

National Aeronautics and  
Space Administration



Applied Sciences' Capacity Building

# DEVELOP

Program Background &  
Project Applications

*Georgia Planning Association – 2019 Fall  
Conference*

*Austin Stone – [ahs11982@uga.edu](mailto:ahs11982@uga.edu)*





# NASA Earth Science



**Advancing understanding of the Earth and developing technologies to improve the quality of life on our home planet.**

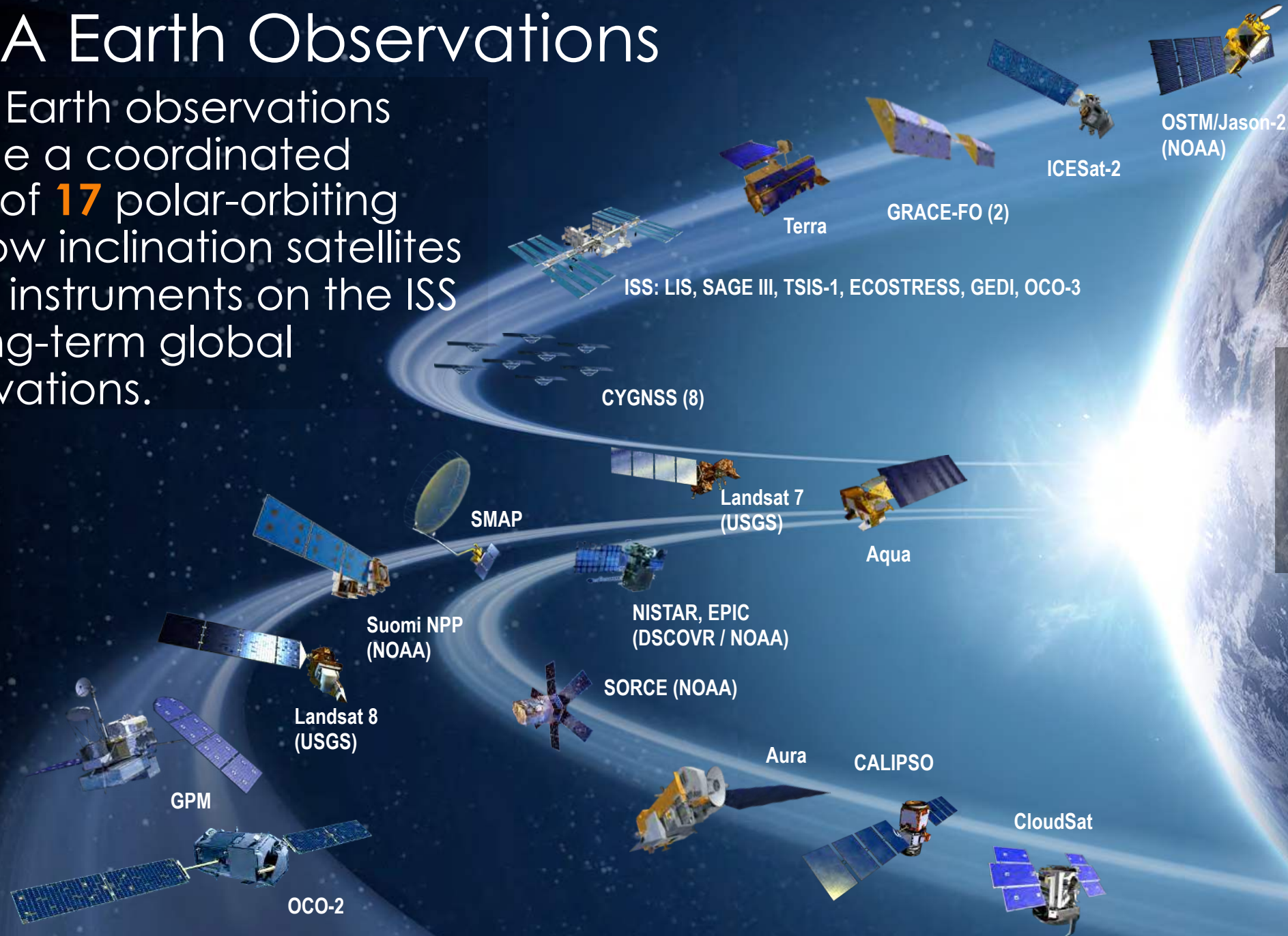
Earth is a complex, dynamic system we do not yet fully understand. The purpose of NASA's Earth science program is to develop a scientific understanding of Earth's system and its response to natural and human-induced changes, and to improve prediction of climate, weather, and natural hazards.





# NASA Earth Observations

NASA Earth observations include a coordinated series of **17** polar-orbiting and low inclination satellites and **6** instruments on the ISS for long-term global observations.





