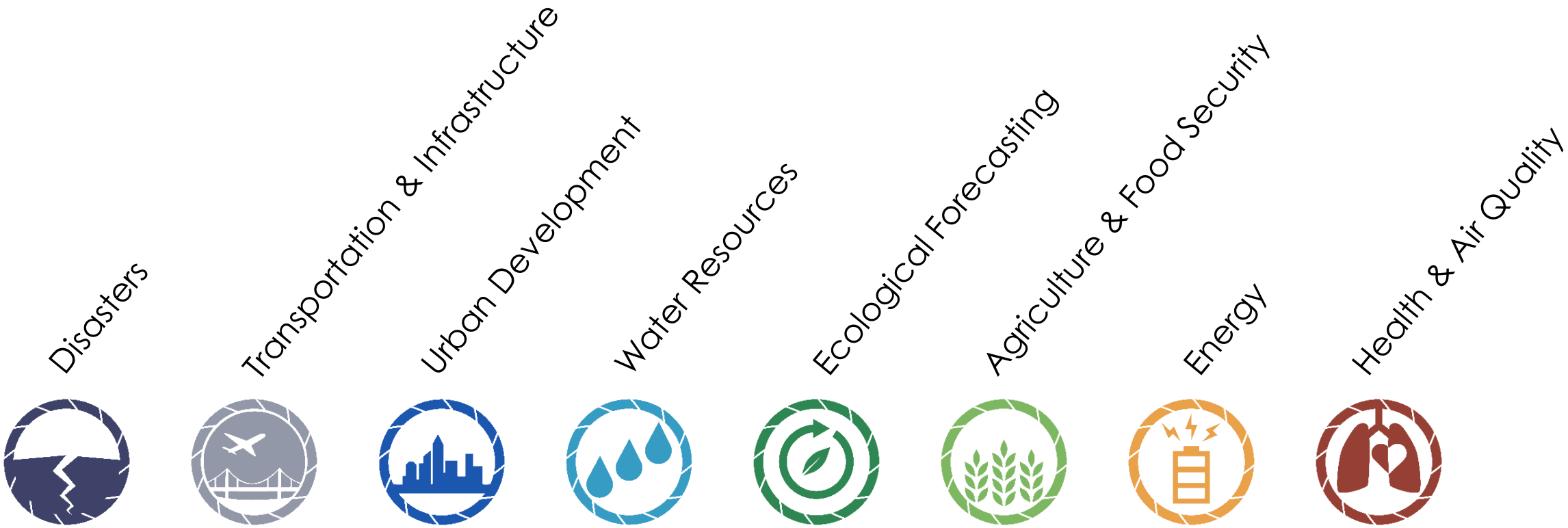
2018 Fall Preview

DEVELOP National Program



(1)

2nd TERM (5)

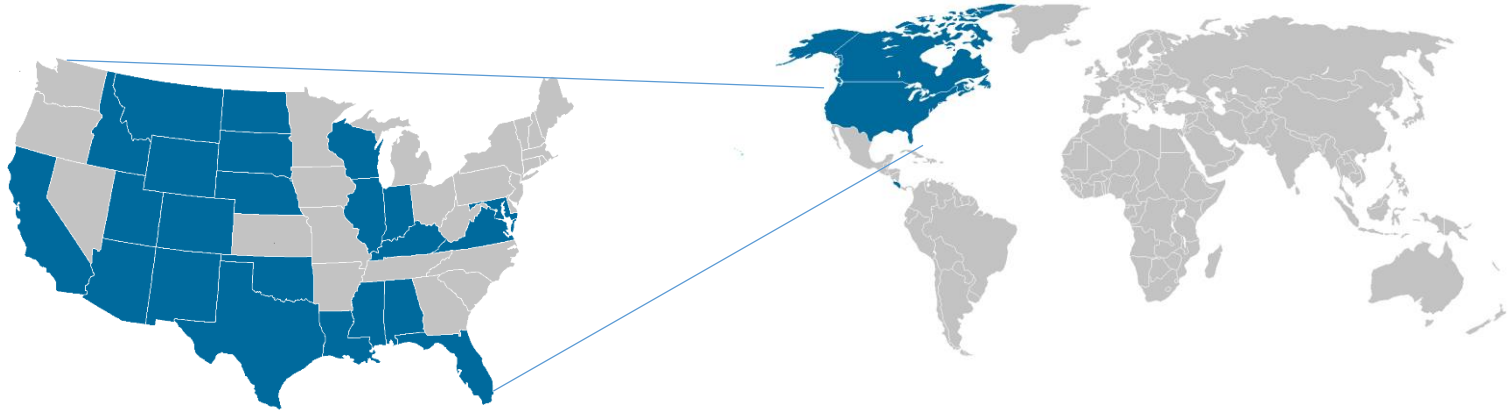
1st TERM (11)

