*IMPACTS AND PARTNERS ARE TENTATIVE

DEVELOP 2024 SUMMER PORTFOLIO

ENGAGEMENT:

100 PARTICIPANTS

42 PARTNER ORGS

25 PROJECTS

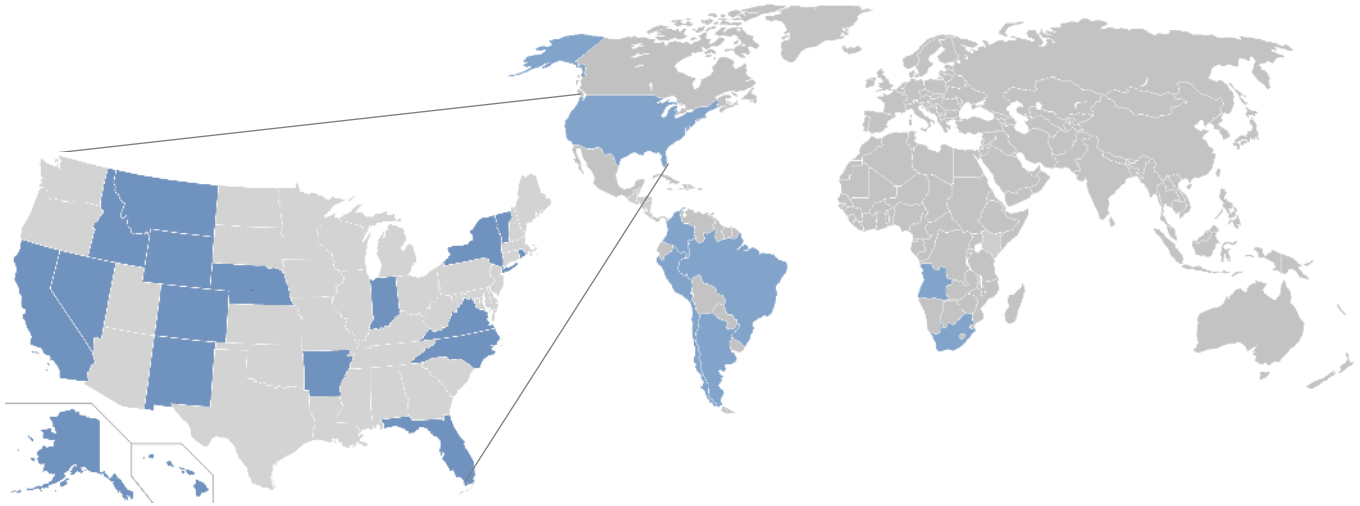
TERM I: 20

TERM II: 5

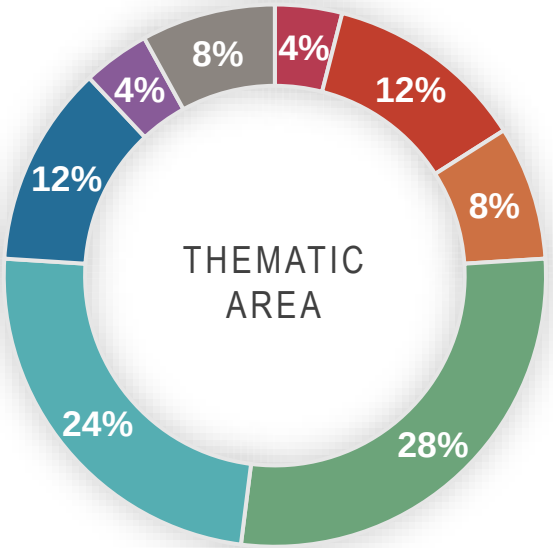
IMPACT:

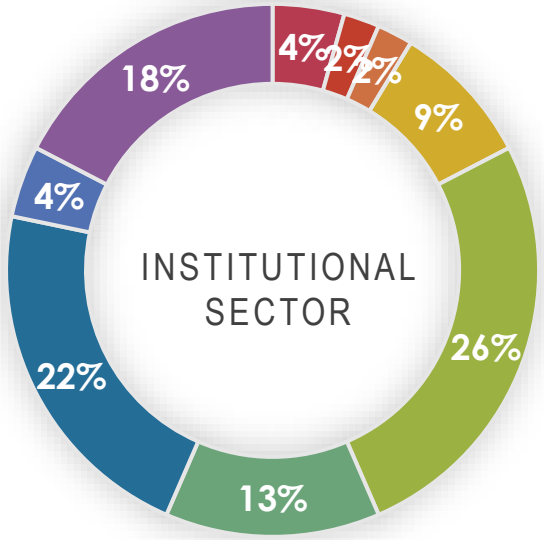
18 U.S. STATES

8 COUNTRIES



- DISASTERS
- WILDLAND FIRES
- AGRICULTURE
- ENERGY
- ECOLOGICAL CONSERVATION
- WATER RESOURCES
- URBAN DEVELOPMENT
- CLIMATE
- HEALTH & AIR QUALITY
- SPACE WEATHER





- ACADEMIC
- CONSORTIUM
- LOCAL GOVERNMENT
- STATE GOVERNMENT
- FEDERAL GOVERNMENT
- INTERGOVERNMENTAL
- FOR-PROFIT
- NON-PROFIT
- TRIBAL
- INTERNATIONAL

Jemez Pueblo Agriculture

Community Concern: As global temperatures increase, local agriculture can be drastically impacted by drought conditions.

