2017 Fall Preview

DEVELOP National Program





Hawaii and US Affiliated Pacific Islands Disasters

North Carolina – NCEI

Community Concern: The US Affiliated Pacific Islands are especially at risk to extreme weather events due to their geographic location and geological makeup. High seas, strong winds, and heavy rains are expected to worsen in a changing climate.

Partners:

NOAA, Regional Climate Services, Pacific Region
University of Guam

Earth Observations:

- Ocean Near-Surface Atmospheric Properties CDR
- ► GPM
- ▶ PERSIANN
- ▶ Jason-2 Ocean Topography Mission

Impact & Benefit: Climate projections for the years 2030, 2040, 2050, 2060, and 2070-2100 will help regional decision makers plan for extreme weather events in the future.



The 95th percentile thresholds for (a) rain rate and (b) wind speed.



Lassen Volcanic National Park Disasters II

California – Ames

Community Concern: Recent drought, the absence of fire, and other factors have created **a landscape primed for costly**, **extreme fire events**, as demonstrated by the magnitude of the 2012 Reading Fire (28,079 acres burned in 29 days; cost \$16 million).

Partners:

- ► Lassen Volcanic National Park
- ► Lassen National Forest

Earth Observations:

Landsat 4,5,8	▶ UAVSAR
▶ Lidar	► RAPIDEYE
Sentinel-2	► STRM – V3

Impact & Benefit: Help the park **build its capacity to assess fuel loading and tree mortality** in the context of **wildland fire risk**. Examine what pre-fire biophysical conditions influenced the outcome of the 2012 Reading Fire.







Community Concern: Wildfires are a major cause of ecosystem and urban disturbance in the western United States, recently increasing in frequency and severity compared to historical data. In addition, restoration success is difficult to determine as vegetation composition is not often known prior to wildfire events and monitoring vegetation composition after restoration efforts can be resource intensive. Understanding the key variables that made reseeding and natural recovery successful in some areas, assessing why they failed in others, and identifying factors that made non-native propagation ideal are important issues for land managers in this region of the country.

Partners:

- Bureau of Land Management, Pocatello Field Office
- USDA, Agricultural Research Service, Northwest Watershed Research Center
- Idaho Department of Fish and Game, Southeast Regional Office
- Idaho Department of Fish and Game, Upper Snake Regional Office
- NASA RECOVER Science Team

Earth Observations:

- Landsat 8 OLI
- ► SRTM v2
- Terra & Aqua MODIS

Impact & Benefit: The locations of these wildfires are not easily accessed and field work is time intensive. Additionally, data from prior field surveys for vegetation composition are normally unavailable and wildfire recovery is not always regularly monitored. This project will give partners the capabilities and know-how needed to regularly monitor wildfire sites and give them some experience and increased familiarity in the use of EO data for wildfire burn recovery monitoring efforts.



Community Concern: While recent attacks by mountain pine beetle have largely subsided, the cyclical nature of bark beetle attacks leaves resource managers concerned that the next large scale outbreak could be imminent. Current mapping and monitoring programs do not provide resource managers or land owners with information on forest vulnerability to future attacks, making preemptive management and monitoring efforts that could reduce the severity of bark beetle attacks difficult to carry out.

Partners:

 Dr. Bill Romme, Bioenergy Alliance Network of the Rockies-Feedstock Supply Team

Earth Observations:

- Landsat 5 TM, Landsat 7 ETM+, Landsat 8 OLI
- Shuttle Radar Topography Mission v3

Impact & Benefit: The project enables analysis across larger scales and new study sites that would not be possible without full utilization of NASA Earth observations. End products will be integrated into BANR decisionmaking processes related to long term feasibility of extraction of beetle killed wood for use as a biofuel.





Community Concern: A recent urbanization boom in Madison and Limestone counties proves the necessity for the Land Trust of North Alabama to expand it's conservation efforts in the areas to protect the natural flora and fauna.



Partners:

Land Trust of North Alabama

Earth Observations:

- Landsat 5 TM, Landsat 8 OLI
- \blacktriangleright SRTM \vee 3
- Sentinel-2 MSI

Impact & Benefit: This project will model urbanization and it's future effect of on the local riparian species. This will aid the Land Trust in their efforts to acquire land for conservation to protect vulnerable species, the hydrological cycle, and agricultural lands from encroaching urbanization and it's long-lasting secondary effects.



Community Concern: Oak woodlands and chaparral shrublands throughout the Santa Monica Mountains experienced extensive tree loss and shrub dieback mostly due to drought, beetle infestations, and other pathogens. Examining the pre-drought vegetation and comparing it to the present will shed light on the current woodland extent and its relation to fuel moisture levels, soil conditions, and pest interference.

Partner:

 Resource Conservation District (RCD) of the Santa Monica Mountains

Earth Observations:

- Terra MODIS
- ► AVIRIS
- ► UAVSAR
- ▶ Sentinel-2 MSI

Impact & Benefit: RCD will use the products from this project to prioritize areas of concern for monitoring and identify the most high risk areas for future infestation, mortality, or increased wildfire risk.





