

OFFICE OF
INTERNATIONAL AND
TRIBAL AFFAIRS:
CLIMATE ADAPTATION
IMPLEMENTATION PLAN

October 2022

U.S. Environmental
Protection Agency

Disclaimer

To the extent this document mentions or discusses statutory or regulatory authority, it does so for informational purposes only. This document does not substitute for those statutes or regulations, and readers should consult the statutes or regulations to learn what they require. Neither this document, nor any part of it, is itself a rule or a regulation. Thus, it cannot change or impose legally binding requirements on EPA, States, the public, or the regulated community. Further, any expressed intention, suggestion or recommendation does not impose any legally binding requirements on EPA, States, tribes, the public, or the regulated community. Agency decision makers remain free to exercise their discretion in choosing to implement the actions described in this Plan. Such implementation is contingent upon availability of resources and is subject to change.

EPA Document Number 160B22002

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 12 2022



DEPUTY ADMINISTRATOR

Preface

Climate change is threatening communities across the nation. Millions of Americans feel the destructive effects of climate change each year when the power goes down, rivers and lakes go dry, homes are destroyed by wildfires and communities are flooded by hurricanes. Underserved communities are especially vulnerable to the climate crisis and are more likely to experience the negative health and environmental effects of extreme weather events.

The Biden-Harris Administration is actively confronting the climate crisis while also advancing environmental justice. As part of a whole-of-government approach, the U.S. Environmental Protection Agency is strongly committed to taking the actions necessary to protect human health and the environment and to increase the resilience of the entire nation, even as the climate changes.

The EPA's commitment to action is reflected in its FY 2022-2024 Strategic Plan and in the 2021 Climate Adaptation Action Plan. Both documents present priority actions the agency will take to ensure that its programs, policies and operations remain effective under future climate conditions while we work to support states, territories, tribes and communities in increasing their own adaptive capacity and resilience to climate change impacts.

From flooding at Superfund sites, to wildfires causing air pollution, to sea-level rise affecting water quality and infrastructure, the EPA will boldly address climate impacts in both its programs and the communities it serves. We recognize the importance of tribal, state and local government partnerships in efficient, effective and equitable implementation of climate change adaptation strategies. Our plans were informed and improved by input we received in listening sessions we held to engage these and other partners as we developed these plans.

To ensure we are addressing the climate crisis in a comprehensive way, each of our national program and regional offices has developed individual Climate Adaptation Implementation Plans that outline how the EPA will attain the agencywide goals described in the broader Climate Adaptation Action Plan. These plans describe how programs and regions will integrate climate adaptation into their programs, partnerships and operations. They also describe how they will help partners build their resilience and capacity to adapt, while

delivering co-benefits, including curbing greenhouse-gas emissions and other pollution, and promoting public health, economic growth and climate justice. Of course, the EPA has a major role to play on emissions reductions as well, though that is not the focus of these plans. Indeed, we must focus on both climate adaptation and mitigation to ensure our nation and communities thrive in an era of climate change.

As part of this effort, we will empower our staff and partners by increasing awareness of how climate change may affect our collective ability to implement effective and resilient programs. We will also provide them with the necessary training, tools, data, information and technical support to make informed decisions and integrate climate adaptation into our work.

The EPA will work to modernize its financial assistance programs to encourage climate-resilient investments across the nation. We will also focus on ensuring that investments funded by the Bipartisan Infrastructure Law, the Inflation Reduction Act and other government programs are resilient to the impacts of climate change. Finally, as our knowledge advances and as impacts continue to develop, our response will likewise evolve. We will work to share these developments to enhance the collective resilience of our nation.

The actions outlined in these implementation plans reflect the EPA's commitment to build every community's capacity to anticipate, prepare for, adapt to and recover from the increasingly destructive impacts of climate change. Together with our partners, we will work to create a healthy and prosperous nation that is resilient to the ever-increasing impacts of climate change — which is vital to the EPA's goal of protecting human health and the environment and to ensuring the long-term success of our nation.



Janet G. McCabe

OITA's International and Tribal Climate Adaptation Implementation Plans

Introduction

Climate change poses a real and present danger to communities across the U.S. including tribal and Alaskan Native Villages, and to our international partner communities as well. Nearly 40% of federally recognized Tribes live in Alaska Native communities where rapidly rising temperatures, melting sea ice and glaciers, and thawing permafrost is having a significant negative impact on critical infrastructure, in addition to other disproportionate impacts to tribal lands and natural resources closely tied to traditions and cultural identities. Internationally, climate impacts are already being felt, and already disproportionately impacting communities in the Global South where historic and growing inequities are especially challenging.

President Biden's Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, requires federal agencies to develop Climate Action Plans that describe their agency's climate vulnerabilities, as well as the vulnerabilities of their tribal and international partners, and the steps it will take to bolster adaptation and increase resilience to the impacts of climate change. The 2021 EPA-wide Plan calls for accelerating and enhancing climate action and focuses agency attention on priority actions it will take to fulfill our mission and increase human and ecosystem resilience even as the climate changes.

The Office of International and Tribal Affairs (OITA) has two distinct areas of focus: the American Indian Environmental Office (AIEO), and the Office of International Affairs (OIA). OITA has developed Climate Adaptation Implementation Plans for the two distinct missions. The specific plans for AIEO (pages 6-18) and for OIA (pages 19-31), are significant enhancements to the OITA's 2014 plans. AIEO and OIA will also consult with its tribal and international partners, as appropriate, as these plans evolve and are refined.

Senior Career Leader Responsible for Oversight

The senior career leader responsible for oversight of the OITA climate adaptation activities is the OITA Principal Deputy Assistant Administrator, Rafael DeLeon. In AIEO, several people have contributed to the development of the climate adaptation plan. Felicia Wright is the Deputy Director of AIEO and provided plan oversight and guidance, especially on priority actions. Lisa Berrios is the Senior Advisor for Tribal Capacity Development and she provided extensive input on plan development and direction. Sarah Finnegan is the performance measures lead for the Tribal Capacity Development team and she contributed to the development of the plan and performance measures. In OIA, Deputy Office Directors provided guidance and oversight, and Anthony Socci, Ph.D., Senior Lead on International Resilience & Adaptation Policy, leads planning, outreach and drafting.

OITA Operating Procedures

OITA will periodically review and evaluate operating procedures to continually ensure that programmatic operational elements account for potential risks posed by climate change. This will help ensure the continued effectiveness and viability of OITA programs and initiatives. OITA will periodically review and assess the changing climate adaptation needs of our international and tribal partners and assess the adequacy and direction of our programs and initiatives and make adjustments insofar as resources permit.

OITA will work with its Office of Mission Support (OMS) and the rest of EPA HQ to ensure the resilience of its facilities and operations to climate changes as needed or desired. Additionally, OITA will consider exploring with the State Department's Bureau of Oceans and International Environmental and Scientific Affairs (OES) and the ESTH community (environment, science, technology, and health officers located within US Embassies internationally) the feasibility of the network of US Embassies around the world, adding to their travel advisories and guidance for official government business travelers, relevant local weather and climate information that may impact the timing of travel, traveler safety or the ability of official government business travelers to move about easily within a specific area subsequent to arrival.

OITA will incorporate climate considerations into the office's publications and communications as applicable. While OITA does not routinely produce publications, OITA does have a web presence and has a process in place for social media and other communications activities. Within that process, OITA will add a step to ensure climate change risks have been considered and communicated when deemed appropriate and/or relevant. OITA will also continue to share its climate adaptation implementation plan with all its partners and continually invite partner feedback as well.

OITA will explore opportunities to integrate climate change considerations into its financial assistance programs in order to expand support for projects that increase climate resilience while delivering co-benefits for public health, the mitigation of greenhouse gases, and the reduction of other pollution.

American Indian Environmental Office Climate Adaptation Implementation Plan

Climate Vulnerability Assessment

Overview

Each Tribe experiences their own unique climate change impacts and vulnerabilities, and collectively, tribal nations experience nearly every climate change impact that's present in North America. Critically, because Tribes are so closely connected to the area and land on which they live, the changes to the physical environment due to climate change have disproportionate impacts on indigenous peoples.

AIEO reviewed the vulnerability assessments that each EPA Region conducted, some of which specifically identified tribal vulnerabilities in their region. This review enhances AIEO's own vulnerability assessment. For example, a consistent tribal vulnerability mentioned throughout regional Climate Adaptation Implementation Plans relates to water. Both extreme drought and extreme precipitation have disproportionate impacts on Tribes because, as Region 9's vulnerability assessment states, "water is at the heart of many tribal cultures and the foundation of livelihoods, economies, subsistence, and treaty rights."

AIEO has also assessed vulnerabilities related to climate adaptation capacity building, which is directly applicable to the Indian Environmental General Assistance Program (GAP) that AIEO manages. During a December 2021 listening session with Tribes, AIEO learned that the most prevalent barriers to tribal climate adaptation work are related to funding, inaccessible data & information, and tribal climate adaptation expertise.