Partners:

- Pueblo of Jemez, Natural Resources Department
- The Nature Conservancy

Earth Observations:

- Landsat 5 TM
- Landsat 8 OLI
- Landsat 9 OLI-2

Impact: This project will help inform grazing management plans and support decision making during droughts. Ultimately, this will lead to sustainable management practices, for the landscape, livestock and people, and build resiliency during future drought events.

Image credit: Jemez Pueblo

Colorado – Fort Collins

NASA EARTH ACTION

Northern Colorado Water Resources

Community Concern: In 2020, multiple severe wildfires ravaged northern Colorado, and those fires have impacted snowpack dynamics. City utilities must adapt to a fluctuating water supply to manage the city's water systems.

Partners:

- Northern Water
- Airborne Snow Observatory
- Colorado State University

Earth Observations:

- Landsat 8 OLI
- Landsat 9 OLI-2
- Airborne LiDAR

Impact: End users will use water supply forecasts to control things such as reservoir levels for Fort Collins. Modeling fire impacts on snowmelt will also give our partners ideas of drivers of snow melt rate.

Colorado – Fort Collins

EARTH ACTION

Platte River Basin Water Resources II

Earth Observations:

- Landsat 9 OLI-2
- Sentinel-1 C-SAR
- Sentinel-2 MSI
- Landsat 8 OLI

Partner: Audubon Great Plains

Community Concern: The expansion of urban areas in the Platte River Basin of NE, WY, and CO poses a risk to natural wetland and riparian ecosystems, which are crucial for bird habitats, flood mitigation, and green infrastructure.

Impact: Maps of projected landcover change into 2050 will inform partners of areas vulnerable to urban encroachment, which they will use to spur collaborative protection efforts with local communities.

Georgia – Athens

NASA EARTH ACTION

Coastal Chile Water Resources

Community Concern: With 6,435 km of coast, Chile harvests generous natural resources from the sea, but it is also widely exposed to natural hazards coming from the Pacific Ocean. One recent concern is an abundance of harmful algae blooms causing negative impacts on human health and aquaculture.

Partners:

- Centro de Información de Recursos Naturales
- Ministry of Health of Chile
- Embassy of Chile, Agricultural Office
- University of Atacama

Earth Observations:

- Aqua MODIS
- Terra MODIS
- Landsat 8 OLI
- Landsat 9 OLI-2
- GPM IMERG

Impact: The results from this project will help the partners better understand locations susceptible to harmful algal bloom events based on potential algal bloom indicators such as chlorophyll-a, sea surface temperature, wind speed, humidity, precipitation, and nutrient runoff in order to determine watersheds of greatest concern for mitigation efforts going forwards.


Image credit: ESA

Virginia – Langley

EARTH ACTION

Narragansett Bay Water Resources

Community Concern: As water temperatures continue to rise, harmful algal blooms (HABs) in Narragansett Bay, Rhode Island, have expanded in both frequency and distribution, leading to negative impacts on local marine species and fisheries. This project will investigate how warming temperatures and wastewater treatment upgrades have impacted HAB presence.

Earth Observations:

- Sentinel-2 MSI
- Sentinel-3 OLCI
- Landsat 8 OLI
- Landsat 9 OLI-2

Partners:

- Environmental Protection Agency, National Health and Environmental Effects Research Laboratory
- Rhode Island Department of Environmental Management

Impact: While warming temperatures have led to an increased presence of HABs, the partner is interested in analyzing how wastewater treatment plant upgrades may have helped mitigate this phenomenon. Project results can help inform future policy and assess if current treatment plans are effective.

Massachusetts – Boston

NASA EARTH ACTION

Hilo Bay Water Resources

Community Concern: Hilo Bay waters have been a cause for concern, exceeding state water quality standards. The county of Hawai'i recently received $2 million in federal funds to create a Watershed Management Plan for Hilo Bay to focus on pollution, water quality, and future climate resilience.

Partner:

- County of Hawai'i, Office of Sustainability, Climate, Equity, & Resilience

Credit: Darold Massaro

Impact: Time series of water quality parameters (ex. chl-a, turbidity, aquatic vegetation) can be used to assess break wall and infrastructure impacts to Hilo Bay to develop data-informed and nature-based solutions to improve community resilience to coastal hazards and ecosystem health.