Community Concern: Recent fires and disturbance due to park expansion and visitor use has rendered Yellowstone National Park highly susceptible to continued cheatgrass invasion as well as increased fire frequency and severity in areas populated by the grass. Competition between cheatgrass and endemic species leads to lower biodiversity and possible changes in the ecology of the landscape and fire regime, ultimately affecting wildlife populations dependent upon native flora.

Partners:

National Park Service, Yellowstone National Park

Earth Observations:

- ▶ Landsat 5 TM
- Landsat 8 OLI
- Landsat 8 TIRS
- Terra MODIS
- ▶ SRTM Version 2

Impact & Benefit: Cheatgrass Cover Time Series and Ross's Bentgrass Cover Map will provide localities of cheatgrass and Ross's bent grass. Cheatgrass Bioclimatic Forecasting Map will predict the future progression of cheatgrass within the park.





Community Concern: Georgia is planning to expand its solar power generating facilities and while this form of energy has several environmental benefits, it can impact sensitive habitats for vulnerable, keystone species such as the gopher tortoise. To avoid siting new solar farms where these impacts would be most damaging, environmental information needs to be made readily available to state officials involved with siting and permitting these facilities.

Partners:

- The Nature Conservancy
- Georgia Department of Natural Resources
- US Fish and Wildlife Service

Earth Observations:

- Landsat 8 OLI
- ▶ Terra CERES
- Aqua CERES

Impact & Benefit: The end products of this project will be extremely valuable in helping The Nature Conservancy in Georgia work with their partners to achieve a more sustainable energy portfolio while protecting sensitive habitats. Our team will provide them with suitability model results to avoid conflict between the need to generate renewable energy and the need to protect habitats from incompatible development when possible.







Community Concern: Over the next five years the City of Phoenix is investing \$1,000,000 in the installation of shade structures at public bus stops to reduce heat exposure and thermal discomfort among transit riders.

Partners:

- City of Phoenix Transit Department
- ► ASU Urban Climate Research Center
- ► ASU Center for Policy Informatics

Earth Observations:

- Landsat 8 OLI and TIRS
- Landsat 5 TM
- NAIP Areal Imagery

Impact & Benefit: Provide a comprehensive assessment of the thermal environment of high priority bus stops, routes, and associated walkways by integrating NASA Earth observations with *in situ* measurements. This assessment will enhance our partner's prioritization criteria for implementing bus stop improvements and shading.







Community Concern: Clean air is considered one of the park's fundamental resources and values, essential to achieving the purpose of the park, maintaining its significance, and ensuring the continued health of the park and visitors.

Partners:

NPS, Shenandoah National Park
NPS, Air Resources Division

Impact & Benefit: The project offers an application enabling park managers to notify park guests of visibility and atmospheric pollution, which would give the park another tool to protect park resources, and provide an increased understanding of trends in visibility and atmospheric pollutants.

Earth Observations:

Aura OMI, TES
Suomi-NPP OMPS, VIIRS
Aqua MODIS, AIRS
Terra MODIS





Community Concern: Over 1 million people worldwide die from mosquito-borne diseases every year. The threat of these diseases is insurmountable without the collaboration of organizations working to monitor and eradicate risk through citizen science.

Partners:

- Global Mosquito Alert Consortium
- The Woodrow Wilson International Center for Scholars
- Citizen Science Association
- European Citizen Science Association
- Institute for Global Environmental Strategies

Earth Observations:

- Terra and Aqua MODIS
- ► GPM IMERG
- SRTM SAR

Impact & Benefit: The end user will have a proof of concept of how mosquito vector data collected by citizen scientists can be combined with satellite data to reduce health risks posed by mosquitos.





Community Concern: Anthropogenic lighting has detrimental effects to nighttime sky quality, wildlife, and humans alike. National Parks within the Colorado Plateau and the surrounding area have historically had some of the clearest night skies in the country due to low humidity and the isolated area. As light from urban areas has increased, this world-class night-time visibility has decreased. In addition to decreased sky-gazing opportunities, increased artificial light has the potential to alter wildlife migratory patterns, breeding and feeding habits.

Partners:

- National Park Service, Intermountain Region
- National Park Service, Natural Sounds and Night Skies Division

Earth Observations:

Suomi NPP VIIRS

Impact & Benefit: The Intermountain Region and Natural Sounds and Night Skies Division of the National Park Service will use the Yearly Nighttime Artificial Skyglow Maps to assess recent changes made to nighttime lighting in nearby communities. Additionally, this product will identify areas within parks and surrounding communities that need further mitigation of artificial light.