# NASA Applied Sciences

Discovering Innovative & Practical Applications of NASA Earth Science

- ▶ **Partner** with public and private organizations
- ▶ **Discover** innovative NASA Earth science applications
- ▶ **Support** environmental decision-making activities
- ▶ **Demonstrate** practical benefits of NASA Earth science
- ▶ **Help** improve the quality of life and strengthen the economy

## Thematic Application Areas

Food Security & Agriculture



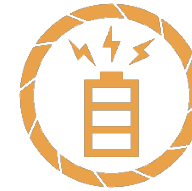
Eco Forecasting



Water Resources



Energy



Urban Development



Transportation & Infrastructure



Health & Air Quality



Disasters



## Capacity Building



**SERVIR**  **GLOBAL**  
CONNECTING SPACE TO VILLAGE





# What is DEVELOP?



Measurements & Predictions



Communities

**DEVELOP bridges the gap between NASA Earth Science and society**, building capacity in both its participants and end-user organizations to better prepare them to handle the environmental challenges that face society.

*DEVELOP is a dual-capacity building program:  
**Partners & Participants***

# Who Participates in DEVELOP?

## Participants



Recent Graduates



Military Personnel



Students



Transitioning Professionals



## Advisors



NASA Researchers



Partner Organizations



## Decision Makers



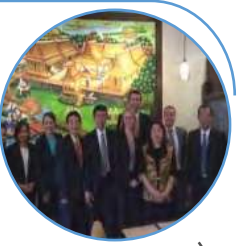
State & Local Govt.



Federal Agencies



NGOs



International



# Participant Opportunities

## Common Majors

- Geography
- Environmental Science
- Computer Science
- Remote Sensing
- GIS
- Biology
- Engineering
- Chemistry
- Meteorology
- Physics
- Accounting
- Economics
- Mathematics
- Public Policy
- Communications
- Planning

*Note: open to all majors!*

## Common Software and Programming Languages

- ESRI ArcGIS
- ERDAS IMAGINE
- ENVI/ IDL
- Python
- MATLAB
- R
- Microsoft Office Suite
- Google Earth Engine

*Note: no previous experience with these programs is required, but an eagerness and ability to learn quickly is a necessity.*