Earth Observations:

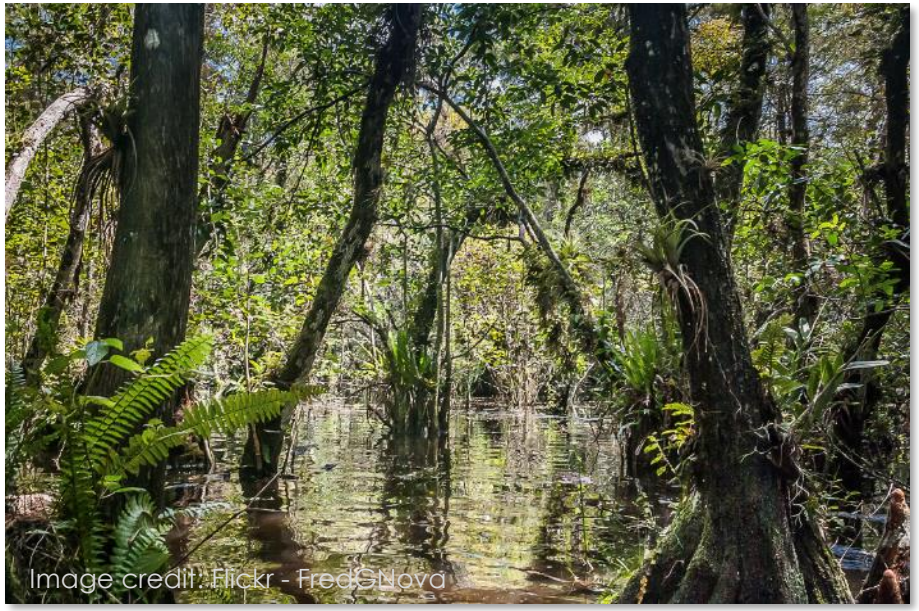
- Suomi NPP VIIRS
- Landsat 8 OLI
- Sentinel-2 MSI
- PACE OCI

Pop-Up Project – Hawaii

NASA EARTH ACTION

Big Cypress Water Resources

Community Concern: Chronic water quality problems affecting the canals, wetlands, and open water bodies of the northern precinct of Big Cypress Preserve, situated within the Everglades ecosystem in South Florida.



Partner:

- Seminole Tribe of Florida

Earth Observations:

- Landsat 8 OLI
- Landsat 8 TRIS
- Landsat 9 OLI-2
- Landsat 9 TRIS-2
- Sentinel-2 MSI
- Sentinel-3 OLCI

Impact: Inform management decisions (canal operations, wetland conservation, etc.) in the preserve by examining water quality metrics such as chlorophyll-a concentrations, turbidity levels, surface temperature differentials, and cyanobacterial growth patterns from 2013 to 2024.

Pop-Up Project – FGCU

EARTH ACTION

Cape Hatteras Ecological Conservation II

Community Concern: Cape Hatteras National Seashore, located along North Carolina's Outer Banks, is vulnerable to frequent storms that bring on heavy winds and treacherous waters. Development along the barrier islands is susceptible to erosion leading to damage of critical infrastructure and loss of habitat for nesting shorebirds and sea turtles.

Impact: Using Sentinel-1 C-SAR in anticipation of NISAR data, this project will support decision making relating to sediment management activities associated with the protection of critical infrastructure and/or restoration of habitat for nesting shorebirds and sea turtles.

Partner:

- National Park Service, Cape Hatteras National Seashore

Earth Observations:

- Sentinel-1 C-SAR

Virginia – Langley

EARTH ACTION

Northern Rockies Ecological Conservation

Community Concern: Whitebark pine is a federally threatened keystone and foundational species located in high elevation regions of the intermountain west. Crucial for supporting biodiversity and providing vital ecological services, Whitebark pine has been on the decline due to the nonnative pathogen white pine blister rust, as well as increased fire activity and bark beetle infestations.


Image credit: NPS

Earth Observations:

- Landsat 8 OLI
- Landsat 9 OLI-2
- ISS ECOSTRESS
- Sentinel-2 MSI
- Suomi NPP VIIRS

Partners:

- USDA US Forest Service, Region 1
- Whitebark Pine Ecosystem Foundation
- US Fish & Wildlife Service
- National Park Service
- Bureau of Land Management

Impact: Whitebark pine is predominantly found on US Forest Service land in rugged, rocky and difficult to access terrain. Remote sensing solutions for accurately determining the species occupancy will provide necessary management tools for assessing mortality and ecosystem health.