2018 Fall Portfolio

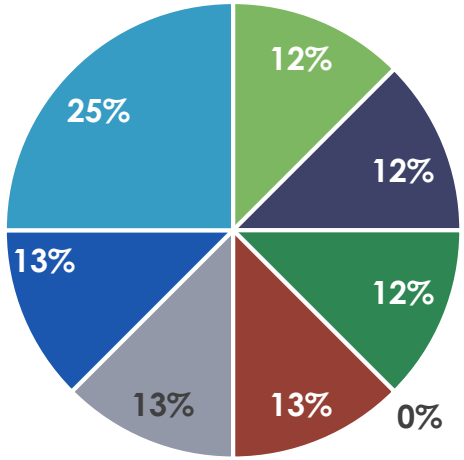
16 Projects

87% Domestic
13% International

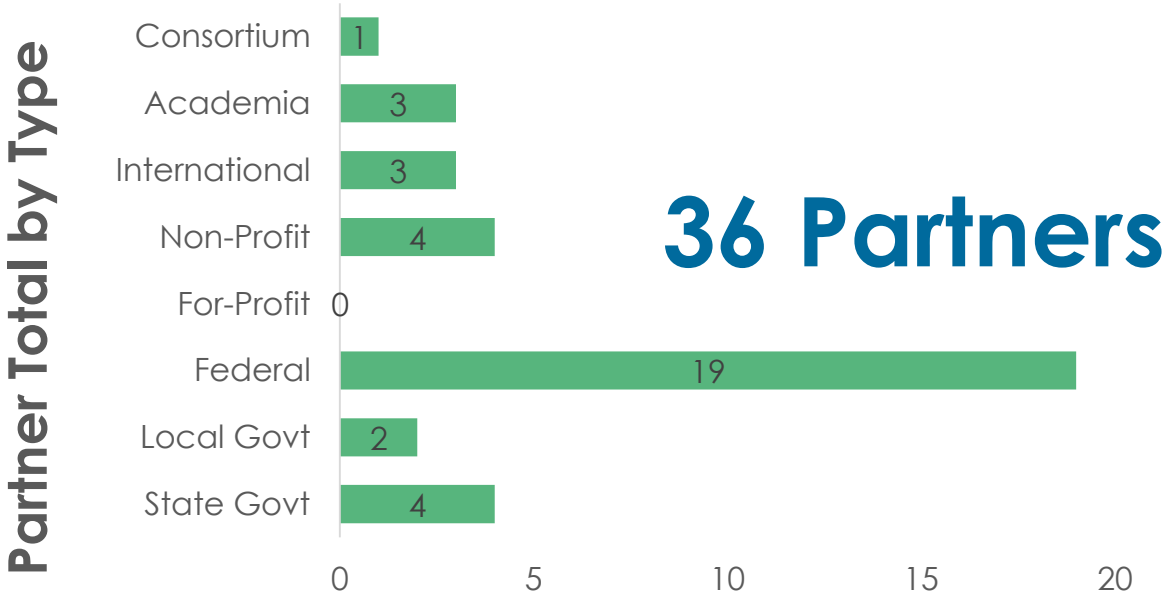
24 States & 3 Countries Impacted



Application Areas Addressed



- Ag & FS
- Disasters
- Eco
- Energy (0)
- Health & AQ
- Trans. & Infr.
- Urban Dev
- Water



36 Partners

*Impacts and partners are tentative

Colorado and New Mexico Disasters

Colorado – Fort Collins

Community Concern: Tercio and Trinchera Ranches and the Colorado State Forest Service are tasked with managing vast regions and preserving open lands and undisturbed wilderness to protect Colorado's natural heritage, identity, and wildlife species. The forest composition and structure, especially in southern Colorado, has been altered due to a historically suppressed seasonal forest fires, large scale insect outbreaks, and extreme to exceptional drought conditions. This has left these forests at risk of a catastrophic wildfire.

Partners:

- Tercio and Trinchera Ranches
- Colorado State Forest Service

Earth Observations:

- Landsat 5 TM
- Landsat 7 ETM+
- Landsat 8 OLI
- Sentinel-2 MSI
- Sentinel-1 C-SAR
- SRTM

Impact & Benefit: This project will help inform the forest management while enabling a refined monitoring and field survey effort. End products will be integrated in the Tercio and Trinchera Ranches' decision making and management processes to more effectively manage insect outbreak affected forests to mitigate wildfire potential.