Physical Impacts of Climate Change

For a broad overview of climate change indicators impacting Tribes in the North America, see Figure 1. These and other projected climate change impacts will affect Tribal Nations. As with all climate change impacts, all projections are dependent on location and may result in compounding effects depending on local climate. Table 1 outlines major climate vulnerabilities across North America from the Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States. For a comprehensive look at climate change in the United States, refer to the full National Climate Assessment report.²

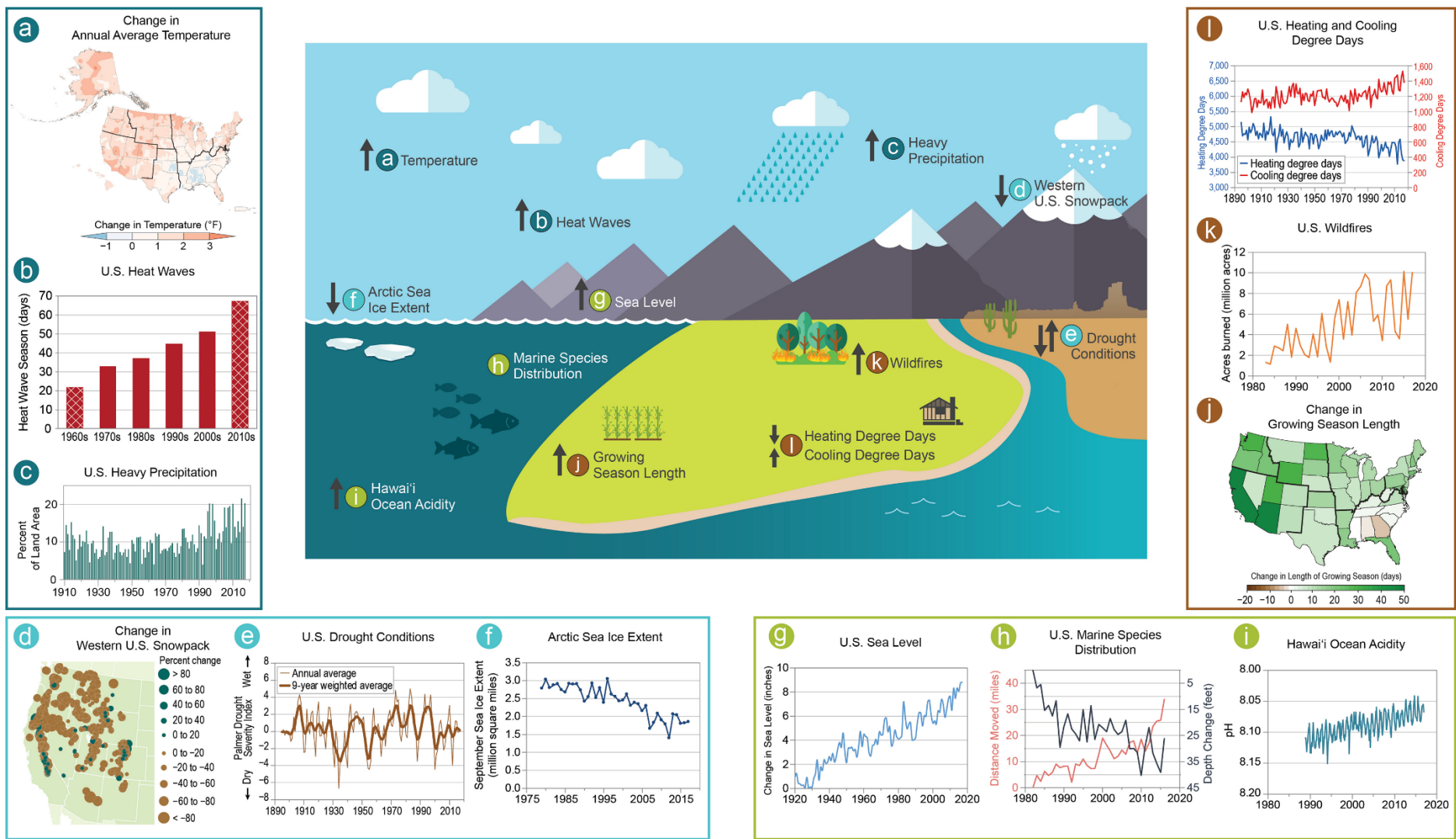


Figure 1: Figure from the 4th National Climate Assessment, 2018³ showing the climate change indicators seen in North America. Sources: (a) adapted from Vose et al. 2017⁴, (b) EPA, (c–f and h–l) adapted from EPA 2016⁵, (g and center infographic) EPA and NOAA.

Climate Change Vulnerabilities by Topic	
Air	Water
<p>Increased tropospheric ozone pollution Increased particulate matter from wildfires Decreased indoor air quality Increases in airborne allergens</p> <p style="text-align: center;">Human Health</p>	<p>Water Quantity and Quality</p> <p>Increases in agricultural drought Reduction of snowpack Changes in timing of water supply Changes in temperature and dissolved oxygen levels</p> <p style="padding-left: 20px;">⇒ losses in biodiversity and shifts in ecosystems and aquatic life ⇒ increased instances of harmful algal blooms</p>
<p>Increases in heat waves and other extreme weather events Increased exposure to allergens Increased exposure to vector-, food-, and water borne diseases Mental health consequences.</p> <p style="text-align: center;">Ecosystems</p>	<p>Water Infrastructure and Built Environment</p> <p>Increases in extreme precipitation events</p> <p style="padding-left: 20px;">⇒ flooding, failure of wastewater and water treatment plants ⇒ failure of levees and other retaining features</p> <p>Permafrost thawing</p> <p style="padding-left: 20px;">⇒ loss of land and flooding</p> <p>Legacy contaminated sites and industrial sites at risk for flooding</p>
<p>Increases in nuisance species Disruption of ecosystems Permafrost melting Destruction from increased wildfires</p>	<p>Coastal Impacts</p> <p>Sea level rise</p> <p style="padding-left: 20px;">⇒ flooding, loss of wetlands, loss of infrastructure</p> <p>Erosion of coastline Ocean acidification</p> <p style="padding-left: 20px;">⇒ affects ability of some aquatic life from producing shells</p>

Table 1: Select climate change vulnerabilities pertinent to Tribal Nations in North America. Sources: Air⁶, Human Health⁷, Ecosystems⁸, Water⁹, Permafrost thawing¹⁰, contaminated and industrial sites flood risk¹¹, coastal impacts¹²

Tribal Nations and Climate Change

Vulnerability Assessments

Tribal Nations and members within each Tribal Nation have a unique relationship with climate and a unique set of climate change impacts that they are experiencing. The best resource for understanding climate change vulnerabilities for a Tribe will come from a Tribe itself. Resources to find current, publicly available tribal climate vulnerability assessments include the [University of Oregon Climate Change Guide](#), [National Congress of American Indians Climate Action: Tribal Approaches](#), [Northern Arizona University](#), and [the Climate Adaptation Knowledge Exchange](#). In the December 2021 Listening Session, AIEO learned from Tribes that many are currently in the process of writing their adaptation plans. Tribes requested technical assistance for the following items: accessing climate data, engaging with leadership and the community, finding resources, understanding vulnerabilities, writing a climate adaptation plan, and methods for implementation of a climate adaptation plan. Table 2 outlines barriers to this work outlined by Tribes in this listening session.

Tribally Identified Barriers to Climate Adaptation Work
Access to relevant climate adaptation data
Funding
Accessibility of online information
Internet access
Capacity to analyze climate data
Capacity to make site specific decisions (mapping, engineering, etc)
Lack of staff with climate adaptation science expertise

Table 2: Barriers to climate adaptation work identified by Tribes in the December 2021 Listening Session

Examples of Tribal Vulnerabilities to Climate Change

The following sections detail some vulnerabilities specific to Tribal Nations, however this list is not exhaustive and does not necessarily apply to all Tribal Nations. Along with the vulnerabilities assessments listed in the previous section, the following references will give a more comprehensive look at climate change and Tribal Nations:

- Institute of Tribal Environmental Professionals “The Status of Tribes and Climate Change Report”¹³
- Fourth National Climate Assessment, Volume II “Chapter 15: Tribes and Indigenous Peoples”¹⁴
- Great Lakes Indian Fish and Wildlife Commission, “A Tribal Climate Adaptation Menu”¹⁵
- Environmental Protection Agency’s “Climate Change and Social Vulnerability in the United States”¹⁶
- Tribal Case Studies within the U.S. Climate Resilience Toolkit^{17,18}

Institutional Vulnerabilities

Federally Recognized Tribes may have a special relationship with the environment.¹³ Tribes’ adaptation to climate change vulnerabilities may depend upon or be affected by treaty rights, acts of Congress, executive orders, administrative agreements, and court decisions.¹³ In order to

respond effectively to Tribal climate vulnerabilities, EPA staff are encouraged to bolster their understanding of Tribal boundaries, treaty rights and economic, cultural, and spiritual practices, as well as incorporation of Tribal Ecological Knowledge into Agency decision making and planning. As noted in Table 2, Tribes have identified the lack of both funding and technical assistance needed to adapt to climate change. To address this, AIEO has developed a priority action to improve tribal climate change adaptation capacity development, which includes sub-actions such as examining how GAP can be leveraged for Tribal climate adaptation work.

