Acknowledgments

This exhibition is the result of the work of students in the Museum Studies Program and the staff of the Global Museum, and supported by the Instructionally Related Activities Fund. Special thanks to exhibit consultant Kathleen McLean, mount-maker Camille Duplantier, Laura Eklund from the California Academy of Sciences, Cathy Kudlick and Emily Beitiks from the Paul K. Longmore Institute on Disability, Soumyaa Behrens from the Documentary Film Institute, and exhibition designer Fran Osborne.

The Global Museum would like to thank the California Academy of Sciences, the Harry D. Thiers Herbarium at San Francisco State University, Nick Sousanis, and graduate student Sara Roberts for lending their collections to the exhibition.

All objects on display are from the collections of the Global Museum, which cares for them on behalf of San Francisco State University, unless otherwise indicated.





# Disability Access and Sustainable Museum Practices

The Global Museum acknowledges the importance of making our exhibition gallery accessible to visitors with disabilities.

Through a partnership with the Paul K. Longmore Institute and a grant from the College of Liberal and Creative Arts, the museum staff and students have worked with members of the disability community on accessibility planning.

We also aim to incorporate sustainable practices into our activities whenever possible. The Global Museum uses recycled materials and eco-friendly cleaning products and repurposes casework and exhibit supplies. Our Museum Studies Student Sustainability Committee support these efforts.

# Thank you for visiting!

We hope you enjoyed our digital version of *Climate Stories*.

This exhibition would not have been possible without the dedicated work of the San Francisco State University Museum Studies students.

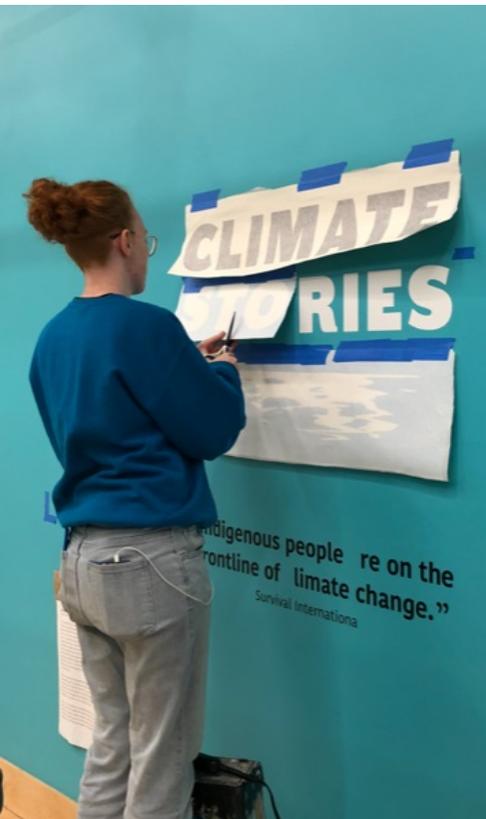
For more information, please visit [museum.sfsu.edu](http://museum.sfsu.edu)

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# CLIMATE STORIES



**“Indigenous people are on the  
frontline of climate change.”**

Survival International