Missouri River Disasters

North Carolina – NCEI

Community Concern: Rangeland managers recognize that changes in local climate are leading to extended droughts and the intensification of certain extreme events such as wildfires. In a region with such extreme variation, there is a constant need for more robust monitoring of rangeland health and wildfire risk.

Partners:

- BIA Wildland Fire Management, Great Plains Region
- South Dakota School of Mines & Technology
- NOAA NCEI Regional Climate Service, Central Region

Earth Observations:

- Terra MODIS
- Aqua MODIS
- SMAP
- PERSIANN-CCS

Impact & Benefit: Our team will create a near real-time tool that can be used to calculate fuel loading, drought, and temperature to generate daily wildfire risk maps for wildland managers.

Gulf of Mexico Transportation & Infrastructure

Alabama – Marshall

Community Concern: Offshore oil production in the Gulf of Mexico accounts for 17% of total U.S. production. Tropical storms and hurricanes regularly impact energy infrastructure negatively in this region, with 2-3 storms reaching the coast each year. Oil rigs, transportation pipelines, processing plants, and other energy infrastructure in the expected path of the storm shut down and crews are evacuated. Repairs can delay production from a couple of days to months, creating instability in energy production.

Earth Observations:

- CYGNSS DDMI
- Jason-3 Altimeter
- ASCAT METOP-A

Partner:

- Bureau of Ocean Energy Management, Office of the Environment

Impact & Benefit: This project will support the National Environmental Policy Act analysis BOEM conducts for offshore energy production. Knowing the wind speed and wave height of storms in the Gulf and their impact on energy infrastructure will assist in developing future models. An alternative way of calibrating storm surges is particularly useful for BOEM supported study, *Assessing Temporal and Spatial Variability in Community and Parish Level Responses to Oil Spills and Other Events in Coastal Louisiana* conducted by The Water Institute of the Gulf.

Ohio River Valley Transportation & Infrastructure

Alabama – Marshall

Community Concern: The Ohio River is a significant contributor to the economic and environmental prosperity of the Ohio River Valley. The ~27 million residents utilize the river for a number of purposes, including industrial manufacturing, power generation, and drinking water. While the Ohio River is a critical resource to the region, it is also the source of numerous flood events that cause both social and economic damages to impacted communities. This frequent flooding can severely disrupt surface transportation, limiting disaster response and relief organizations' ability to reach those in need.

Earth Observations:

- Landsat 8 OLI
- Sentinel-1 C-SAR

Partners:

- Federal Emergency Management Agency
- National Weather Service, Ohio River Forecast Center
- NASA Short-term Prediction Research and Transition Center

Impact & Benefit: The Ohio River Valley Flood Risk and Disaster Response Optimal Road Maps will be used to enhance flood resilience in the Ohio River Valley. These products will enable end users to determine the most effective and efficient transportation systems to take when responding to a disaster, potentially reducing response times across the region, allow more targeted flood warning messages, and identify flood reaches.

Alaska Eco Forecasting

California – JPL

Community Concern: Wetlands are one of the most important ecosystems in the world, providing numerous benefits for humans and wildlife. Some wetland loss in Alaska has occurred due to habitat change, and project partners do not have an accurate wetlands extent map to help manage these impacted areas. The NWI created the Wetlands Mapper, but it does not include inundation, used in refining the boundaries of wetlands, and some parts of Alaska have yet to be mapped.

Partners:

- US Fish and Wildlife Service, National Wetlands Inventory
- Alaska Satellite Facility

Earth Observations:

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

Impact & Benefit: The end products will help improve the NWI's automated wetland mapping capacity by using SAR to map inundation and soil saturation. This project will assist with the production of a coarser-scale wetland types map product for Alaska. The forecasted wetland extent maps will also bring awareness about wetland areas that are at risk for future loss.

Mojave Desert Eco Forecasting

California – JPL

Community Concern: Big Horn Sheep populations and habitat in California are currently fragmented into small and isolated herds due to shrinking habitat resource availability. As such, it is difficult to monitor, assess, and manage BHS populations with respect to water availability and vegetation conditions.