Idaho – Pocatello

NASA EARTH ACTION

South Africa Ecological Conservation

Community Concern: The South African National Biodiversity Institute (SANBI) is interested in mapping the extent of riparian ecosystems, which are the narrow bands of vegetation flanking the banks of rivers. The extremely narrow spatial extent and the challenge that extensive historical riparian areas have been lost to cultivation and urbanization make riparian ecosystems difficult to identify and represent on a map.


Image credit: Wiki Commons


Image credit: Wiki Commons

Partners:

- South African National Biodiversity Institute
- NASA BioSCape

Earth Observations:

- Sentinel-1 C-SAR
- Sentinel-2 MSI
- Landsat 9 OLI-2
- SWOT KaRIn

Impact: These difficult-to-identify riparian areas have been identified as a key priority for conservation planning. However, they have not received the required attention because of low capacity, poor data availability, and a lack of funding.

California – JPL

EARTH ACTION

Peruvian Amazon Ecological Conservation

Community Concern: Deforestation of the Peruvian amazon is linked with large-scale agricultural farming moving into the confines of the Amazon. The Agency for Environmental Assessment and Enforcement (OEFA) has an interest in identifying sites used for exploitative agriculture, particularly those related to palm oil plantation expanding past OEFA-issued agricultural permitted zones.

Earth Observations:

- Landsat 9 OLI-2
- Landsat 8 OLI
- PerúSat-1

Partners:

- Agency for Environmental Assessment and Enforcement (OEFA)
- The National Commission for Aerospace Research and Development (CONIDA)

Impact: Land cover land use maps and a time series analysis will help identify areas of greater risk of being degraded/deforested for the use of exploitative agriculture. End products will aid in determining areas in need of mitigation efforts to prevent further expansion of agricultural sites.


Image credit: Wiki Commons

Alabama – Marshall

EARTH ACTION

Iona Ecological Conservation

Community Concern: Angola has experienced decades of instability due to warfare, but the last 20 years of peace have reignited conservation efforts. Human and livestock populations have increased in Iona National Park, and staff have been working to rehabilitate the landscape since 2019.


Image Credit: African Parks


Image credit: African Parks

Partner:
African Parks, Iona National Park

Earth Observations:

- Landsat 5 TM
- Landsat 7 ETM+
- Landsat 8 OLI
- Sentinel-1 C-SAR

Impact: Maps of long-term vegetation and climate patterns will inform park staff of wildlife movement and management concerns, and the collaboration will build their capacity in using remotely sensed data.

Georgia – Athens

NASA EARTH ACTION

Alaska Ecological Conservation II

Community Concern: Research suggests that the Western Arctic Caribou Herd selects calving zones based on nutrient availability. As vegetation patterns shift in response to environmental and anthropogenic changes, understanding spatial and temporal trends in vegetation phenology will help predict future caribou migration patterns.


Image credit: Kyle Joly, NPS


Image credit: Kyle Joly, NPS

Partner:

- National Park Service, Gates Of The Arctic National Park & Reserve

Earth Observations:

- Landsat 8 OLI
- Sentinel-2 MSI

Impact: Understanding the correlation between vegetation and calving zones can help inform future National Petroleum Reserve – Alaska (NPRA) boundaries, some of which currently overlap with vegetated areas suitable for caribou calving.

Massachusetts – Boston

NASA EARTH ACTION

Southern Indiana Ecological Conservation

Community Concern: Two centuries of fire suppression in the fire-adapted ecosystems of southern Indiana has impacted the health of oak-hickory forests. Concerned about restoring these forests and creating crucial habitat for bird species like the red-headed woodpecker and prairie warbler, project partners seek to identify target areas for restoration activities.

Earth Observations:

- Landsat 4 TM
- Landsat 5 TM
- Landsat 8 OLI
- Landsat 9 OLI-2

Partners:

- Let the Sun Shine In - Indiana
- Central Hardwoods Joint Venture
- American Bird Conservancy
- US Forest Service, Hoosier National Forest

Impact: Canopy closure maps and a forest types suitability analysis will help guide partners' restoration priorities. Creative science communications will illustrate the environmental and social significance of oak/hickory forests to local stakeholders.