Community Concern: Due to projections of sea level rise, the cities surrounding Biscayne Bay have increased their storm water drainage capacity and pump stations as the primary adaptive strategy to mitigate effects associated with changing coastal conditions. These predicted changes in shoreline could significantly impact the economies (primarily the tourist industry) of The City of Miami Beach and others in Biscayne Bay. Additionally, declining water quality and hurricanes pose major threats to coastal communities surrounding Biscayne Bay.

Partners:

City of Miami Beach, Public Works Department

Earth Observations:

- Landsat 5 TM
- Landsat 7 ETM+
- Landsat 8 OLI
- Terra MODIS
- Terra ASTER

Impact & Benefit: These end products will contribute to resilience studies being conducted by officials at the Miami Beach Public Works Department. The outputs of this project will enhance ongoing storm surge modeling research for Miami Beach and other neighboring cities. Decisions about prioritizing certain areas of interest in relation to sea level rise and coastal resiliency will be enhanced by the methods and analysis conducted during this project.





Community Concern: Salinity, SST, and turbidity all play an important role in the health of coastal habitat and marine health. Many community leaders, researchers, and commercial fisheries in the coastal Alabama area need these measurements to manage these areas and to plan for the future. Suitable water quality in the region is vastly important for maintaining healthy environments for the fishing and shellfish industries. Water quality is also a factor in identifying areas of focus for creating living shorelines and conducting habitat restorations.

Partners:

- Alabama Coastal Foundation
- Nature Conservancy, Alabama Chapter
- Dauphin Island Sea Lab, Manatee Sighting Network
- Mississippi Alabama Sea Grant Consortium

Earth Observations:

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





Impact & Benefit: The products generated will allow the end users to identify areas where oyster shells and living shorelines may be suitable for placement. Additionally, the results, methodologies, and tutorials created from this project will assist the partners in creating future products and continuing further analyses.



Community Concern: The Colorado River is the primary water supply for more than 40 million people in the western US, irrigating 5.5 million acres of crops, and is a major recreational resource. Invasive species such as tamarisk and Russian olive affect riparian ecosystem structure and function, alter flow regimes and sediment loads, and affect evapotranspiration rates. Quantifying the riparian areas threatened by invasive species is a major concern for farmers, land managers, and the general public.

Partners:

- Walton Family Foundation
- USGS, Fort Collins Science Center (FORT)
- USGS, North Central Climate Science Center

Earth Observations:

- Landsat 5 TM, Landsat 7 ETM+, Landsat 8 OLI
- Sentinel-2 MSI
- Shuttle Radar Topography Mission v3

Impact & Benefit: Maps of total potential riparian area and the percentage of that area negatively impacted by invasive species, and the potential effects of invasive species on water availability will enhance Walton Family Foundation efforts in outreach and planning of environmental programs in the Colorado River Basin, with a focus on water resource management efforts.





Community Concern: The Delta smelt is a rare and endemic fish species listed as threatened under both the California and U.S. Endangered Species Act that likes to feed in turbid waters. This leads to pumping restrictions, periodic closure, or high Delta smelt salvage at pumping facilities in the southern Bay-Delta. This is problematic since 70% of California's water comes from northern California while 19 million people demand water from the south.

Partners:

- Metropolitan Water District of Southern California (MWD)
- California Department of Water Resources, State Water Project

Earth Observations:

- ▶ PRISM
- AVIRIS / AVIRIS-NG
- MASTER
- Landsat 8 OLI
- Sentinel-2 MSI

Impact & Benefit: Turbidity and water temperature maps from this project will improve MWD's understanding of how smelt may be impacted during winter and summer seasons. The end products can help with improving Delta smelt habitat and improve monitoring of turbidity and pumping facility management.





Community Concern: NCEI's Climate Monitoring Branch creates yearly temperature rankings for the US. In Recent years, these temperatures have all been within the top 15 warmest.

Impact & Benefit: Satellite data can provide better spatial resolution and a new temperature index to account for recent temperature trends will provide NCEI's Climate Monitoring Branch with improved temperature indices for the Northeast.



Partners:

 NOAA, Regional Climate Services, Eastern Region
 NOAA, NCEI, Climate Monitoring Branch

Earth Observations:

- Terra and Aqua MODIS
- NOAA AVHRR
- Landsat 7 ETM+ and Landsat 8 TIRS



Community Concern: The USFWS is responsible for monitoring millions of acres of private and publicly owned lands and easements. However, limited resources in staff and expertise can result in inadequate follow-ups on independent monitoring. These checks are often critical to ensure conservation areas are undisturbed.

Partners:

USFWS, Pacific Southwest Region, Ecological Services Program
 USFWS, Midwest Region, National Wetland Inventory

Earth Observations:

- Landsat 5 TM, Landsat 7 ETM+, Landsat 8 OLI
- Sentinel-1 C-SAR, Sentinel-2 MSI
- ▶ Terra MODIS

Impact & Benefit: This decision-support tool would be the first step in establishing an independent assessment of HCP area resiliency to moderate- and large-scale disturbances using remotely sensed data, which will save USFWS staff travel time and efforts.