Partners:

- NPS, Mojave National Preserve
- NPS, Biological Resources division, Wildlife Health Branch
- California Dept. of Fish and Wildlife, Wildlife Branch, Game Management
- Oregon State University, Dept. of Fisheries & Wildlife
- Sierra Nevada Bighorn Sheep Foundation

Earth Observations:

- Landsat 5 TM
- Landsat 8 OLI
- SMAP
- SRTM
- Terra & Aqua MODIS
- Sentinel-2 MSI

Impact & Benefit: End products from both terms will provide additional datasets to inform nutrient availability and population dynamics. Predicted habitat maps will assist partners in understanding potential BHS distributions and aid in managing available foraging sites.

Intermountain West Health & Air Quality II

Virginia – Langley

Community Concern: Clean air supports natural resources including soils, water, vegetation, and visibility. Over the past 30 years, 90% of park visitors surveyed say that scenic views are extremely important to their visit. Park units have inadequate ground monitoring stations for to use for decision making related to air quality.

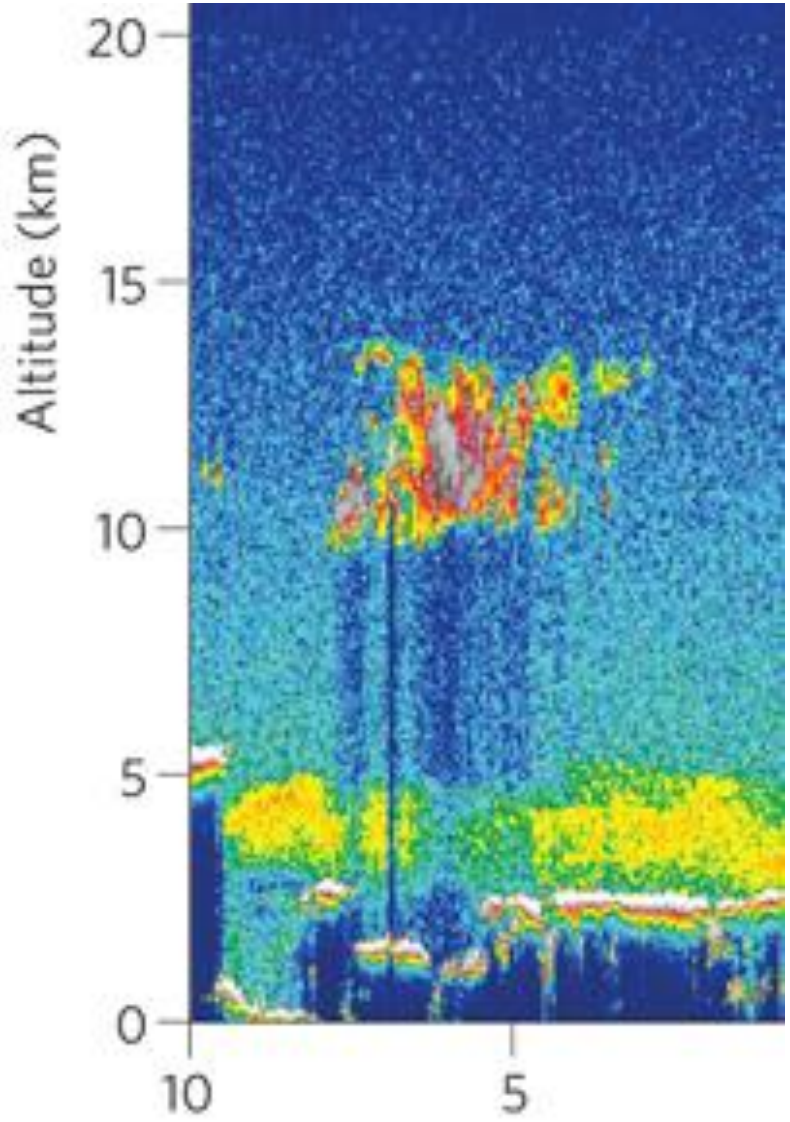
Partners:

- National Park Service, Intermountain Region

Earth Observations:

- Aqua & Terra MODIS
- Suomi NPP VIIRS
- Aura OMI
- Sentinel-5P Tropomi
- CALIPSO CALIOP

Impact & Benefit: This project will build upon previous work measuring pollutant trends and concentrations in the Intermountain Region by providing a vertical profile and measuring aerosol optical depth. This information could identify pollutant sources, allowing the NPS to better prioritize mitigation strategies.



New Orleans Health & Air Quality

Alabama – Mobile

Community Concern: The Urban Heat Island (UHI) effect can directly impact the health of urban residents. New Orleans' paved surfaces, dark roofs, and grey infrastructures contribute to increases in temperature throughout the city. This phenomenon can increase the rate of hospitalization, stroke, respiratory difficulties, tiredness, fainting, and the risk of mortality.