Pay level is determined by **education level** and **DEVELOP location**

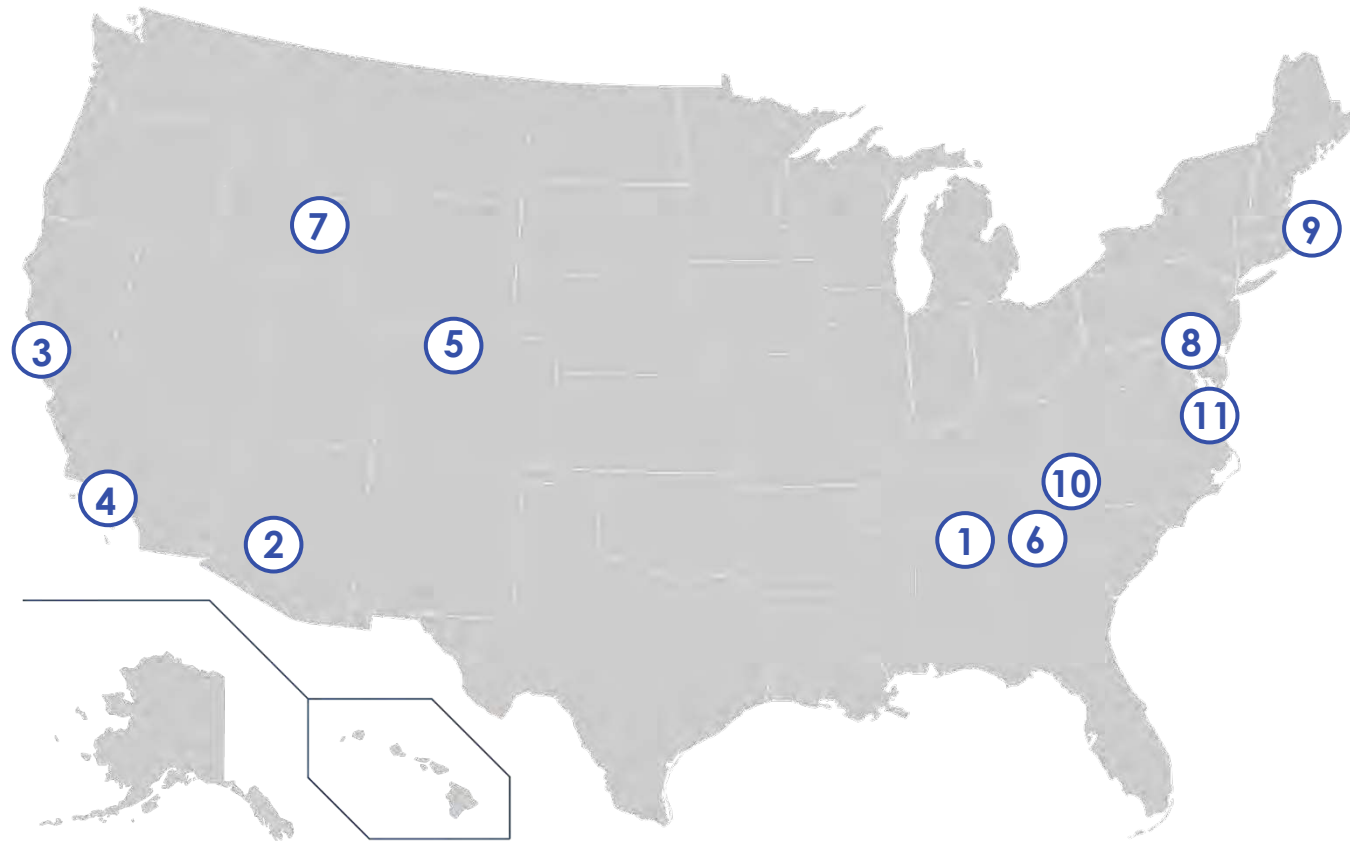




# Where is DEVELOP?

## Locations

- ① Alabama – Marshall (Huntsville, AL)
- ② Arizona – Tempe (Tempe, AZ)
- ③ California – Ames (Moffett Field, CA)
- ④ California – JPL (Pasadena, CA)
- ⑤ Colorado – Fort Collins (Fort Collins, CO)
- ⑥ Georgia – Athens (Athens, GA)
- ⑦ Idaho – Pocatello (Pocatello, ID)
- ⑧ Maryland – Goddard (Greenbelt, MD)
- ⑨ Massachusetts – Boston (Boston, MA)
- ⑩ North Carolina – NCEI (Asheville, NC)
- ⑪ Virginia – Langley (Hampton, VA)