Tribal Ecological Knowledge

Many indigenous peoples have a spiritual connection with the environment that informs their view of climate and climatology.¹⁴ In particular, a Tribe’s Traditional Ecological Knowledge, or TEK, has been developed over hundreds or perhaps thousands of years and is intimately tied to the environmental systems in which the Tribe lives.¹⁹ Changes to the environment, or a Tribe’s relocation to a different area due to climate change, may severely limit the applicability of a Tribe’s TEK and the responsible stewardship benefits embodied in a Tribe’s TEK are consequently lost to the environment. Because of this, climate change can have severe repercussions on Tribal members’ knowledge base, community connection, spiritual health, and subsistence practices.¹⁴ See Table 3 for some generalized examples of Tribal ecological knowledge.

Examples of Tribal Ecological Knowledge
Specific language to describe local conditions and seasons Location of sacred and or medicinal plants Knowledge of seasonal timing: harvesting, water availability, wildlife movements etc. Stories passed through generations to convey lessons Connections with non-human relatives

Table 3: Generalized examples of Tribal ecological knowledge meant for illustrative purposes.

Inter-cultural exchange of Tribal ecological knowledge can be a sensitive topic, as this knowledge can relate to spiritual practices and beliefs.¹³

Cultural Practices

Since many Tribal groups have this connection to their environment, many cultural and spiritual practices could be disrupted by climate change. See Table 4 for examples.

Examples of Cultural and Spiritual Practices at Risk Due to Climate Change
Invasive species threatening Fond du Lac Band's use of baapaagimaak (aka black ash trees) for snowshoes and woven baskets ¹³ Temperature affecting beings important to upper Midwest Ojibwe Tribes' spiritual, subsistence and economic needs (such as wild rice) ¹³

Increasing temperatures and harmful algal blooms altering when mussels are safe to eat for the Tlingit, Haida, and Tsimshian people of southeast Alaska¹³

Table 4: Examples of cultural and spiritual practices threatened by climate change.

Priority Adaptation Actions

The information below represents the specific actions AIEO plans to complete in FY2022 and FY2023, with some actions extending into FY2024. These actions support one or more of the priorities in [EPA's Climate Adaptation Plan](#). AIEO will update our plan with additional specific actions for FY2024-FY2026 in the coming years. A crucial part of developing future actions will be assessing the efficacy of previous actions, incorporating new information into the development of new actions, and input received from Tribes through consultation and engagement opportunities.

The four priority actions for AIEO are:

1. Develop AIEO portion of OITA Climate Adaptation Implementation Plan
2. Align EPA climate efforts with Tribal Treat Rights Memorandum of Understanding
3. Incorporate Indigenous Traditional Ecological Knowledge in Agency Decision-Making
4. Improve Tribal Climate Change Adaptation Capacity Development

1. Develop AIEO Portion of OITA Climate Adaptation Implementation Plan

The climate adaptation planning process is extremely important to ensure we spend our energy on actions that are meaningful and impactful to EPA, Tribes and other stakeholders. To that end, we are holding ourselves accountable to complete a number of steps that will help us achieve our planning goals.

- Agency-wide priorities addressed: This activity addresses EPA adaptation priority action areas 1, 2 & 4.
- Timeframe (in FY): FY2022
- Performance Metric: Completion of below sub-actions and climate plan
- Sub-actions, measures & vulnerabilities:
 - 1a) AIEO will complete two sub-actions in FY22 to contribute to the main action of developing the OITA climate adaptation plan. The first is to host a Tribal listening session with other National Programs, specifically the Office of Water, the Office of Air and Radiation, the Office of Land and Emergency Management and the Office of Chemical Safety and Pollution Prevention, to engage with and receive input on climate priorities from tribal governments. We will consider this action accomplished when the listening session is completed.
 - 1b) The next action is to coordinate with OITA's Lead Region to co-host and streamline agency-wide consultation on draft National Program and Regional Climate Adaptation Plans. This effort will not only strengthen OITA's Climate Adaptation Implementation Plan, but it will inform the planning process for all EPA Climate Adaptation Implementation Plans. We will consider this action accomplished when all tribal consultations are completed.

- Co-benefits (if any): In addition to sharing EPA’s climate adaptation priorities and actions, tribal engagement provides opportunities to learn more about tribal climate adaptation interests, mitigation needs and environmental justice concerns, and further inform the ongoing adaptation planning process.
- Resource Requirements: No new resources are required.

2. Improve Tribal Climate Change Adaptation Capacity Development

AIEO is committed to improving Tribes’ ability to build capacity to adapt to climate change. Tribal nations, communities and individuals experience a wide variety of impacts from climate change. As such, providing meaningful assistance towards building capacity to adapt to climate change will allow Tribes to tailor their environmental programs to meet the climate change adaption needs of their communities.

- Agency-wide priorities addressed: This activity addresses EPA adaptation priority action areas 1 & 2.
- Timeframe (in FY): FY2022-FY2023
- Performance Metric: Completion of below sub-actions
- Sub-actions, measures & vulnerabilities:

2a) AIEO’s primary means of assisting Tribes to build environmental capacity is through General Assistance Program (GAP) grants. Office of Policy (OP) has already identified the number of GAP-funded activities that climate adaptation in the agency-wide baselining efforts. Building upon this baselining effort, AIEO will communicate and amplify how GAP can be used for Tribal climate change adaptation needs. AIEO will consider this action accomplished when the communication resources (e.g. fact sheets, training, etc.) are developed and deployed to GAP Project Officers and Tribes. The primary purpose of these communication resources is to highlight climate-related opportunities that are GAP-eligible. Measuring GAP-funded climate adaptation activities will continue in future years as part of OP’s LTPG and AIEO aims to see a correlation between the amplification efforts and an increased use of GAP funds to address Tribal climate adaptation needs. Future actions will depend on the analysis of this measure.

2b) Another action AIEO will pursue is identifying opportunities for joint grant opportunities (such as BIA Tribal Resilience and GAP) to leverage resources and align work. AIEO will coordinate with WHCNA to identify climate grant opportunities with other federal agencies and/or other EPA funding sources, find alignment, determine feasibility of joint grant solicitations and pursue viable solicitations. AIEO will measure this action by completing a joint grant solicitation. For FY23, AIEO is targeting one solicitation. If this action is successful, AIEO intends to pursue additional solicitations in future years.

2c) AIEO is developing a technical assistance webinar series for Tribes based on feedback we have heard from Tribes on their climate adaptation support needs. We will partner with the [Environmental Protection Network](#) (EPN), which is a network of former EPA staff, to deliver the webinar content. During the webinars, EPN will offer the opportunity to provide direct technical assistance to requesting Tribes at no cost to EPA or Tribal governments through their technical assistance program.

- Co-benefits (if any): Assisting Tribes in assessing vulnerabilities and developing climate adaptation needs and priorities may provide a co-benefit to tribal environmental justice concerns, including international indigenous communities.
 - Resource Requirements: Additional Congressional appropriations to support EPA tribal climate adaptation programs and efforts, including GAP, may be needed to support collaboration and sufficiently fund Tribal climate adaptation needs while continuing to address tribal environmental capacity building.
3. ***Align EPA climate efforts with the Tribal Treaty Rights (TTR) Memorandum of Understanding (MOU)***

EPA has a government-to-government relationship with Tribes and recognizes tribal governments as sovereign entities with primary authority and responsibility for the reservation populace.²⁰ Under the Constitution, treaties with tribal nations are part of the supreme law of the land, establishing unique sets of rights, benefits and conditions for the treaty-making Tribes who were forced to cede millions of acres of their homelands to the United States, in return for recognition of property rights in land and resources as well as federal protections. Tribal treaty rights have the same legal force and effect as federal statutes and they should be integrated into and given the fullest consideration throughout EPA’s collective work. Reserved rights are the rights Tribes retain that were not expressly granted to the United States by Tribes in treaties. Treaty and reserved rights, including but not limited to the rights to hunt, fish and gather, may be found both on and off-reservation lands. Agencies should consider treaty and reserved rights in developing and implementing climate adaptation plans in order to protect these rights and ensure the Agencies meet their legal and statutory obligations and other mission priorities as we work to combat the climate crisis.

In September 2021, EPA joined 16 other federal agencies¹ in signing a [Memorandum of Understanding](#) (MOU) that committed those parties to identifying and protecting tribal treaty rights early in the decision-making and regulatory processes. Accordingly, EPA will consider and protect treaty and reserved rights in developing and implementing climate adaptation plans through strengthened consultation, additional staff training and annual reporting requirements.

- Agency-wide priorities addressed: This activity addresses EPA adaptation priority action areas 1 & 2.
- Timeframe (in FY): FY2022-FY2024
- Performance Metric: Completion of below sub-actions
- Sub-actions, measures & vulnerabilities:
3a) In order to align EPA climate efforts with the TTR MOU, AIEO plans to complete five sub-actions between FY22-FY24. The first is to provide guidance to Regions and Programs on how to identify and incorporate treaty and reserved rights early in climate adaptation implementation plans, consistent with TTR MOU. We will consider this action accomplished when guidance is provided.