Partners:

- Louisiana Public Health Institute

Earth Observations:

- Landsat 8 OLI/TIIRS
- Landsat 5 TM
- Sentinel-2 MSI
- Sentinel-3 SLSTR
- Terra MODIS

Impact & Benefit: The project aims to contribute to the LPHI's current clinic monitoring system by recognizing and monitoring severe urban heat levels in New Orleans, LA, and identifying the relationship between New Orleans' urban heat island, the city's land cover characteristics, and health-outcome disparities.

Image Credit: Pixabay

Hampton Roads Urban Development

Virginia – Langley

Community Concern: Situated at the mouth of the Chesapeake Bay, Hampton Roads is open to the direct forces of the Atlantic Ocean. This, coupled with projected sea level rise makes coastal resilience planning a priority.

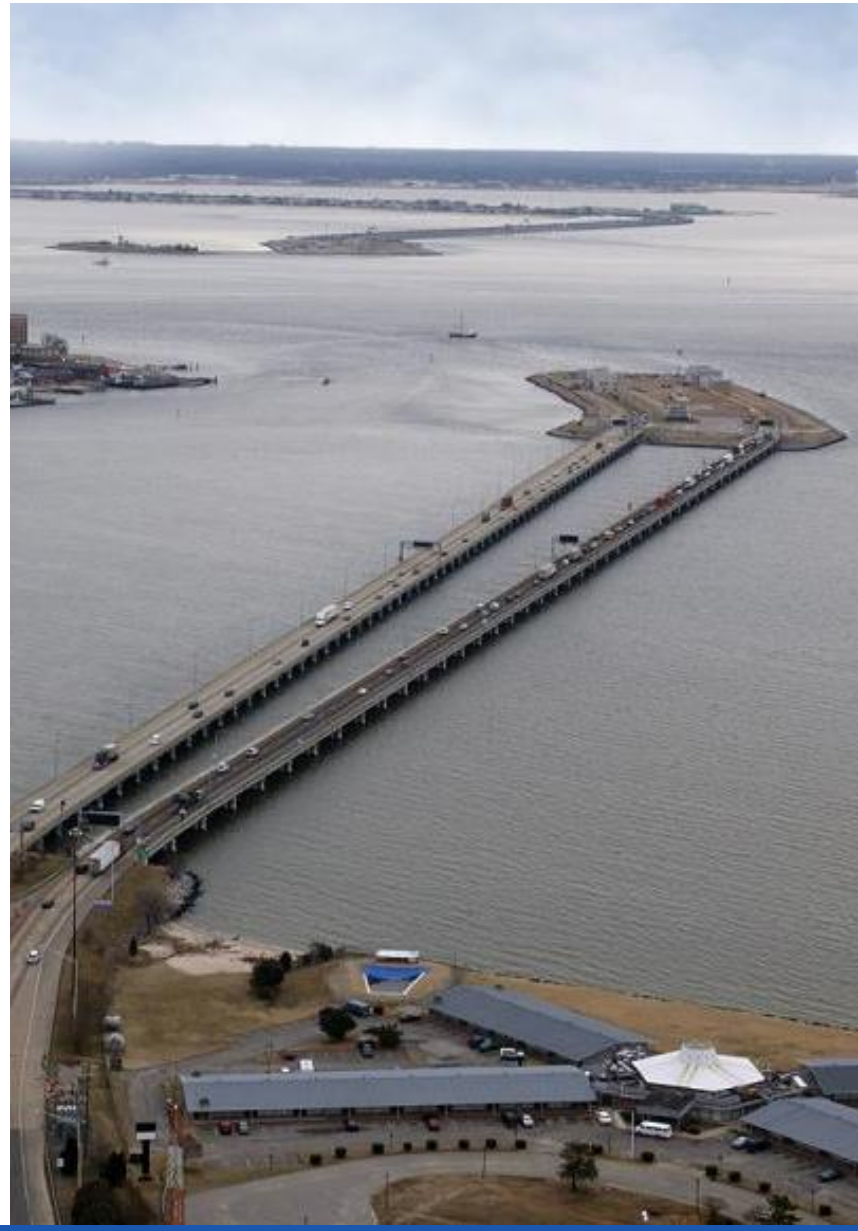
Partners:

- City of Hampton

Earth Observations:

- Landsat 8 OLI
- Landsat 7 ETM+
- Landsat 5 TM
- Sentinel-2 MSI
- Sentinel-1 CSAR

Impact & Benefit: This project will map coastline change and barrier island transgression over time, and forecast potential changes into the future. This will allow our partners to make better-informed decisions in their resilience planning.