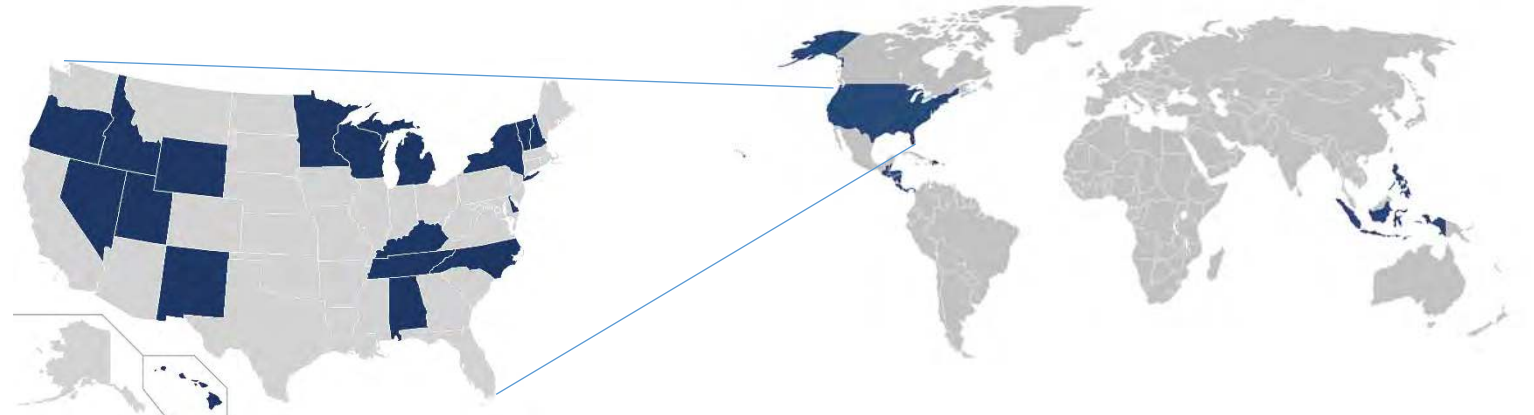


# 2019 Fall Portfolio

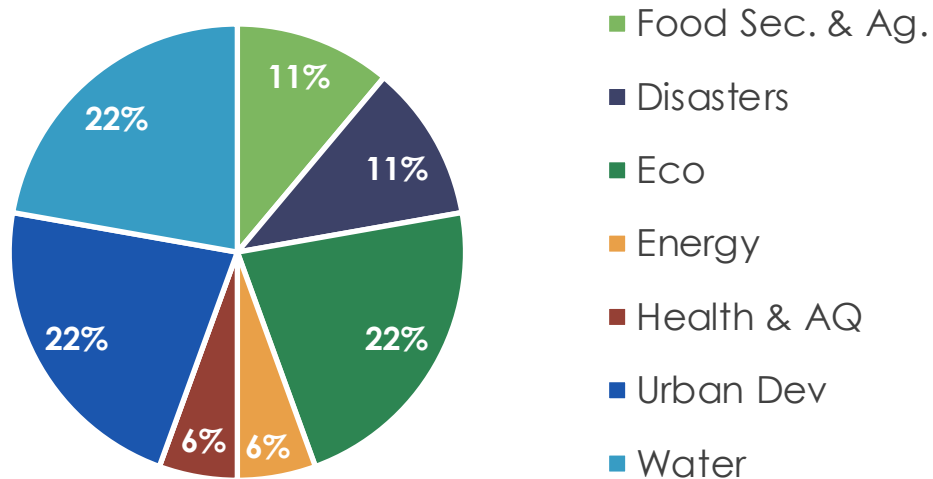
**18 States & 11 Countries Impacted**

**72 Participants**  
**18 Projects**

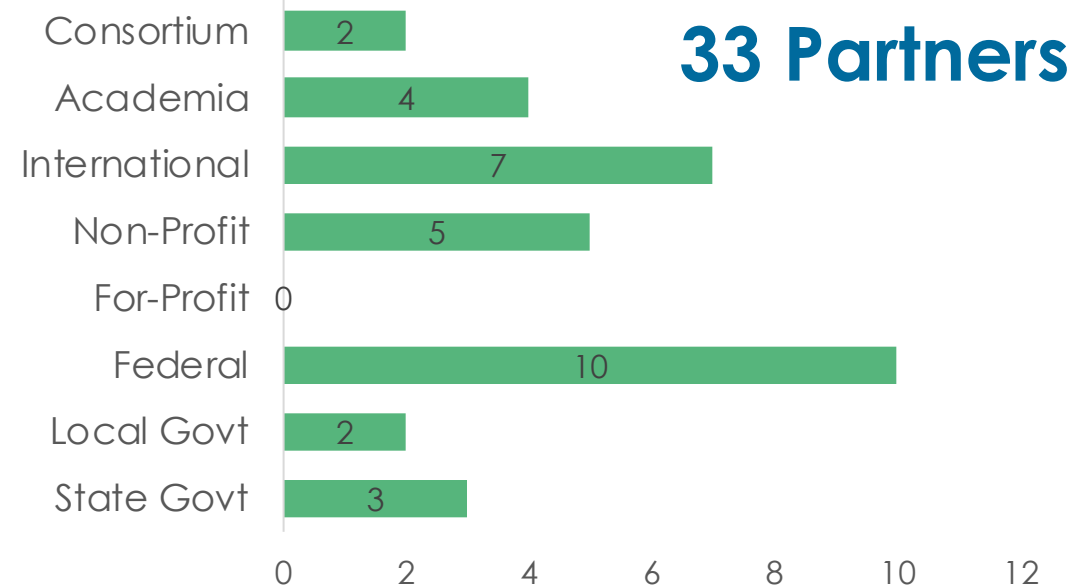
61% Domestic  
39% International



## Application Areas Addressed



## Partner Total by Type



\*Impacts and partners are tentative

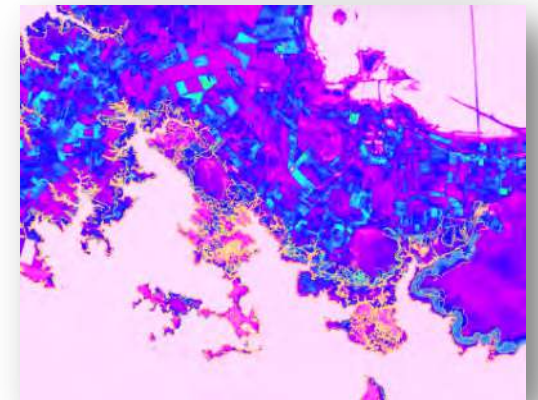
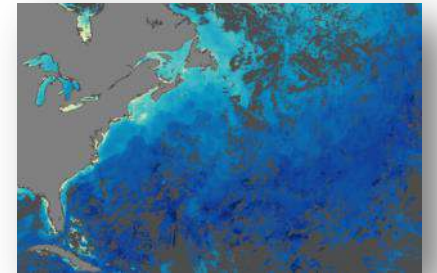


# DEVELOP Project Characteristics



**55-65 projects take place each year – at their core they share these characteristics:**

- ▶ Highlight the applications and capabilities of **NASA Earth observations**