¹ The MOU signatory agencies include DOI, USDA, DOJ, DOD, DOC, ED, DOE, DHS, HUD, DOL, DoS, DOT, VA, EPA, OPM, CEQ, and ACHP.

3b) Another action is for AIEO to establish an understanding of the universe of EPA consultations that include climate actions and impact TTR. To date, this type of data collection or categorization has not been conducted, so AIEO is first committed to identifying a process for collecting or identifying information about consultation activities that include both Tribal Treaty Rights and climate actions. We will consider this action accomplished when the process has been identified and communicated. Future actions, such as identifying improvement opportunities and actions taken, will be dependent on this initial phase of data collection. One of the main sources of data AIEO will consider is existing data input into The Tribal Consultation Opportunity Tracking System (TCOTs). We will also utilize existing resources and processes to the extent possible, such as TPM meeting forums and the annual OMB reporting process.

3c & d) Another action AIEO will complete is to collaborate with other federal agencies through the White House Council on Native American Affairs (WHCNA) Committee on identifying best practices and areas of collaboration for protecting treaty and reserved resources impacted by climate change. While collaboration is an ongoing activity, two deliverables that AIEO will track are a) completion of an inventory of federal agency climate adaptation plans with TTR included and b) best practices identified and delivered to relevant stakeholders.

3e) Another action that AIEO will complete is to train EPA staff on the use of the new Treaty Database in development by USDA to better identify treaty and reserved rights and resources. AIEO will consider this action accomplished with the training has been developed and delivered.

- Co-benefits (if any): This action will assist EPA to comply with the White House Council on Environmental Quality (CEQ) guidance on the inclusion of TTR in climate adaptation plans and commitments of the TTR MOU.
- Resource Requirements: New resources (training materials, training expert, software, etc) may be needed dependent on the Treaty Database platform (Sub-action 3d).

4. Incorporate TEK (Indigenous Traditional Ecological Knowledge) in Agency Decision Making

Incorporating TEK into agency decision making is imperative to EPA's decision making processes because it provides tribal environmental and cultural information that informs critical climate baseline and historical data from unique and often unrepresented or absent indigenous perspectives. In November 2021, the White House Office of Science and Technology Policy (OSTP) and the CEQ jointly released a new memorandum that commits to elevating TEK in federal scientific and policy processes. The memorandum includes the creation an Interagency Working Group charged with initiating a process to develop government-wide guidance for Federal agencies on elevating TEK, with Tribal consultation, Native community engagement, as well as agency, expert, and public input.

- Agency-wide priority addressed: This activity addresses EPA adaptation priority action area 5.
- Timeframe (in FY): FY22-FY23
- Performance Metric: Completion of below sub-actions
- Sub-actions, measures & vulnerabilities:

4a) In order to support the broader action of incorporating TEK in Agency Decision making, AIEO will complete two sub-actions between FY22-FY23. In coordination with Region 10, AIEO will lead the EPA's participation in the OSTP-CEQ-led TEK interagency working group. As participation is an ongoing activity, AIEO will measure success based on the completion of the TEK Guidance in FY22.

4b) After the TEK Guidance is produced, AIEO will develop and deploy TEK training to EPA staff in order to implement CEQ TEK Guidance. AIEO will consider this action accomplished when training is developed and delivered.

- Co-benefits (if any): Incorporating TEK in federal decision making, and particularly climate adaptation planning, is a priority for tribal governments and communities. Taking action will significantly advance our partnership with Tribes in combatting the climate crisis locally. Additionally, with federal government guidance and training, a better understanding by EPA of TEK may benefit tribal environmental justice concerns, including international indigenous communities.
- Resource Requirements: No new resources are required for AIEO's contribution to the TEK interagency working group. New resources may be needed to develop TEK training to all EPA staff, depending on the guidance and its implementation directives, resources, etc.

Aspirational Actions & Future Considerations

In addition to the above specific actions that AIEO is committing to in the near term, AIEO is considering a number of ideas for actions in FY24 and beyond. The ability to complete these actions will depend on resource availabilities, results of previous actions, etc. Including these aspirational actions in this plan will help AIEO focus on these potential opportunities in the future.

- AIEO recognizes that a critical aspect of assisting Tribes with climate adaptation work is making sure that resources and information are relevant and easy to find. Tribes have told EPA that the administrative burden of identifying where to locate certain pieces of information negatively impacts their ability to meet climate adaptation goals. AIEO would like to organize a centralized online location for a wide variety of climate adaptation resources, including funding sources, relevant data, technical assistance, training, etc. This is similar to EPA's Climate Change Adaptation Resource Center, [ARC-X](#) but would function as a tribally-focused resource center. Longer term, AIEO would like to expand this concept to include resources from other federal agencies, potentially in cooperation with the WHCNA Climate Adaptation Subcommittee.
- While AIEO's primary means of assisting Tribes is through GAP funding, AIEO is interested in looking for opportunities to partner with other federal agencies outside of GAP. For example, partnering with the Indian Health Service (IHS) to identify vulnerable water, wastewater, or solid waste infrastructure and then developing an action plan on how to address those vulnerabilities. This could include identifying available funding, developing best practices for adapting to the vulnerabilities, etc. There is also the possibility of looking for ways to address those vulnerabilities within GAP.
- EPA Office of Water is seeking to incorporate TEK in water quality monitoring projects, including TEK/tribal data layers in Hows My Waterway and ATTAINS reporting system.

OITA is a partner in this effort, but may be more involved (e.g., through GAP leveraging and/or pilot projects) if additional resources, including FTE, are available.

- While AIEO doesn't currently manage any of the Infrastructure Investment and Jobs Act (BIL) funding, AIEO is committed to supporting climate adaptation considerations with other offices that manage the BIL expenditures and helping to communicate BIL opportunities to tribal communities.

Training Plan for Enhancing Staff Knowledge About Climate Adaptation

There are two planned trainings for EPA staff included in AIEO's implementation plan: TTR and consultation, Tribal Treaty database, and TEK. In addition to the below trainings that AIEO is developing for EPA staff, OITA is also committing its own staff to take Climate Adaptation 101 training that is currently being provided by EPA's Office of Policy. This introductory training will ensure that all of OITA's own staff have baseline knowledge about climate adaptation, which will further enable OITA's staff to more fully consider climate adaptation in all programmatic work.

- 1) AIEO will lead (in cooperation with USDA) efforts to train EPA staff on the use of the new Treaty Database in development by USDA to better identify treaty and reserved rights and resources. The purpose of this database is not only as a repository of Tribal treaties, but it will also increase understanding of Tribal treaties and how they should be implemented and considered. As EPA staff become more aware of Tribal treaty and reserved rights, they can better incorporate their provisions and protections in Agency decision making. AIEO's training plan will align with the roll out of the USDA database and is anticipated to rely heavily on training resources developed by USDA. The training audience will be all EPA staff.
- 2) AIEO will coordinate appropriately to develop and deploy TEK training to implement the CEQ TEK Guidance. The guidance and resultant training will focus on TEK (what it is) and how to incorporate it into agency decision making, especially climate adaptation and mitigation efforts. This training will build upon existing resources, and rely on forthcoming guidance from the CEQ, an effort with which AIEO is involved. The training audience will be all EPA staff.

Science Needs

AIEO has identified several science needs that would benefit our office and our tribal partners. At a procedural level, AIEO is focused on helping the Agency better incorporate TEK in decision making, which means elevating TEK in EPA science processes. More information on what this means for EPA science needs will be available after the CEQ TEK Guidance is complete; AIEO will revisit science needs and update this section at that time.

EPA tribal partners have identified data accessibility as a primary need for identifying and addressing climate adaptation vulnerabilities and priorities. For our Tribal partners, it is important that our science data can be filtered and targeted to Tribal geographic areas – state wide data may not be relevant to their location, landscapes, and traditional uses. Related to

targeted Tribal data, it is important EPA considers Tribal-specific projections of climate impacts. It is also important to make sure EPA’s science is easily accessible to our Tribal partners and that there is sufficient technical assistance and expertise available to Tribes in using adaptation tools and interpreting the data.