Tempe Urban Development

Arizona – Tempe

Community Concern: Tree canopy cover influences the outdoor thermal environment through the processes of evapotranspiration and shading. Focusing on parks and green spaces, the City of Tempe has a goal of achieving 25% tree canopy cover to protect pedestrian activity.

Impact & Benefit: This project will enable the City of Tempe to establish performance measures to track greening initiatives and efforts to reduce the thermal burden residents experience. The performance metrics will enable the city to implement the greening interventions outlined in it's various master plans.

Partners:

- City of Tempe
- Arizona State University, Urban Climate Research Center

Earth Observations:

- Landsat 5 TM
- Landsat 8 OLI
- Landsat 8 TIRS
- Sentinel-2 MSI

Great Bear Lake Water Resources

Massachusetts – Boston

Community Concern: Déline is a small, primarily indigenous community that relies on the fisheries and freshwater resources of Great Bear Lake. The people of Déline are concerned that shifting climatic conditions are changing lake conditions, thus threatening the livelihoods of community members.

Partners:

- Déline Got'ine Government, Déline Renewable Resources Council
- Environment and Climate Change Canada

Earth Observations:

- Aqua MODIS
- SeaWiFS
- Landsat 8 OLI

Impact & Benefit: End products will provide community members with a landscape-level view of surface temperature and water quality, with greater temporal resolution, to help focus preservation efforts and lake resource utilization. Decision makers will also build capacity in the use of remote sensing to monitor their vast natural resources.

Google Earth

Idaho Water Resources II

Idaho – Pocatello

Community Concern: Knowing where water is stored and how it moves through a system affects wildfire assessments, rangeland management, and ecosystem health. This project will investigate ways to estimate ET in the specialized systems of ID's semi-arid sagebrush steppe for a more holistic view of the regional water balance.

Partners:

- USFWS, Eastern ID Field Office
- Idaho Dept. of Fish & Game, Southeast Regional Office
- Idaho National Laboratory
- National Scientific & Technical Research Council (Argentina)
- USDA NRCS, Pocatello Field Office
- USDA ARS, Northwest Watershed Research Center

Earth Observations:

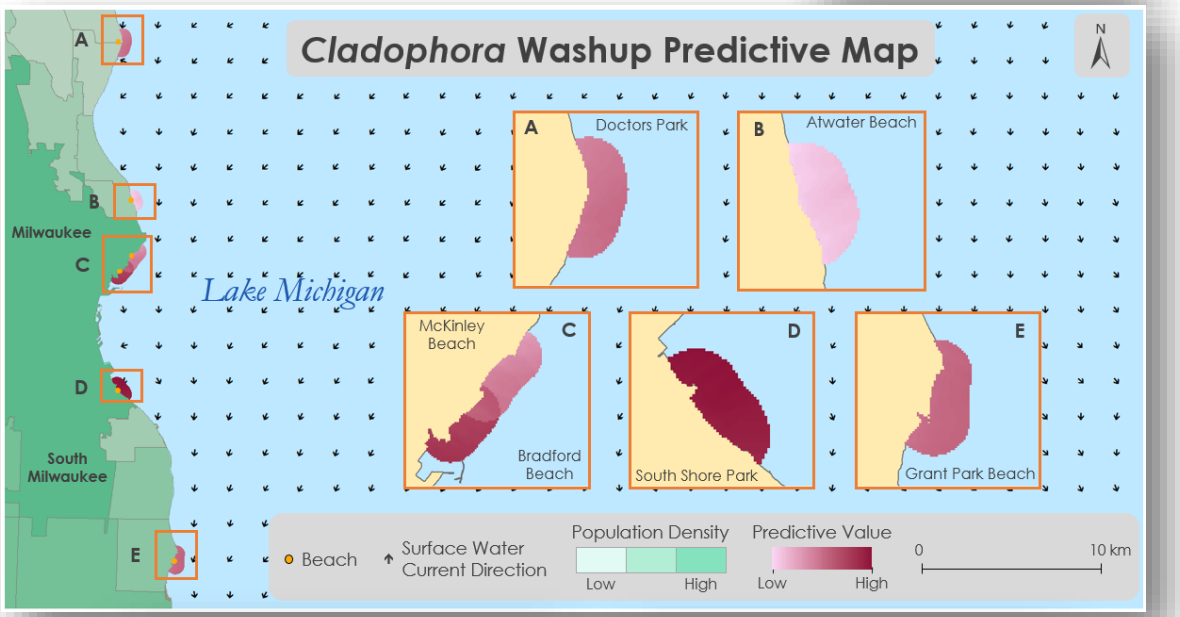
- Aqua & Terra MODIS

Impact & Benefit: With over 60% of Idaho's land area classified as public, ground-based monitoring is a management challenge. Testing different satellite-based ET estimations can help land managers save time, money, and have a broader picture of ecosystem health.