Image credit: U.S. National Archives

Maryland – Goddard

EARTH ACTION

Central Park Ecological Conservation

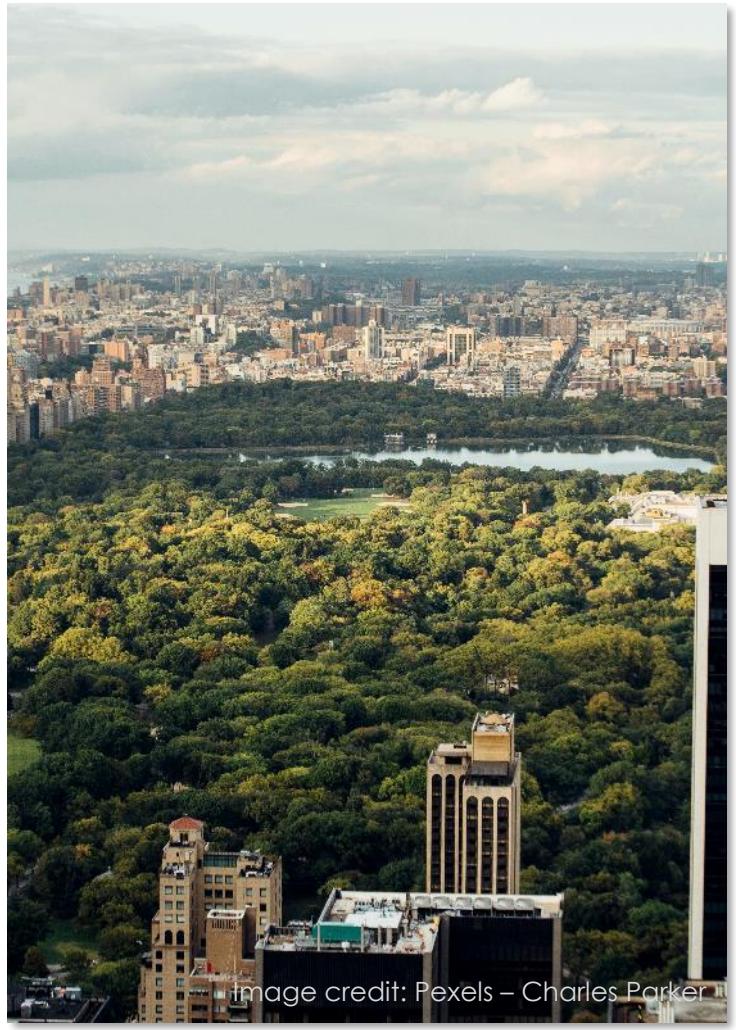
Community Concern: Central Park's tree population is threatened by pests and diseases. The Central Park Conservancy implements a management strategy for monitoring, treatment, mitigation, and reporting cycles for tree health within Central Park in New York City.

Partner: Central Park Conservancy

Earth Observations:

- Landsat 5 TM
- Landsat 7 ETM+
- Landsat 8 OLI
- Sentinel-2 MSI
- Aqua MODIS
- Suomi NPP VIIRS
- PlanetScope
- WorldView

Impact: Assessing forest foliar greenness, greenness phenology, moisture, and surface temperature in Central Park to develop forest health mapping products and identify health parameters of park forest trees.



Pop-Up Project – Hunter College

NASA EARTH ACTION

Clear Lake Volcanic Field Disasters

Community Concern: Hazards related to volcanic activity include volcanic unrest, landslide activity, and Earth movement, which must all be monitored to spot precursors which may lead to dangerous situations for those living around volcanoes.

Partners:

- USGS, California Volcano Observatory
- USGS, National Innovation Center
- USGS, Yellowstone Volcano Observatory

Earth Observation:

- Sentinel-1 C-SAR

Impact: This project will create a long-term record of deformation to create a baseline that will inform the observatory's decisions about future hazard assessment and emergency response activities .


Image credit: USGS

California – Ames

NASA EARTH ACTION

Hawaii Urban Development

Community Concern: In Hawaii, it is estimated that over 83,000 cesspools release 53 million gallons of raw sewage into Hawaii's waterways every day, threatening coral reefs and other sensitive ecosystems. In 2017, the State of Hawai'i enacted legislation mandating the upgrade of all cesspools to septic or sewer by 2050.