References

- ^[1] “White House Commits to Elevating Indigenous Knowledge in Federal Policy Decisions,” Nov 15, 2021, <https://www.whitehouse.gov/ostp/news-updates/2021/11/15/white-house-commits-to-elevating-indigenous-knowledge-in-federal-policy-decisions/#:~:text=ITEK%20is%20a%20body%20of,between%20humans%20and%20environmental%20systems>.
- ^[2] USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: [10.7930/NCA4.2018](https://doi.org/10.7930/NCA4.2018).
- ^[3] Jay, A., D.R. Reidmiller, C.W. Avery, D. Barrie, B.J. DeAngelo, A. Dave, M. Dzaugis, M. Kolian, K.L.M. Lewis, K. Reeves, and D. Winner, 2018: Overview. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 33–71. doi: [10.7930/NCA4.2018.CH1](https://doi.org/10.7930/NCA4.2018.CH1)
- ^[4] Vose, R.S., D.R. Easterling, K.E. Kunkel, A.N. LeGrande, and M.F. Wehner, 2017: Temperature changes in the United States. In: Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 185-206, doi: [10.7930/J0N29V45](https://doi.org/10.7930/J0N29V45).
- ^[5] U.S. Environmental Protection Agency. 2016. Climate change indicators in the United States, 2016. Fourth edition. EPA 430-R-16-004. <https://www.epa.gov/climate-indicators>.
- ^[6] Nolte, C.G., P.D. Dolwick, N. Fann, L.W. Horowitz, V. Naik, R.W. Pinder, T.L. Spero, D.A. Winner, and L.H. Ziska, 2018: Air Quality. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 512–538. doi: [10.7930/NCA4.2018.CH13](https://doi.org/10.7930/NCA4.2018.CH13)
- ^[7] Lipton, D., M. A. Rubenstein, S.R. Weiskopf, S. Carter, J. Peterson, L. Crozier, M. Fogarty, S. Gaichas, K.J.W. Hyde, T.L. Morelli, J. Morissette, H. Moustahfid, R. Muñoz, R. Poudel, M.D. Staudinger, C. Stock, L. Thompson, R. Waples, and J.F. Weltzin, 2018: Ecosystems, Ecosystem Services, and Biodiversity. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 268–321. doi: [10.7930/NCA4.2018.CH7](https://doi.org/10.7930/NCA4.2018.CH7)
- ^[8] Ebi, K.L., J.M. Balbus, G. Luber, A. Bole, A. Crimmins, G. Glass, S. Saha, M.M. Shimamoto, J. Trtanj, and J.L. White-Newsome, 2018: Human Health. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 539–571. doi: [10.7930/NCA4.2018.CH14](https://doi.org/10.7930/NCA4.2018.CH14)
- ^[9] Lall, U., T. Johnson, P. Colohan, A. Aghakouchak, C. Brown, G. McCabe, R. Pulwarty, and A. Sankarasubramanian, 2018: Water. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 145–173. doi: [10.7930/NCA4.2018.CH3](https://doi.org/10.7930/NCA4.2018.CH3)
- ^[10] Jantarasami, L.C., R. Novak, R. Delgado, E. Marino, S. McNeeley, C. Narducci, J. Raymond-Yakoubian, L. Singletary, and K. Powys Whyte, 2018: Tribes and Indigenous Peoples. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 572–603. doi: [10.7930/NCA4.2018.CH15](https://doi.org/10.7930/NCA4.2018.CH15)
- ^[11] Dupigny-Giroux, L.A., E.L. Mecray, M.D. Lemcke-Stampone, G.A. Hodgkins, E.E. Lentz, K.E. Mills, E.D. Lane, R. Miller, D.Y. Hollinger, W.D. Solecki, G.A. Wellenius, P.E. Sheffield, A.B. MacDonald, and C. Caldwell, 2018: Northeast. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment,

Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 669–742. doi:

[10.7930/NCA4.2018.CH18](https://doi.org/10.7930/NCA4.2018.CH18)

^[12] Fleming, E., J. Payne, W. Sweet, M. Craghan, J. Haines, J.F. Hart, H. Stiller, and A. Sutton-Grier, 2018: Coastal Effects. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 322–352. doi:

[10.7930/NCA4.2018.CH8](https://doi.org/10.7930/NCA4.2018.CH8)

^[13] Status of Tribes and Climate Change Working Group (STACCCWG). (2021). *Status of Tribes and Climate Change Report*, Institute for Tribal Environmental Professionals, Northern Arizona University, Flagstaff, AZ. [Marks-Marino, D. (ed.)] <http://nau.edu/stacc2021>

^[14] Jantarasami, L.C., R. Novak, R. Delgado, E. Marino, S. McNeeley, C. Narducci, J. Raymond-Yakoubian, L. Singletary, and K. Powys Whyte, 2018: Tribes and Indigenous Peoples. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 572–603. doi: [10.7930/NCA4.2018.CH15](https://doi.org/10.7930/NCA4.2018.CH15)

^[15] Tribal Adaptation Menu Team. 2019. *Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu*. Great Lakes Indian Fish and Wildlife Commission, Odanah, Wisconsin. 54 p.

<https://forestadaptation.org/tribal-climate-adaptation-menu>

^[16] EPA. 2021. *Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts*. U.S. Environmental Protection Agency, EPA 430-R-21-003. <https://www.epa.gov/cira/social-vulnerability-report>

^[17] U.S. Federal Government, 2017: U.S. Climate Resilience Toolkit: Tribal Nations [web site]. U.S. Global Change Research Program, Washington, DC <https://toolkit.climate.gov/topics/tribal-nations>

^[18] U.S. Federal Government, 2018: U.S. Climate Resilience Toolkit: Case Studies [web site]. U.S. Global Change Research Program, Washington, DC. <https://toolkit.climate.gov/case-studies>

^[19] Chief, K., A. Meadow, and K. Whyte, 2016: Engaging southwestern tribes in sustainable water resources topics and management. *Water*, 8 (8), 350 as cited in The US Global Climate Research Program’s 2018 report, “[Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment Volume II](https://doi.org/10.7930/NCA4.2018.CH18)” (NCA4)

^[20] EPA, Indian Policy for the Administration of Environmental Programs on Indian Reservations (Nov. 8, 1984), available at <https://www.epa.gov/sites/default/files/2015-04/documents/indian-policy-84.pdf>

Office of International Affairs

Climate Adaptation Implementation Plan

Climate Vulnerability Assessment

Internal OIA and EPA Challenges and Vulnerabilities

OIA's work faces several climate- and non-climate-related vulnerabilities that could adversely impact the office's work on climate adaptation. The non-climate-related vulnerabilities could affect every region in which OIA works. These range from ransom-ware attacks that could compromise government systems, functionality, and databases, to the diminution of administrative capacity, including loss of FTE's, outdated equipment, and reduced security measures. These pose a growing risk to OIA in effectively fulfilling its mission in response to the global climate crisis. Left unaddressed, these challenges could erode the capacity for OIA and the EPA more broadly, to effectively carry out its mission. It could also erode public and partner confidence in OIA and EPA to provide effective and timely services.

External OIA Partner Climate Challenges, Vulnerabilities, and Opportunities by Region

OIA anticipates its international partner governments, communities, and organizations will collectively experience a wide range of climate impacts. Given that a significant number of partner governments and communities are located in low- and middle-income countries, inequities will not only remain but are likely to be exacerbated. Continued disruptions to global trade, trade routes, supply chains, and the cost of goods and services, because of both climate- and non-climate-related phenomena, also pose risks. The following section provides a more detailed assessment of the climate-related challenges, vulnerabilities, and opportunities facing OIA's partner governments and communities, organized by region.

Arctic

Current Programs and Initiatives

OIA supports ongoing projects to strengthen the capacity of remote and indigenous Arctic communities in responding to climate change and will promote the needs of these communities in the Arctic Executive Steering Committee (AESC). Two projects, run through the Arctic Council Arctic Contaminants Action Program (ACAP), which are underway or about to get underway, are led by Indigenous Arctic communities. They are the *Community-based Black Carbon Health Assessment* and a forthcoming project on wildfire management co-led by Environment and Climate Change Canada and the Aleut International Association with US government expert cooperation. These projects have the scope for mitigation and resilience activities. The Circumpolar Local Environmental Observer (CLEO) project supports local

observers to report environmental phenomena, and the project received funding from EPA to help its launch. It also received support from ACAP to expand to additional Arctic communities.

Likely Vulnerabilities

OIA's Arctic country and Indigenous community partners will face challenges from rising temperatures causing permafrost melt, thinning and loss of sea ice, melting of glaciers, sea level rise, accelerated regional land and ocean warming, enhanced drying, increased forest fires, black carbon, the breakdown of Arctic ecosystems, and loss of habitat and food sources. Permafrost melt in particular poses a serious challenge to infrastructure and transportation systems, jeopardizing supply chains and the delivery of basic goods and services. Forced migration from these changes also poses a threat and is an issue that some communities have already experienced.

Potential Areas for Future OIA Programmatic Efforts

OIA can consider delivering training for enhanced wildfire management to support its country partners and communities to mitigate the spread of community and environmental harm during wildfire events. Boosting air quality monitoring throughout the Arctic can also enhance determination of black carbon content. Continued support for Indigenous communities as local environmental observers through the CLEO project can also enhance reporting of climatic and environmental events to help share and integrate traditional ecological knowledge (TEK) among Indigenous Arctic communities in the US and internationally. CLEO observations may also be incorporated into locally-scaled climate model projections.