- ▶ Address **community concerns** relating to decision-making for real-world environmental issues
- ▶ Partner with organizations who can benefit from using NASA Earth observations to **enhance decision-making** by providing decision support tools
- ▶ Align with at least one of the eight NASA Applied Sciences Program's thematic **Application Areas**
- ▶ Research is conducted by **interdisciplinary teams** under the scientific guidance of DEVELOP Science Advisors and Mentors from NASA and partner organizations
- ▶ Create a comprehensive set of **deliverables**







# DEVELOP Project Deliverables

## Project Deliverables:

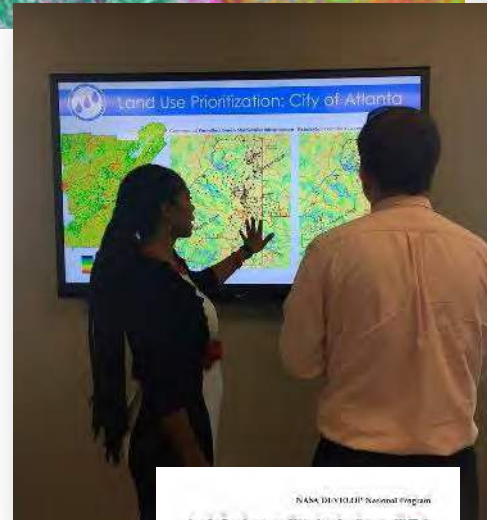
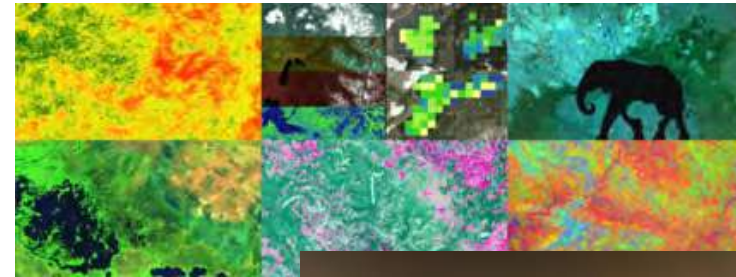
Created by all DEVELOP teams.