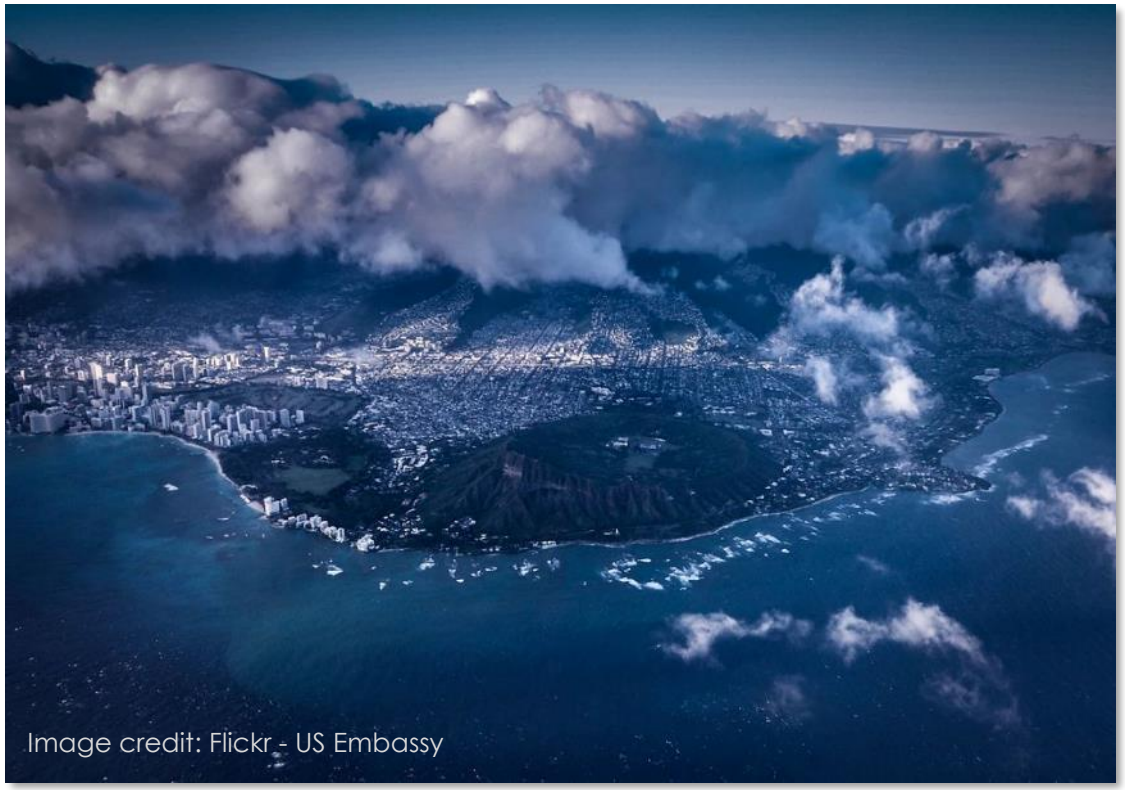


Image credit: Flickr - US Embassy

Partners:

- The Nature Conservancy Hawaii Regional Office
- University of Hawaii, Manoa

Earth Observations:

- ISS EMIT
- Landsat 9 OLI-2
- Landsat 8 OLI
- Landsat 7 ETM+
- Planetscope

Impact: Currently, Hawai'i is beginning development of comprehensive wastewater management plans throughout the islands. To prioritize the most at risk and vulnerable areas and communities within the State's plans, accurate data is needed, and the incorporation of NASA Earth observations would help ensure the accuracy of infrastructure data and related water quality endpoints.

Cali Urban Development II

Community Concern: Cali, Colombia communities face the urban heat island effect as a result of decades of deforestation and wetland declinations. This project investigates the Urban Heat Island (UHI) effect on communities of Cali, Colombia while using the wetlands as a rural reference.


Image credit: David Alejandro Rendón

Partners:

- Fundación Dinamizadores Ambientales
- Departamento Administrativo de Gestión del Medio Ambiente

Earth Observations:

- Landsat 8 OLI & TIRS
- Landsat 9 OLI-2 & TIRS-2
- ISS ECOSTRESS

Impact: This project will quantify the socioeconomic impacts of UHIS and introduce the usage and methodologies of NASA Earth observations in the partner's tool kit to inform decisions related to the recovery and conservation of Cali's wetlands.

California – Ames

NASA EARTH ACTION

Asheville Urban Development II

Community Concern: Extreme heat is the leading cause of weather-related mortality in the U.S., disproportionately affecting vulnerable populations. Stakeholders in Asheville, NC are interested in mapping urban heat to support cooling initiatives and plan for local climate resilience.


Image credit: Bret Frk

Partners:

- Sustainability Department, The City of Asheville
- Asheville GreenWorks

Earth Observations:

- ISS ECOSTRESS
- Landsat 8 TIRS
- Landsat 9 TIRS-2
- WorldView-2 & 3

Impact: The goal of this project is to develop a heat vulnerability analysis that identifies heat hot spots and models the impacts of cooling strategies.

North Carolina – NCEI

EARTH ACTION

Hampton Roads Health & Air Quality

Community Concern: Since 1885, coal transportation has taken place throughout communities in the Hampton Roads region of Virginia and caused concern regarding health effects due to coal dust. Currently, dust spreads from coal storage and transportation facilities in the area which poses potential health risks.


Image credit: Luis Rodriguez

Partner:

- Virginia Department of Environmental Quality

Earth Observations:

- Terra MODIS
- Aqua MODIS
- CALIPSO CALIOP

Impact: The VA DEQ has started the Tidewater Air Monitoring Evaluation Project (TAME) to measure toxic metals and air particulates found within dust in the region. The DEVELOP Team will assess air quality using Earth observations and compare these data to the VA DEQ's PurpleAir air quality monitors to provide the partners with resources that will help them inform community members and increase awareness of the importance of the TAME project.