Asia-Pacific

Current Programs and Initiatives

OIA implements programming in Taiwan, Vietnam, Singapore, Thailand, Japan, and Australia, and had 40 years of bilateral programming with China which lapsed in 2020. The biggest program in the region is on marine litter. OIA coordinates with multiple countries on this issue. The US and Taiwan work together with the Asia-Pacific Mercury Monitoring Network to lead a community of policymakers and mercury experts from 17 member countries dedicated to establishing a system of mercury monitors in the region. OIA also works with Taiwan to address e-waste, build capacity to advance policy, governance, and practice in environmental education, advance special consideration to the disproportionate environmental impacts on children, and share best practices and air quality data within the region. Programming in Vietnam is focused on strengthening environmental governance and cleaning up contaminated lands. In Cambodia, OIA provides technical input to draft and implement environmental laws for pollution controls. OIA partners with Singaporean stakeholders to advance clean drinking water research by addressing high priority topics such as algal blooms, detection of contamination, and water reuse. With stakeholders in Thailand, OIA shares best practices and provides policy guidance and reviews regarding air quality issues. OIA's programming with China was the Agency's largest bilateral program and worked across a variety of environmental topics. These included developing domestic environmental protection laws and policies, improving air quality, reducing

water pollution, preventing exposure to toxic chemicals, remediating soil and hazardous waste, and improving environmental enforcement and compliance.

Likely Vulnerabilities

Across the region, there is a high likelihood of species range shifts across land and ocean ecosystems. There are medium to high risks of varied impacts to water scarcity and agriculture and crop production, and an increasing number of hot days per year, infectious diseases, floods, droughts, storms, and sea-level rise. Together, these risks put populations in several countries at high risk of health effects and displacement.^{1,2,3,4}

Potential Areas for Future OIA Programmatic Efforts

With positive and negative impacts to food and water security across the region, providing technical assistance and building capacity for climate smart agriculture, water quality monitoring, water capture and storage, watershed management, and nutrient and crop management will be crucial to manage the range of impacts. Since many countries in the Asia-Pacific are vulnerable to impacts of increasingly powerful storms, flooding, drought, and dangerously hot days, bolstering early warning systems and disaster management protocols would also be beneficial.

Border Regions

Current Programs and Initiatives

OIA works with respective partners in Mexico and Canada to manage and coordinate on environmental projects along the countries' borders. Along the US-Mexico border, OIA works with Mexico's Secretariat of the Environment and Natural Resources on the Border 2025 plan to address environmental and public health issues. These include air and water quality, solid waste management, emergency preparedness and response, and enforcement and compliance. OIA also works with the North American Development Bank by participating in board meetings and reviewing and clearing environmental infrastructure projects based on environmental performance. Along the US-Canada border, OIA coordinates with EPA Regions, Native American Tribes, and the State Department on a variety of agreements and MOUs, including the Boundary Waters Treaty and mining development in British Columbia.

Likely Vulnerabilities

The border region between the US and Mexico is nearly 2,000 miles long and covers 62.15 miles on each side, containing a variety of types of ecosystems which will undergo a myriad of changes.⁵ The starkest changes will be increased dryness, drought, and decreased available water supply due to decreased precipitation, continued overuse of the Colorado River, and increased urban and agricultural water use. Impacts to accessible safe drinking water will also be exacerbated. Wetland ecosystems and biodiverse areas, in addition to human health, are at risk of these changes to water supply and water quality.⁶

The US-Canada border is the longest in the world at around 5,525 miles long. This border crosses a range of ecological zones and is thus vulnerable to a range of climate impacts, both positive and negative.⁷ As a result of warmer temperatures, the eastern border region will

experience stronger and more frequent storms, while the central prairie and western regions will likely experience more drought. The western region will also experience more precipitation-induced landslides. The Alaska-Canada border will likely experience increased permafrost melt.

Potential Areas for Future OIA Programmatic Efforts

On the US-Mexico border, it will be pertinent to focus on improving watershed management, water capture, storage, and water quality. On the US-Canada border, it will be important to ensure that early warning systems and scientific research for storms, permafrost melt, changing growing seasons, and ensuring appropriate are readily available for people to respond to changing conditions on the ground in a timely manner.

Latin America and the Caribbean

Current Programs and Initiatives

OIA implements a range of environmental programming in Latin American and Caribbean countries. It provides training to CAFTA-DR countries (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the Dominican Republic) as well as Panama, Peru, Colombia, and Chile, to build national environmental governance. OIA also works with ten countries that make up the Latin American Network for Environmental Enforcement and Compliance to share best practices and develop strategies to address common environmental challenges. OIA provided training to Network members on criminal environmental enforcement, next generation approaches to enforcement, and hazardous waste management. In addition to governance and enforcement, OIA provided technical assistance to El Salvador, Costa Rica, Dominican Republic, and Honduras to make their environmental impact assessment processes more streamlined and accessible to the public. In Panama, OIA assistance led to the development of the country's first water quality reference lab. OIA worked with Panama, Costa Rica, and the Dominican Republic to develop or implement a national marine litter action plan, and collaborated with stakeholders in Jamaica, Panama, and Peru to identify and prioritize solid waste management actions that prevent litter from entering waterways and the marine environment. Finally, OIA provides technical assistance to Brazil on policies, programs, and tools to address water contamination to freshwater bodies.

Likely Vulnerabilities

Across the region, there is a high likelihood of changes in ecosystem structures and species range shifts across land, freshwater, and ocean habitats as a result of future climate changes. There are medium to high risks of water security, severe health effects due to increasing epidemics, coral reef ecosystem degradation due to coral bleaching, food security issues due to frequent and/or extreme droughts, and damages to life and infrastructure due to floods, landslides, sea level rise, storm surges, hurricanes, earthquakes, and coastal erosion. These vulnerabilities are unevenly distributed throughout the region, with some countries more likely than others to experience the range of impacts.⁸

Potential Areas for Future OIA Programmatic Efforts

With food and water insecurity being major vulnerabilities across the region, providing technical assistance and building capacity for climate smart agriculture, water quality monitoring, water capture and storage, watershed management, and nutrient and crop management will be crucial. Since many countries in the Caribbean and Central America are vulnerable to impacts of increasingly powerful storms, bolstering early warning systems and disaster management protocols would also be beneficial.

Middle East

Current Programs and Initiatives

OIA's environmental programming in the Middle East addresses a variety of topics in Jordan, Morocco, and Israel. OIA recently concluded cooperation with Jordan on public participation training and solid waste management, including developing a landfill health and safety plan that will help improve management of existing landfills in the Jordan River Valley. OIA also completed a policy paper on alternatives to plastic mulch used by Jordan Valley farmers. In Morocco, OIA recently cooperated with stakeholders on crisis communication and solid waste management, including sharing best practices, tools, and public outreach strategies to help the community of El-Kelaa des Sraghna in Morocco to implement its waste reduction plan. In Israel, OIA collaborates on a wide range of scientific and technical topics, including water quality monitoring, contaminated site clean-up and remediation, air pollution modelling, and emergency response. Water reuse and contaminated site clean-up are the current priorities in Israel. In support of the Global Alliance to Eliminate Lead in Paint, EPA has also worked with Israel to strengthen its regulation on lead in paint.

Likely Vulnerabilities

As an already water-scarce country, Jordan's main climate vulnerability is increasing water scarcity as a result of decreasing precipitation and an increasing number of hot days per year.⁹ Ensuring water availability for agricultural purposes and clean drinking water for its population will be crucial for the country moving forward.

Morocco's climate vulnerabilities include increased frequency and intensity of drought which will exacerbate water insecurity.¹⁰ Food security will be impacted due to effects to the agricultural sector. Morocco will also experience increased average temperatures and hot days per year which will increase stress on crops and exacerbate public health concerns. Changing rainfall patterns, including more intense arid periods and more intense rain events, will also impact water security and cause flooding. As a country with a long coastline, Morocco is also vulnerable to sea level rise.

Israel's climate vulnerabilities include changes in rainfall patterns and increasing temperatures and number of hot days per year.¹¹ Together, these will account for increased drought, more intense storms, and water insecurity.

Potential Areas for Future OIA programmatic Efforts

In Jordan, OIA can consider assistance to address clean water. Since a hotter climate and an increased likelihood of drought in Morocco will impact agricultural output, EPA should consider programming to address clean water, build capacity for climate smart agriculture, improve water capture and storage, watershed management, and nutrient and crop management. Continuing programming in Israel will be crucial, especially on water quality monitoring and water re-use. Expanding these capabilities to other water-insecure countries in the region, including Jordan and Morocco, are an opportunity to deepen OIA's relationships and promote water security.

Sub-Saharan Africa

Current Programs and Initiatives

OIA's environmental program in Sub-Saharan Africa is focused on addressing Ghana and Ethiopia's growing urban and industrial pollution issues that impact people's health, with a particular focus on vulnerable populations such as children and the economically disadvantaged. Areas of focus include outdoor and indoor air quality, water quality, and exposure to toxic chemicals. To help ensure the delivery of clean water in urban areas, OIA works with the African Water Association (AfWA) and Ghanaian stakeholders to build capacity of drinking water quality laboratories in Accra. The objective is to enhance the proficiency of participating labs using best available methods by trained personnel to produce high quality analytical data. Efforts have included support on laboratory auditing, quality control/quality assurance procedures, and development of a Ghanaian Quality Assurance Manual that is now in use and can be used as a model for other laboratories in the region. OIA also works in Ethiopia to build capacity in support of air quality management planning. The next phase will be to move toward capacity building for regional leadership, enabling these countries to serve as regional models, with trainings on air quality management planning.