- ▶ Poster
- ▶ Presentation
- ▶ Technical Report
- ▶ Shapefiles

## Additional products:

Created by some teams based on specific partner needs and identified ahead of time with team.

- ▶ Tutorial
- ▶ Code
- ▶ Brochure
- ▶ Project Video

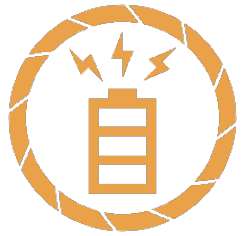




# Application Areas



**Urban Development**



**Energy**



**Water Resources**



**Health & Air Quality**

**Disasters**



**Transportation & Infrastructure**



**Food Security & Agriculture**



**Eco Forecasting**



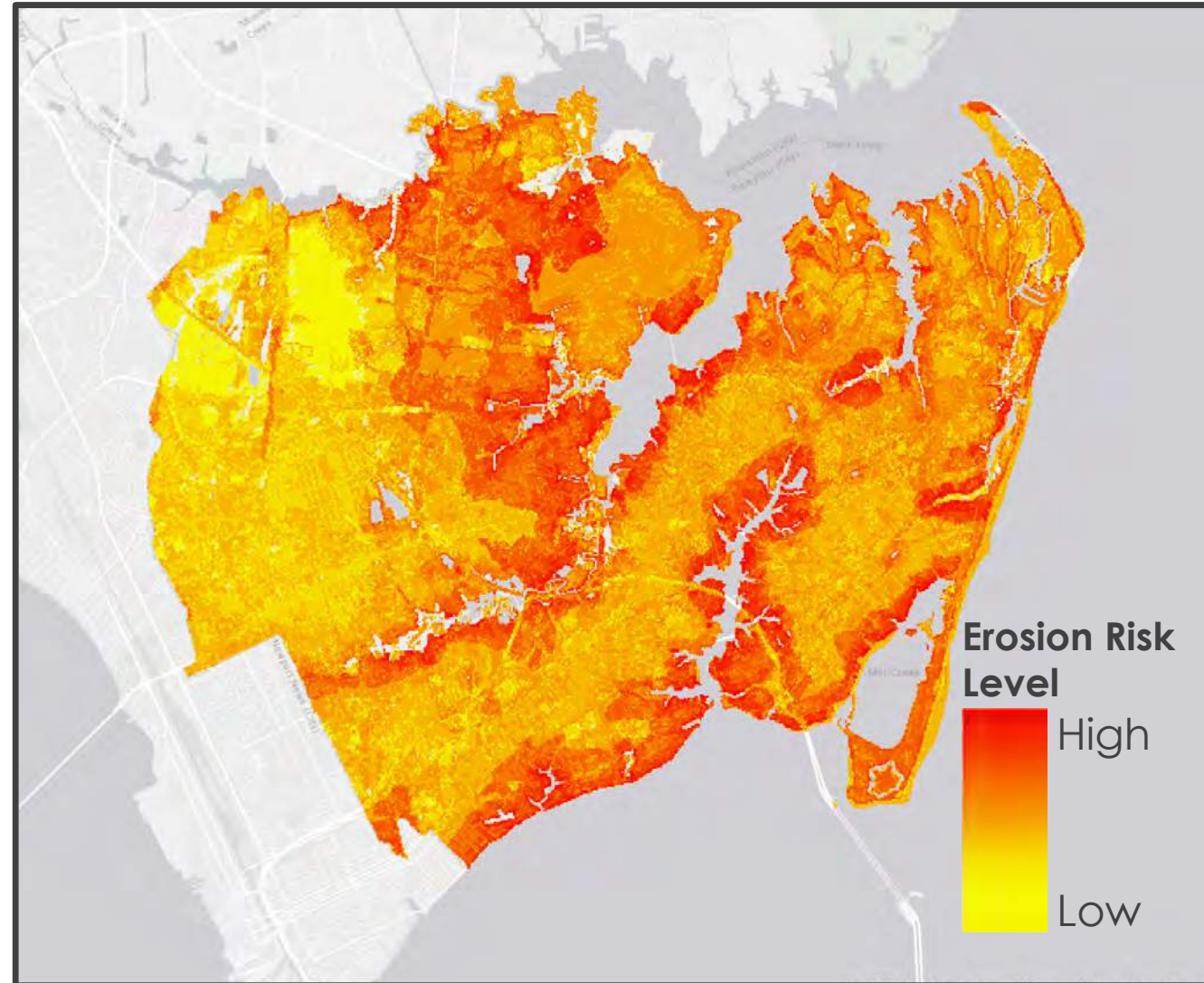




# Urban Development

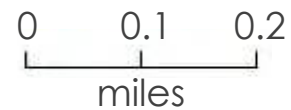
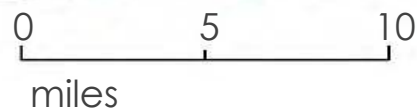
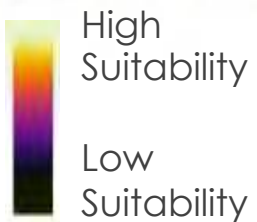
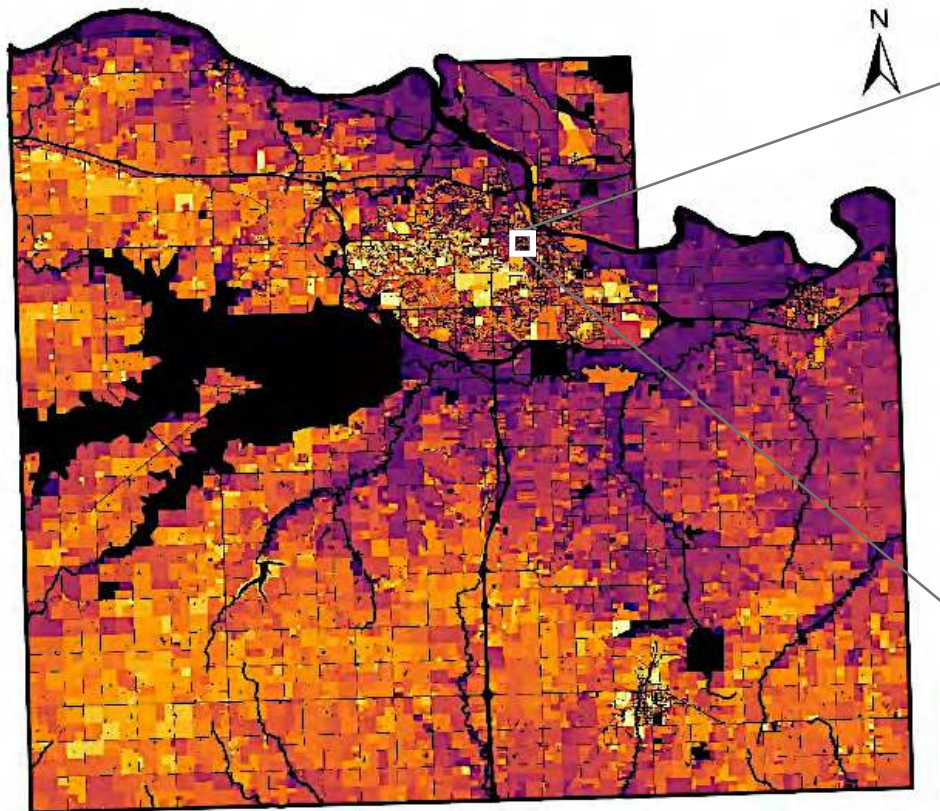
## Hampton Roads

Helping the local government of Hampton, VA understand impacts of coastal erosion and sea level rise. And creating maps to identify highest areas of risk.





# Energy



## Lawrence

Working with the City of Lawrence in Kansas to map out the potential for residential and commercial rooftop solar using POWER tools.