Virginia – Langley

NASA EARTH ACTION

Nevada Wildland Fires

Community Concern: Increasing fire return intervals in the Mojave Desert of southern Nevada pose a threat to the desert tortoise because the ecosystem is not fire-adapted. Partners aim to mitigate this threat by identifying early warning indicators of fire events in desert tortoise habitat, particularly those fueled by invasive species such as red brome and cheatgrass.


Image credit: NPS


Image credit: USFWS

Partners:

- Bureau of Land Management Southern Nevada District
- USDA, US Forest Service, Rocky Mountain Research Station

Earth Observations:

- Terra/Aqua MODIS
- Sentinel-2 MSI
- Landsat 8 OLI
- Landsat 9 OLI–2
- Landsat 5 TM

Impact: Analyzing the spatial and temporal dynamics of cheatgrass and red brome over twenty years will provide partners with historical vegetation post-fire regrowth records, as well as help partners identify fuel load early warning signals and adaptively-manage desert tortoise habitat.

Maryland – Goddard

NASA EARTH ACTION

Vermont Wildland Fires

Community Concern: Increases in dry conditions and extreme heat events are projected to heighten wildfire risk in the northeastern U.S. However, antecedent conditions and environmental trends in exacerbating wildland fire risk in Vermont are not yet well understood.


Image credit: REUTERS/Noah Berger

Partners:

- NASA Goddard Space Flight Center
- National Weather Service, VT Weather Forecast Office
- NOAA National Integrated Drought Information System
- The University of Vermont
- Vermont Agency of Natural Resources, Forestry Division

Earth Observations:

- Landsat 5 TM
- Landsat 7 ETM+
- Landsat 8 OLI
- Landsat 8 TIRS
- Landsat 9 OLI
- Landsat 9 TIRS

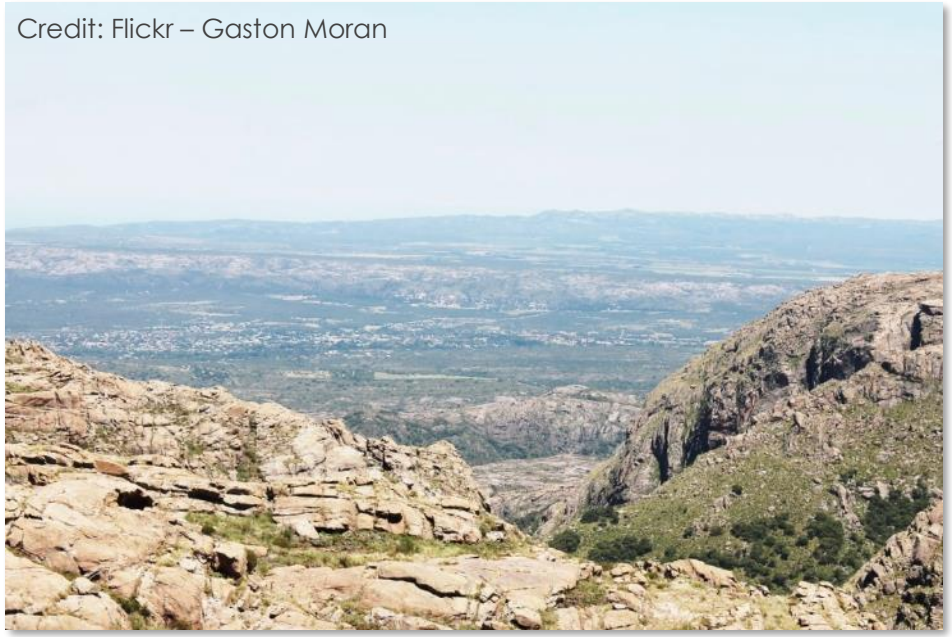
Impact: The goal of this project is to investigate the influence of environmental conditions on wildfire risk to inform fire forecasting efforts and outreach in Vermont.

North Carolina – NCEI

EARTH ACTION

Cordoba Wildland Fires

Community Concern: In Cordoba, Argentina, rapid urban expansion paired with higher temperatures induced by climate change is leading to increased severity in wildland fire encroachment within the critical rural-urban interface of this semi-arid region.


Credit: Flickr – Gaston Moran

Partner: Instituto Nacional de Tecnología Agropecuaria (INTA)

Impact: Inform INTA's fire prevention plan and give insight into where management practices can be implemented to control the origin and spread of wildfires within the rural-urban interface of Cordoba.