Likely Vulnerabilities

Ghana and Ethiopia are both agriculture-dependent and water insecure countries. In Ghana, 50% of the population is employed in agriculture and 25% lacks access to clean water.¹² In Ethiopia, 85% of the population is employed in agriculture while 75% lacks access to clean water.¹³

Despite geographical differences, these countries share similar climate vulnerabilities, including increased and more intense drought, flooding, and heat stress. These vulnerabilities are likely to impact agriculture through soil erosion and decreased arable land and crop yields. Floods will likely cause infrastructure damage and further land degradation. With an increase in the number of hot days, human health and livestock production are also put further at risk. Together these vulnerabilities will likely cause Ghanaians and Ethiopians to become more food and water insecure, rely more on health systems, and be more at risk of the spread of disease.

Potential Areas for Future OIA Programmatic Efforts

Since a hotter climate and an increased likelihood of drought will aggravate the number of public health concerns that are linked to indoor and outdoor air pollutants and decreased agricultural output, the importance of OIA's current programming in Ghana and Ethiopia to monitor and manage air quality cannot be overstated. Programming in Ghana to address clean water is also

pertinent. Further areas of programming for OIA to consider include extending current clean water programming in Ghana to Ethiopia. For both countries and others in the region with similar climate vulnerabilities, OIA can consider strengthening these countries' technical capacity to integrate climate-smart agriculture practices and climate change risk management, improving observational data of weather and groundwater monitoring, and improving water capture, storage, watershed management, and nutrient and crop management.

Priority Adaptation Actions

The following OIA priority adaptation actions will be implemented provided that sufficient resources continue to be made available. OIA's priority activity is to provide technical and policy training on a range of environmental governance issues to international partners and national and sub-national governments for the purposes of helping our partners establish effective and equitable environmental governance practices that result in effective policies that in turn, result in desirable environmental and societal outcomes.

1) Climate Environmental Governance: Deployment and Implementation of the EPIC (Educational Partnerships for Innovation in Communities) Capacity Building Tool

OIA's commitment to the provision of trainings on various aspects of environmental governance presents opportunities to offer training and capacity building related to climate literacy, climate risk, resilience, and climate adaptation, especially to partners in developing countries. More specifically, OIA will seek to educate and train international partners on the use of EPIC, a tool for creating local government-university partnerships that bring the full range of university knowledge and expertise to the service of local governments and communities. EPIC partnerships are locally-led, demand-driven, action-oriented partnerships that enhance the capacity of local governments and communities to adapt, build resilience and develop more sustainably. Partners in this activity include but are not limited to the EPA Office of Policy, the UN Global Adaptation Network (GAN), the EPIC Network (EPIC-N) Secretariat, ICLEI (Local Governments for Sustainability), the US National Science Foundation (NSF) and the International START (System for Analysis, Research and Training) program.

- Agency-wide priorities addressed: This activity addresses EPA Agency adaptation priorities 1 and 2 (See text box below).
- Timeframe: This work is already underway and is slated to continue through FY2026 and beyond, pending resources are made available. However, trainings and subsequent actions taken by OIA international partners as a direct consequence of these trainings, will be documented. See section on metrics.
- Performance Metrics: Short- and long-term metrics include the number and name of states, Tribes and international partners (national and sub-national) who seek training and enhanced capacity to address climate adaptation, resilience and sustainable development, utilizing the EPIC tool. In addition, in May 2021, 11 Asian cities were awarded small grants to implement the EPIC model to work on adaptation, resilience and sustainability actions that benefit their respective cities/communities. OIA's metrics will also include updates on actions, outputs and outcomes resulting from implementing the EPIC model in these 11 Asian cities. Lastly, OIA will examine the feasibility of developing metrics on

actions taken and/or policies implemented as a consequence of trainings on the use of the EPIC tool.

- Co-Benefits: Use of the EPIC tool is designed to bring about a range of actions from climate adaptation and mitigation to more sustainable development, and making progress on the full range of SDGs, including addressing issues of underserved and especially vulnerable communities.
- Lead Organization: This activity will be led by the policy and bilateral sides of OIA.
- Resource Requirements: There are currently very few if any resources for this activity. Resources for this activity have thus far come almost exclusively from outside partners such as the GAN, NSF, START, and the EPIC Secretariat, with in-kind support from ICLEI (Local Governments for Sustainability) and OIA in the form of services and FTEs. Despite OIA having played a lead role in creating an international partnership to introduce the EPIC model to local governments and universities internationally in various parts of Africa and Asia to date, the lack of sufficient EPA resources for this activity to date leaves OIA at a serious disadvantage in choosing where and when future trainings on the tool will take place as well as the selection of trainees. EPA funding for this activity would provide OIA with considerably more leverage to play a lead role in directing essential training on the use and implementation of the EPIC tool to realize its full benefits.

2) Climate Environmental Governance: Deployment and Implementation of the ARC-X Capacity Building Toolkit.

OIA's commitment to the provision of trainings on various aspects of environmental governance presents opportunities to offer training and capacity building related to climate literacy, climate risk, resilience, and climate adaptation, especially to partners in developing countries. More specifically, OIA will seek to partner with OP to educate and train international partners on the use of EPA's Adaptation Resource Toolkit (ARC-X). ARC-X is an interactive resource to help local government officials effectively deliver services to their communities even as the climate changes. Though originally designed for local government officials and practitioners in the US, the toolkit has proven to have international relevance as well.

- Agency-wide priorities addressed: This activity addresses EPA Agency adaptation priorities 1 and 2 (See text box below).
- Timeframe: This work is already underway and is slated to continue through FY2026 and beyond, pending resources are made available. However, trainings and subsequent actions taken by OIA international partners as a direct consequence of these trainings, will be documented. See section on metrics.
- Performance Metrics: Short- and long-term metrics include the number and name of states, Tribes and international partners (national and sub-national) who seek training and enhanced capacity to address climate adaptation, resilience and sustainable development utilizing the ARC-X Toolkit. OIA's metrics will also include updates on actions, outputs and outcomes resulting from trainings on the ARC-X Toolkit. Lastly, OIA will examine the feasibility of developing metrics on actions taken and/or policies implemented as a consequence of trainings on the ARC-X Toolkit.
- Co-Benefits: Use of the ARC-X toolkit is designed to bring about a range of actions from climate adaptation and mitigation to more sustainable development, and making progress

on the full range of SDGs, including addressing issues of underserved and especially vulnerable communities.

- Lead Organization: This activity will be led by the policy and bilateral sides of OIA in partnership with OP.
- Resource Requirements: There are currently very few if any resources for this activity. Introducing the ARC-X Toolkit in international settings will require additional support and FTEs.

3) Strengthening Capacity to Address Climate in Arctic Communities

Working through the Arctic Council Arctic Contaminants Action Programme (ACAP) and its Expert Groups on Short-Lived Climate Pollutants (SCLPs) and the Indigenous Peoples Contaminants Action Programme (IPCAP) along with some funding from the Arctic Council's Project Support Instrument (PSI), OIA will continue to support ongoing projects to strengthen the capacity of remote and indigenous Arctic communities in responding to climate change. In addition, OIA will promote the needs of these communities in the Arctic Executive Steering Committee (AESC). At present, there are two ACAP projects underway or about to get underway, that are led by indigenous Arctic communities. They are the *Community-based Black Carbon Health Assessment* and a forthcoming project on wildfire management co-led by Environment and Climate Change Canada and the Aleut International Association, with US government expert cooperation. These projects have scope for mitigation and resilience activities. In addition, the Circumpolar Local Environmental Observer (CLEO) project received funding from EPA to help its launch and then support from ACAP to expand it to additional Arctic communities. OIA is examining ways to promote the expansion and sharing of this tool and its capabilities for the purposes of promoting knowledge exchanges, including among traditional ecological knowledge (TEK) holders, scientific experts, academics, and other knowledge holders, among indigenous Arctic communities in the US and internationally. Lastly, EPA/OIA has signed an interagency agreement with the State Department to work with Arctic communities on climate change.

- Agency-wide priorities addressed: This activity addresses Agency adaptation priorities 1 and 2 (See text box below).
- Timeframe: At least one project is slated to run from 2021-2023. OIA anticipates that results can be evaluated in 2023. The timeline for additional activities is still under development. However, recent events involving Russia and Ukraine have impacted leadership issues among the Arctic Council countries and Arctic Council work has been temporarily put on hold.
- Performance Metrics: Short-term metrics include the number of training activities conducted, countries, regions, Tribes, and communities engaged, and number of individuals trained. Longer-term metrics are under discussion and could include looking at whether the project is sustained by project partners, for example the number of interventions made by trained partners after a project is completed.
- Co-benefits: Co-development and use of these tools will foster greater understanding of and ability to address and reduce human exposure to black carbon and other short-lived climate pollutants, the lessons of which can be transferred to projects that address other contaminants and resilience in remote Arctic communities. Wildfire management will

help make Arctic communities more resilient to warmer temperatures and drought, and reduce the threat of air pollution from forest fires.

- Lead Organization: This activity will be led by the policy and bilateral sides of OIA with input, as appropriate, from AIEO and Region 10.
- Resource Requirements: OIA provides in-kind expertise in the form of FTE's to these activities, though there are no extramural resources at the moment.