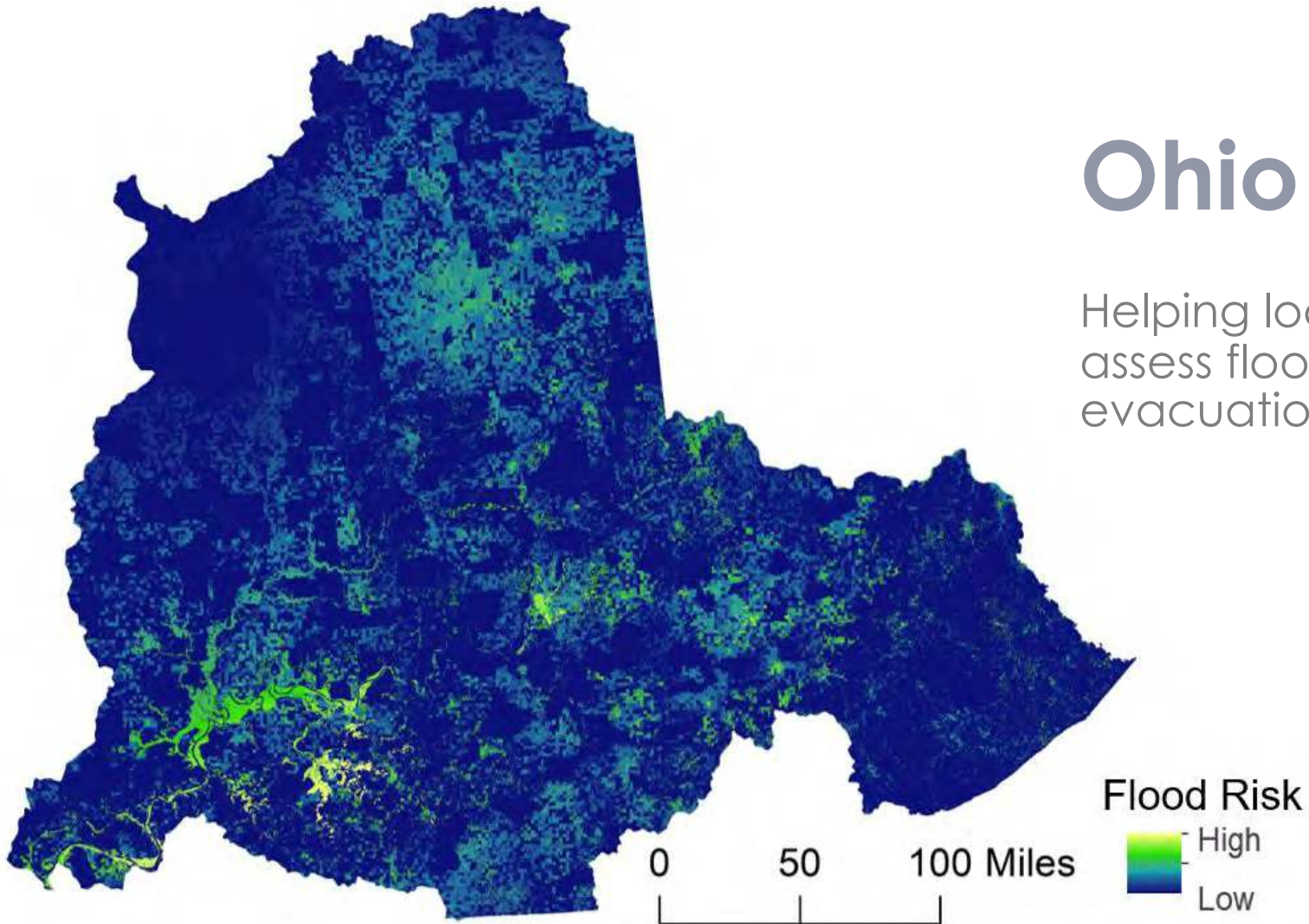




# Transportation & Infrastructure

## Ohio River Valley

Helping local management agencies assess flood risk to maximize efficient evacuation plans.



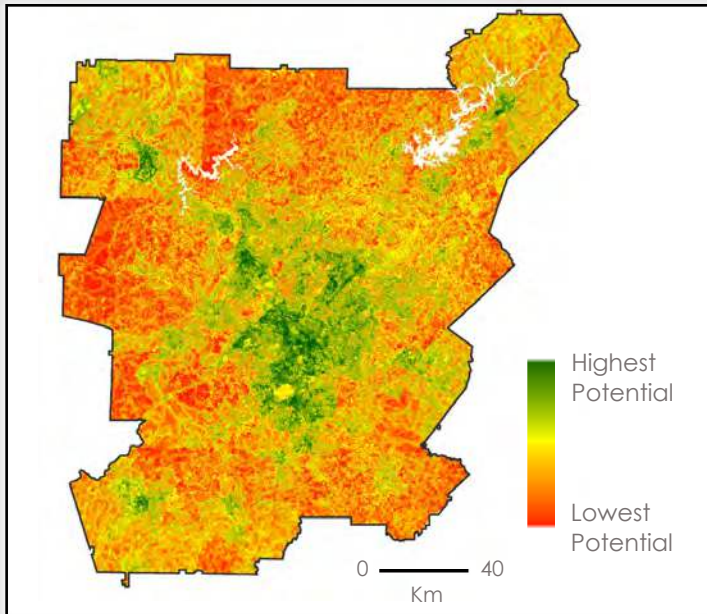


# Water Resources

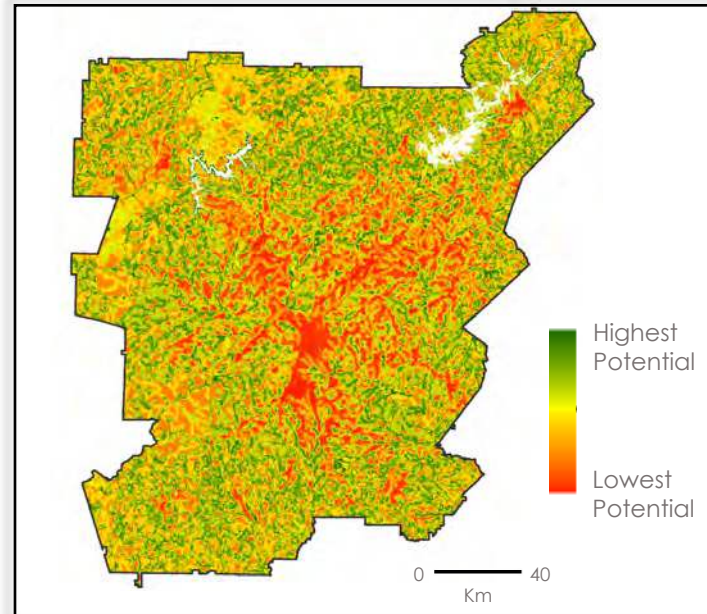
## Atlanta

Working with the City of Atlanta and the Nature Conservancy to understand stormwater runoff and what that means for it's surrounding communities, and how green infrastructure can aid in mitigating runoff.