Earth Observations:

- Landsat 8 OLI
- Landsat 9 OLI-2
- Sentinel-2 MSI
- Terra MODIS
- Aqua MODIS
- Landsat 8 TIRS
- Landsat 9 TIRS-2
- GPM IMERG
- ISS ECOSTRESS
- SMAP

Pop-Up Project – Texas Tech

EARTH ACTION

Brazil Space Weather

Community Concern: Every year Companhia Nacional de Abastecimento (CONAB), a public corporation supporting Brazil's Ministry of Agriculture, estimates crop yield for crops such as soybean, maize and sugarcane. With new estimation technology based on Global Navigation Satellite System introduced in modern farms, the estimated yield can have uncertainties depending on solar activity cycle. The partner would like to understand the potential impacts.

Partners:

- Companhia Nacional de Abastecimento (Brazil)
- SLC AgrÍcola, Brazil

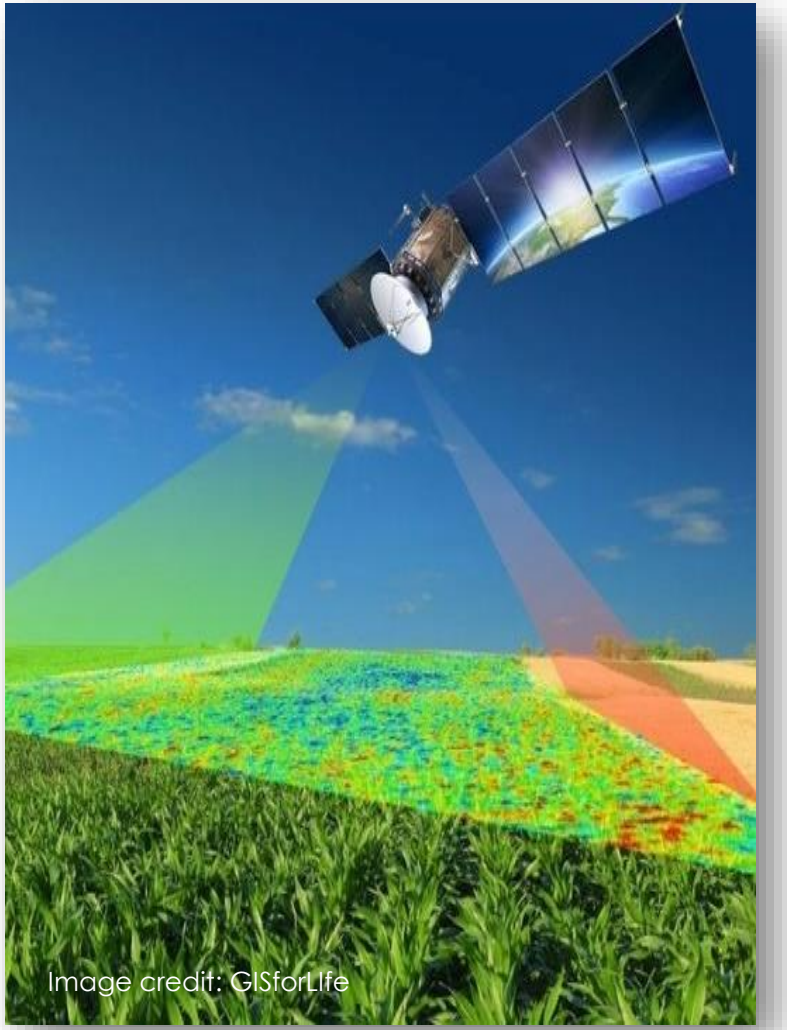
NASA Observations:

- GOLD

Global Navigation Satellite System:

- GPS, Galileo

Impact: The results from this project will help the partner understand how crop yield estimation is impacted by solar activity if using Global Navigation Satellite System technology, quantify the uncertainties of crop yield estimation, and explore a mitigation algorithm to improve the estimation accuracy.



Virginia – Langley

Heliophysics

Glacier & Denali Space Weather

Community Concern: Every Spring and Fall, Glacier & Denali National Parks in Montana & Alaska attracts aurora borealis watchers to enjoy the magnificent scenes. With the Solar activity projected to reach its maximum in 2025, the park would like to improve its aurora prediction capability to better serve the aurora borealis watchers and park visitors in general.

Partners:

- National Park Service, Glacier National Park
- National Park Service, Natural Sounds and Night Skies Division

NASA Observations:

- Polar UVI
- IMAGE FUV and EUV
- Suomi NPP and NOAA-20 VIIRS

Impact: The results from this project will help the partners better understand the characteristics of the aurora borealis at local and regional scales, validate the current aurora prediction practice using a global disturbance index, and enhance the prediction capability using a polar or regional disturbance index .

Virginia – Langley

Heliophysics


SAVE THE DATE
DEVELOP
SCIENCE SERVING SOCIETY
DEVELOP DAY
Tuesday, August 6, 2024
Mary W. Jackson NASA Headquarters, West Lobby
300 St SW, Washington DC 20024