3) Commission on Environmental Cooperation (CEC) EJ4Climate Grants for Climate Action in Underserved and Vulnerable Communities

OITA will continue to work through the CEC to direct funds to support climate adaptation and resilience activities in the US, Canada, and Mexico, especially within underserved and vulnerable communities as part of the new EJ4Climate Grants Program established by President Biden. The Commission for Environmental Cooperation (CEC) is an international organization established by the United States, Canada, and Mexico under the 1994 North American Agreement on Environmental Cooperation (NAAEC) as a complement to the North American Free Trade Agreement (NAFTA). The NAAEC promotes sustainable development based on cooperation and mutually supportive environmental and economic policies and fosters the protection and improvement of the environment in the territories of the Parties for the well-being of present and future generations. EPA and its counterparts in Mexico and Canada sit as CEC Council members. Being that the CEC is a trilateral Organization EPA/OIA is limited in resources and an agreement from the other two parties is required to proceed with projects or direct funds. However, as a member of the CEC Council OIA is in a position to advocate for additional climate adaptation and resilience work.

- Agency-wide priorities addressed: This activity addresses Agency adaptation priorities 1 and 2 (See text box below).
- Timeframe: Funding awards for work on climate resilience and adaptation were granted to 3 underserved urban communities and 2 US Tribes in 2022. This work is already underway and should be completed by 2024. Additional funds are available for a second round of awards for addressing climate. As a member of the CEC Council OIA will continue to support climate awards beyond 2023.
- Performance Metrics: Metrics will include periodic updates on actions taken, outputs and outcomes.
- Co-Benefits: CEC EJ4Climate Grants have the capacity to bring about a range of actions from climate adaptation and mitigation to more sustainable development, and making progress on the full range of SDGs, while focusing explicitly on underserved and especially vulnerable communities.
- Lead Organization: This activity will be led by the bilateral side of OIA in partnership with EPA counterparts in Canada and Mexico.
- Resource Requirements – Resources are currently available for EJ4Climate grants up until 2023. Though OIA plans to continue to support more action on climate, as equal parties to the CEC, EPA's counterparts in Canada and Mexico can elect to direct funds to activities outside of climate as well.

Aspirational Action

1) International Mitigation, Adaption, and Resilience: Economic Instruments for Climate-Friendly Trade and Public Infrastructure Investment

OIA contributes to the implementation of the climate finance plan, identified in Executive Order 14008, by providing expertise for incorporating the overall costs of greenhouse gas emissions in the analysis of proposals for public investment in energy-intensive projects overseas. This action has three sub-actions: (1) To gain inter-agency agreement on including the social cost of greenhouse gas emissions in the methodology to be used by Federal agencies for the analysis of alternatives to investing international assistance in projects that prolong reliance on fossil fuel infrastructure for economic development; (2) To provide compelling environmental and economic reasons for international financial institutions to incorporate comparable methodologies as safeguards against reckless investments and as guidance for development strategies that are consistent with international climate policy objectives; and (3) To encourage global consensus on the use, by private companies, of voluntary standards for the production and trade in products that conform to responsible business practices validated by reliable certification systems. These standards, such as adopted by ISO, may have global applicability to private enterprises, or may be recommendations by multilateral organizations such as the Organization for Economic Cooperation and Development (OECD) for use by member governments. While efforts to date have largely focused on greenhouse gas mitigation, OIA will also explore the possibility of including adaptation and resilience in lending safeguards to ensure that infrastructure investments funded by the United States are built to withstand climate change in all its manifestations. This activity will also try to apply as feasible, lessons learned internationally from domestic experiences drawn from the U.S. Bipartisan Infrastructure Law.

- Agency-wide priorities addressed: This activity addresses Agency adaptation priorities 1, 2 and 5 (See text box below).
- Timeframe: This work is already underway with a modest level of technical expertise and staff time. The anticipated timeframe for this activity is 2022-2026 and possibly beyond.
- Performance Metrics: The short-term metric is to count the number of interventions made by EPA to promote inclusion of the social cost of carbon, climate adaptation or climate resiliency in investment guidelines for USG overseas development assistance, responsible business practices or standards. Longer term metrics are under consideration and may include evidence that projects are sustained by project partners, requiring that development assistance is predicated at least in part on evidence of climate adaptation and enhancing climate resilience as well as evidence of factoring in the social cost of carbon as pre-conditions. This is a new exploratory activity, and no results are expected until at least the end of 2023.
- Co-Benefits: These actions support the objectives of other initiatives led by the National Security Council such as Build Back Better World (B3W) in collaboration with G-7 countries, the US-EU Trade and Technology Council that was a result of the June 2021 Summit between President Biden and European Union leaders, and the International Energy Engagement Guidance. Issues of equity and environmental justice are also addressed by incorporating the social cost of greenhouse gas emissions and climate adaptation and resilience into trade and investment decision-making.
- Lead Organization: This activity is led by OIA, in consultation with OAR and OP.

- Resource Requirements: Within available resources, OIA provides a modest level of technical expertise to these activities in the form of FTE's. There are no extramural resources.

EPA Agency-Wide Adaptation Priorities

1. Integrate climate adaptation into EPA programs, policies, rulemaking processes, and enforcement activities.
2. Consult and partner with states, Tribes, territories, local governments, environmental justice organizations, community groups, businesses, and other federal agencies to strengthen adaptive capacity and increase the resilience of the nation, with a particular focus on advancing environmental justice.
3. Implement measures to protect the agency's workforce, facilities, critical infrastructure, supply chains, and procurement processes from the risks posed by climate change.
4. Measure and evaluate performance.
5. Identify and address climate adaptation science needs

Training Plan for Enhancing Staff Knowledge About Climate Adaptation

OIA plans to host or facilitate approximately one training per year on various aspects of climate adaptation and resilience as needed, beginning in 2022. These trainings will specifically draw upon the climate and sustainability webinars hosted by the White House, the National Academy of Sciences, and other institutions respected for their expertise in climate and climate-related matters. In addition, OIA will make use of climate modules from various offices within EPA such as the Office of Policy's climate adaptation module currently under revision. OIA will also seek out briefings from leaders and authors of the UN IPCC WG II 6th Assessment Report (Impacts, Adaptation and Vulnerability) due to be released in February 2022. The IPCC WG II briefing will likely be of especial relevance to OIA's regional interests and equities around the globe.

OIA will also occasionally reach out to other climate and climate-related experts, as needed or desired, to brief OIA staff on specific aspects of climate of particular interest to all or parts of OIA such as finance and trade-related aspects of climate adaptation and resilience, or the implications of climate impacts in the Arctic or parts of Asia or Latin America.

Finally, OIA will also continue to explore the nexus between climate adaptation, resilience and sustainability, and the issues of equity, environmental justice, and underserved populations, especially among OIA's partners in the Global South.

Science Needs

OIA-specific science needs to assess climate impacts and build resilience on behalf of ourselves and our international partners might include training on the use of risk assessment tools and regionally sensitive climate projections. Such trainings are likely to warrant additional FTEs to enhance climate competence within OIA as risk assessment tools and climate projections typically necessitate specialized expertise and skills.

References

1. Climate Risk Country Profile: China (2021): The World Bank Group and the Asian Development Bank.
2. Climate Risk Country Profile: Thailand (2021): The World Bank Group and the Asian Development Bank.
3. Climate Risk Country Profile: Vietnam (2021): The World Bank Group and the Asian Development Bank.
4. IPCC, 2022: Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press.
5. Border 2025: United States - Mexico Environmental Program. 2021.
6. Wilder, M., G. Garfín, P. Ganster, H. Eakin, P. Romero-Lankao, F. Lara-Valencia, A. A. Cortez-Lara, S. Mumme, C. Neri, and F. Muñoz-Arriola. 2013. "Climate Change and U.S.-Mexico Border Communities." In *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment*, edited by G. Garfín, A. Jardine, R. Merideth, M. Black, and S. LeRoy, 340–384. A report by the Southwest Climate Alliance. Washington, DC: Island Press.
7. Climate Change Overview, Country Summary: Canada (2021): The World Bank Group, <https://climateknowledgeportal.worldbank.org/country/canada>.
8. IPCC, 2022.
9. Climate Change Risk Profile: Jordan (2017): USAID, https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile_Jordan.pdf.
10. Climate Risk Profile: Morocco (2021): The World Bank Group.
11. Climate Change Overview, Country Summary: Israel (2021): The World Bank Group, <https://climateknowledgeportal.worldbank.org/country/israel#:~:text=Israel's%20vast%20range%20of,also%20impacts%20an%20economic%20cost>.
12. *State and Trends in Adaptation Report 2021: Africa Country Profiles*, Global Center on Adaptation, Ghana (pgs. 522-5), https://gca.org/wp-content/uploads/2021/10/GCA_STA21_Sect4_COUNTRY_PROFILES.pdf.
13. *State and Trends in Adaptation Report 2021: Africa Country Profiles*, Global Center on Adaptation, Ethiopia (pgs. 514-7), https://gca.org/wp-content/uploads/2021/10/GCA_STA21_Sect4_COUNTRY_PROFILES.pdf