



# Climate Change Adaptation and Mitigation tools with **Arc-X**

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# How will Climate Change Affect our areas?

- ▶ Rainy seasons have shifted to later in the year
- ▶ Gathering periods for native plants have been altered
- ▶ Animal migration patterns have been affected
- ▶ Winters are longer, and heavy rain storms cause more damage
- ▶ Summers are hotter and drier, there are more fires and drought.

# What planning can be done now?

## What exactly is needed?

- ▶ Tribes need resources to support education, outreach, and program implementation
- ▶ A need for Tribal specific and culturally sensitive methods to communicate climate change and assist tribes where necessary.
- ▶ Program Implementation: - ie. Obtain a baseline assessment by conducting emissions inventory to determine impacts of climate change on air quality
- ▶ Provide tools to connect environmental decisions with public health specific to individual areas and tribes.

# How can we measure success in our plans

- ▶ Document impact on climate change on Tribal and Native communities and their ecosystems
- ▶ Report on climate change educational outreach and adaptation activities within Tribal communities
- ▶ Ownership of climate change adaptation plans specific for Tribes
- ▶ Share and present research, studies, ideas, successes at community, academic, government and inter-government levels
- ▶ Observe behavioral changes due to implementation of climate change measures

# Adaptation Resource Center Arc-X

- ▶ <https://www.epa.gov/climate-adaptation>
- ▶ ARC-X - <https://www.epa.gov/arc-x>

# Your Climate Adaptation Search

## Geographic Region

Pick one region:



## Area of Interest

Pick one or more interests:

### Air Quality

- Indoor Air
- Outdoor Air
  - Ground Level Ozone
  - Particulate Matter

### Water Management

- Water Utility Facility Operations
  - Drought
  - Saltwater Intrusion
  - Sea-level Rise
  - Storms & Flooding
  - Source Water Impacts
- Water Quality
  - Stormwater Runoff
  - Erosion & Sedimentation
  - Algal Blooms
- Ecosystem Protection
  - Wetland Protection
  - Estuaries
  - Change in Fish Species

### Waste Management & Emergency Response

- Contaminated Site Management
- Disaster Debris Management

### Public Health

- Air Quality
- Water Quality
- Extreme Heat

### Adaptation Planning

- Getting Started
- Comprehensive
- Sector-Based

**Select both a Region and an Area of Interest to search.**


intranet.epa.gov | Adaptation - Tribes & Climate Ch | Your Climate Adaptation Search

epa.gov/arc-x/your-climate-adaptation-search

# Your Climate Adaptation Search

## Geographic Region

Pick one region: Southwest



## Area of Interest

Pick one or more interests:

- Air Quality**
  - Indoor Air
  - Outdoor Air
  - Ground Level Ozone
  - Particulate Matter
- Water Management**
  - Water Utility Facility Operations
  - Drought
  - Saltwater Intrusion
  - Sea-level Rise
  - Storms & Flooding
  - Source Water Impacts
  - Water Quality
    - Stormwater Runoff
    - Erosion & Sedimentation
    - Algal Blooms
  - Ecosystem Protection
    - Wetland Protection
    - Estuaries
    - Change in Fish Species
- Waste Management & Emergency Response**
  - Contaminated Site Management
  - Disaster Debris Management
- Public Health**
  - Air Quality
  - Water Quality
  - Extreme Heat
- Adaptation Planning**
  - Getting Started
  - Comprehensive
  - Sector-Based

Select both a Region and an Area of Interest to search.

Submit Search Clear All

https://www.epa.gov/KS

Select the Southwest Region

Select an area for additional information

Submit Search

intranet.epa.gov x Adaptation - Tribes & Climate Ch x Your Climate Adaptation Search x +

epa.gov/arc-x/your-climate-adaptation-search

Apps 9online | One EPA... Region 9 Grant File... One EPA Workplace R9 Tribal CWA Proje... Oaks Christian Scho... Water 3-1 Reading list

Environmental Topics v Laws & Regulations v Report a Violation v About EPA v

[Climate Change Adaptation Resource Center \(ARC-X\)](#) CONTACT US

# Your Climate Adaptation Search

## Integrated Package of Tailored Information:

**Steps to Help You Prepare for the Impacts of Climate Change**

On this page:

- [Implications of Climate Change](#)
- [Adaptation Strategies](#)
- [Case Studies](#)
- [Tools](#)
- [Training](#)
- [Funding](#)
- [EPA Contacts & State Websites](#)


**Implications of Climate Change – Why does climate change matter for the things you care about?**

**Water Quality:** Stormwater Runoff, Erosion and Sedimentation Rates, and Harmful Algal Blooms

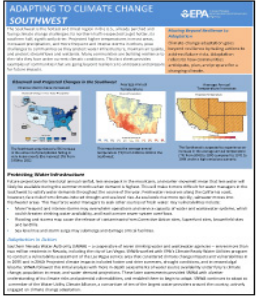
- [Climate Adaptation and Stormwater Runoff](#)
- [Climate Adaptation and Erosion and Sedimentation](#)
- [Climate Adaptation and Harmful Algal Blooms](#)

**Adaptation Strategies – What can you do about it?**

Search Again



[How Communities in the Southwest are Adapting](#)



- ▶ These pages will produce information on
- ▶ What to expect with climate change
- ▶ How mitigation of these effects can be planned for.



# Stormwater Runoff

- ▶ Climate change could bring more frequent and intense storms and extreme flooding events.
- ▶ Mitigation
  - ▶ Try to reduce runoff with Rain Gardens or bioretention, blue roof to hold precipitation and discharge at a controlled rate
  - ▶ Permeable pavement - pavement or pavers with void space that allow runoff to flow through. Permeable pavers are also effective at removing heavy metals, oils, and nutrients such as phosphorus and nitrogen.
  - ▶ Retention ponds, stormwater tree trenches, detention wetlands, and planting trees are other ideas based on your area.

# Indoor Air

- ▶ Climate change can lead to extreme weather causing breakdowns in physical barriers between outdoor and indoor spaces where indoor fungi and mold can grow.
- ▶ Mitigation:
  - ▶ Maintain proper weatherization and ventilation. To manage moisture control and dilute pollutants generated indoors.
  - ▶ Install storm windows, weather stripping, caulking and better insulate homes.
  - ▶ If possible new designs to allow for prolonged power outages

# Outdoor Air

- ▶ Ground level ozone will increase as temperatures rise, increasing the number of poor air quality days, and a longer ozone season.
  - ▶ Do these days need to be planned for?
  - ▶ Can an area offset this with ozone precursor emissions reductions?
- ▶ Particulate matter: Forest fires are likely to increase in frequency, severity and distribution. Particulates from wildfires can travel long distances, reduce visibility and cause environmental damage.
  - ▶ Are there designated places community members can go for cleaner air - a community center with good air filtration and temperature control in extreme situations
  - ▶ Are there communication plans in place to notify community members of this availability?

## ..What else can be done?

- ▶ Drive less, choose cleaner commutes, walk, bike. Combine errands, do not idle cars. Don't use gas powered lawn and garden equipment.
- ▶ Conserve electricity, set A/C higher in summer and heater lower in the winter. Look for Energy Star labels.
- ▶ Try not to burn wood, trash or leaves.
- ▶ Compost! Methane released from food waste is a large source of emissions

# Ecosystem protection

- ▶ Impacts of climate change:
  - ▶ Flooding and stormwater management, erosion and sedimentation, wetland protection, sea level rise, estuaries and changes in fish species.
- ▶ Mitigation:
  - ▶ Promote natural buffers, adequate culvert sizing
  - ▶ Create a regional sediment management plan
  - ▶ Maintain sediment transport
  - ▶ Promote wetland accretion by introducing sediment
  - ▶ Prevent or limit groundwater extraction from shallow aquifers.
  - ▶ Manage water demand through water reuse, recycling, rainwater harvesting, desalination

# Other resources!!

- ▶ <http://www7.nau.edu/itep/main/tcc/>
- ▶ <http://www7.nau.edu/itep/main/tcc/Resources/adaptation>
- ▶ <https://www.georgetownclimate.org/adaptation/featured.html>
- ▶ <https://tribalclimate.uoregon.edu/>
- ▶ <https://www.epa.gov/climate-adaptation>
- ▶ <https://www.epa.gov/arc-x>

# Questions?

Thank you!

Please contact Suzanne Marr ([Marr.Suzanne@epa.gov](mailto:Marr.Suzanne@epa.gov))  
or myself with questions!

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