Lake Michigan Water Resources II

California – Ames

Community Concern: There has been a recent resurgence of macroalgae, predominantly *Cladophora*, along the coastline of Lake Michigan. Although this naturally occurring algae is not toxic to human when it washes ashore and decays, it leads to unsightly and foul-smelling beaching, which deters visitors, reduces water quality, and clogs water intakes.

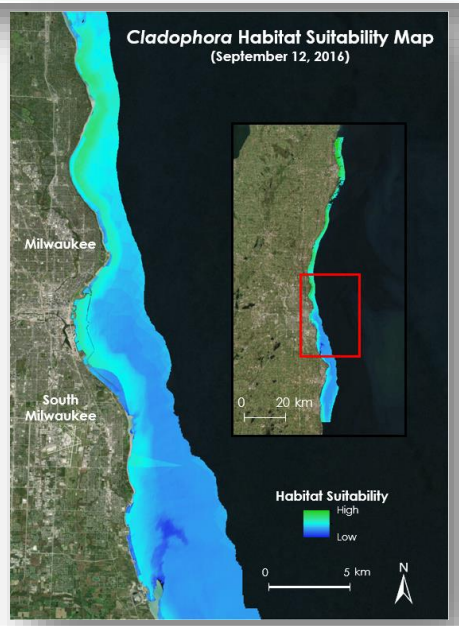


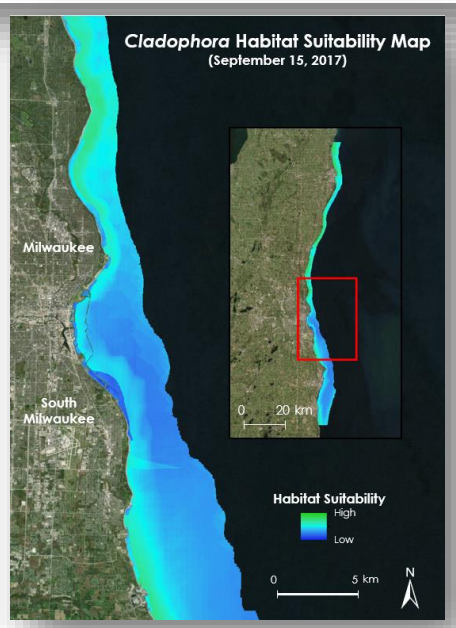
Partners:

- Groundwork USA, Groundwork Milwaukee

Earth Observations:

- Landsat 7 TM
- Landsat 8 OLI
- Aqua MODIS
- Sentinel-2 MSI





Impact & Benefit: Groundwork Milwaukee is actively involved in the remediation of; *Cladophora*. With this project, our partners will be able to better assess when and where the *Cladophora* will wash up on the city's beaches. It will also be building the capacity of Groundwork youth in using geospatial technologies.

Osa Peninsula Water Resources III

Georgia – Athens

Community Concern: Extensive use of agricultural pesticides and fertilizers have polluted and degraded watersheds in the Osa Peninsula, Costa Rica. Due to the peninsula's extremely biodiverse ecosystems, small changes in river water quality can make lasting impacts in riparian and coastal zones, especially mangrove forests and coral reefs. Mangroves and coral reefs play key roles in sustaining ecosystems and are extremely important to protect, and restore for future conservation efforts.

Partner:

- Osa Conservation

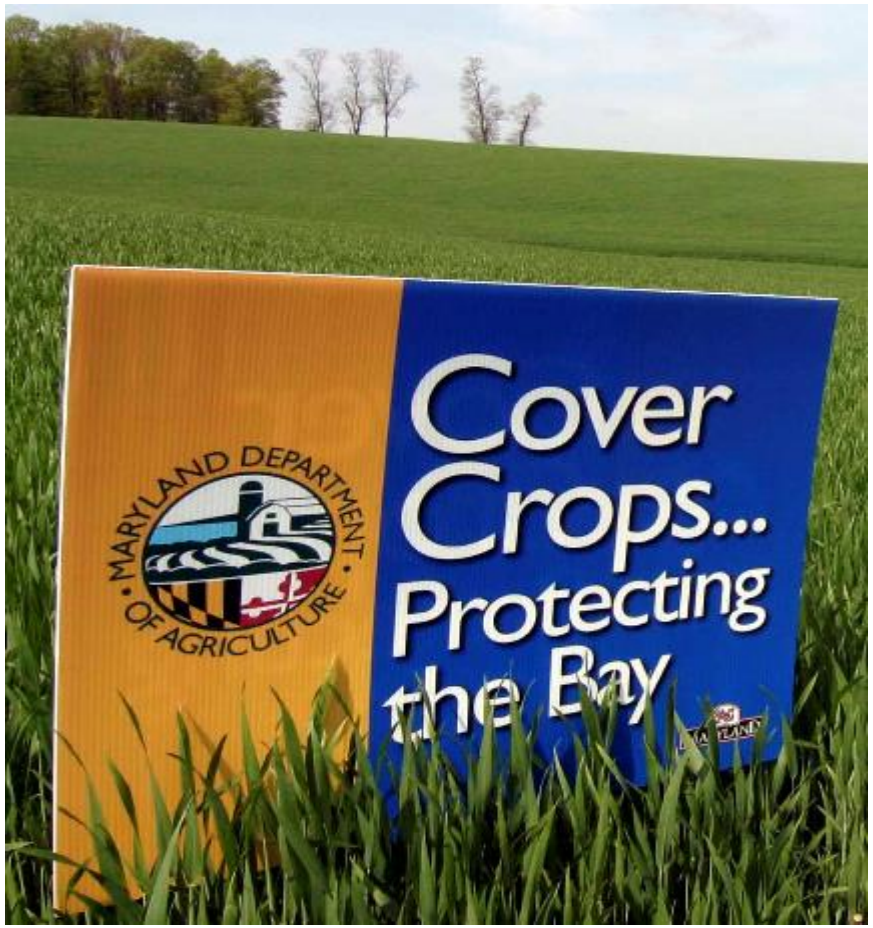
Earth Observations:

- Landsat 8 OLI
- Landsat 5 TM
- Terra ASTER

Impact & Benefit: The team will determine priority watersheds based on environmental and social data provided by Osa Conservation to help improve watershed monitoring, restoration efforts, & environmental education initiatives. A series of risk map assessments will help investigate the link between watershed, mangrove, and coral reef health and changes in land use. This information will help the project partner identify key areas for restoration and to educate local residents on the importance of conservation.

Chesapeake Bay Agriculture & Food Security II

Maryland – Goddard



Community Concern: The use of winter cover crops on agricultural fields has been identified as a key conservation management practice for reducing the loss of nitrogen and sediment from farmland. However, the effectiveness of winter cover crops varies widely depending on landscape, climate, and agronomic management.

Partners:

- Maryland Department of Agriculture, Office of Resource Conservation
- USGS, Eastern Geographic Science Center
- USDA ARS, Hydrology & Remote Sensing Lab
- EPA, Chesapeake Bay Program

Earth Observations:

- Landsat 5 TM
- Landsat 7 ETM+
- Landsat 8 OLI
- Sentinel-2 MSI

Impact & Benefit: This follow-on project will combine results from spring 2017 to develop a user-friendly GUI in Google Earth Engine, streamlining the analysis of wintertime ground cover and conservation benefits. This project will focus on the re-integration of remote sensing analysis with the MDA cover crop implementation dataset, and automate the production of cover crop environmental performance reports at county and watershed scale.

Wisconsin Agriculture & Food Security

Colorado – Fort Collins

Community Concern: Our partners are tasked with collecting, preserving, and making available for research an array of crucial species as a means to conserve genetic diversity and to bolster both national and global food security, as well as rural economic productivity. Currently, there is a need for both improved spatial resolution and field validation of distributions of crop wild relative species. Identifying and improving these distributions by utilizing species distribution models, while incorporating NASA Earth observation spectral data, can provide resource managers with more targeted and effective species conservation strategies.

Impact & Benefit: This project will save the USDA time and money by further refining monitoring and field survey collection efforts. The project also enables future analysis across larger scales and new species and study sites that would not be possible without full utilization of NASA Earth observations. End products will be integrated into the USDA decision making and conservation processes.

Partners:

- USDA ARS, National Plant Germplasm System

Earth Observations:

- Landsat 5 TM
- Landsat 7 ETM+
- Landsat 8 OLI
- Sentinel-2 MSI
- Sentinel-1 C-SAR
- SRTM