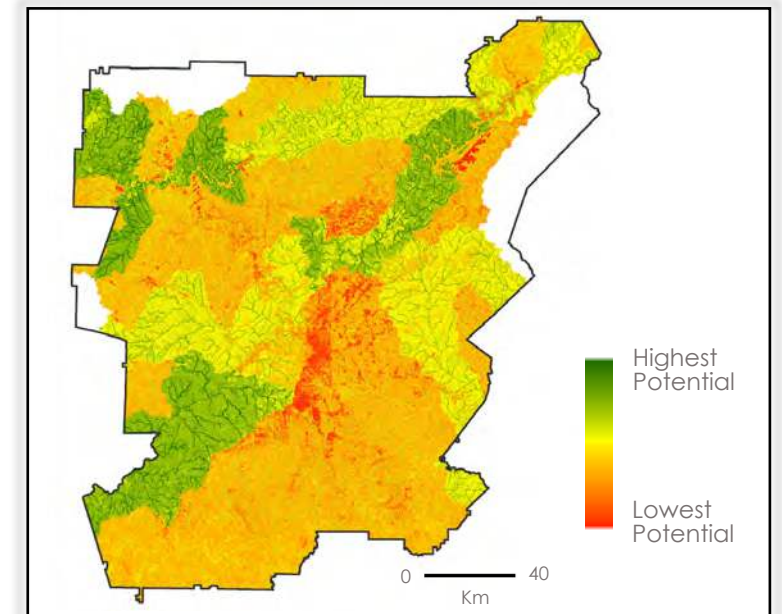
**Minimizing Untreated Stormwater Flow From Impervious Surfaces**



**Protecting Existing Green Infrastructure and Identify Reforestation Opportunities**



**Identifying Managed Lands with a High Potential to Impact Local Water Quality**



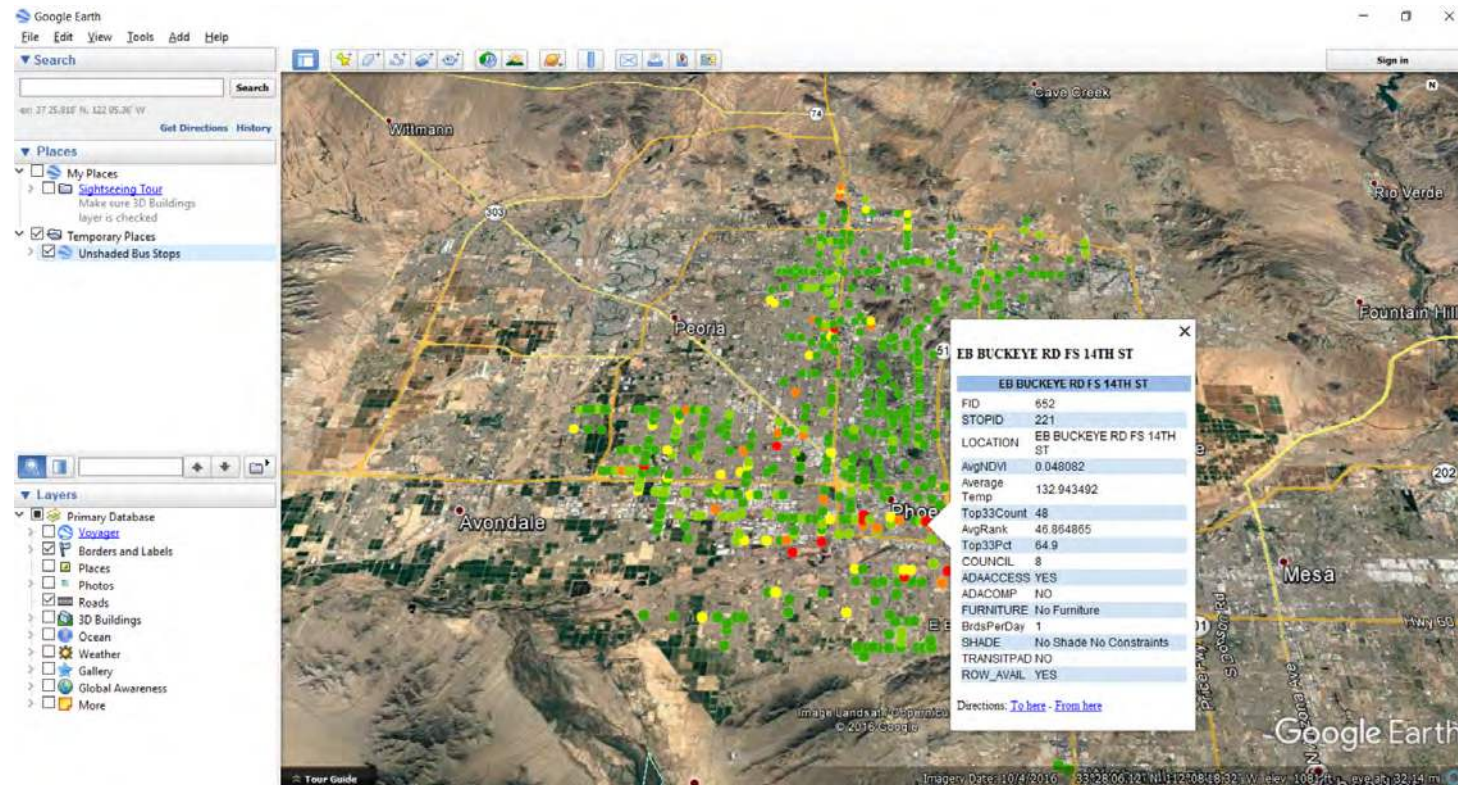




# Health & Air Quality

## Phoenix

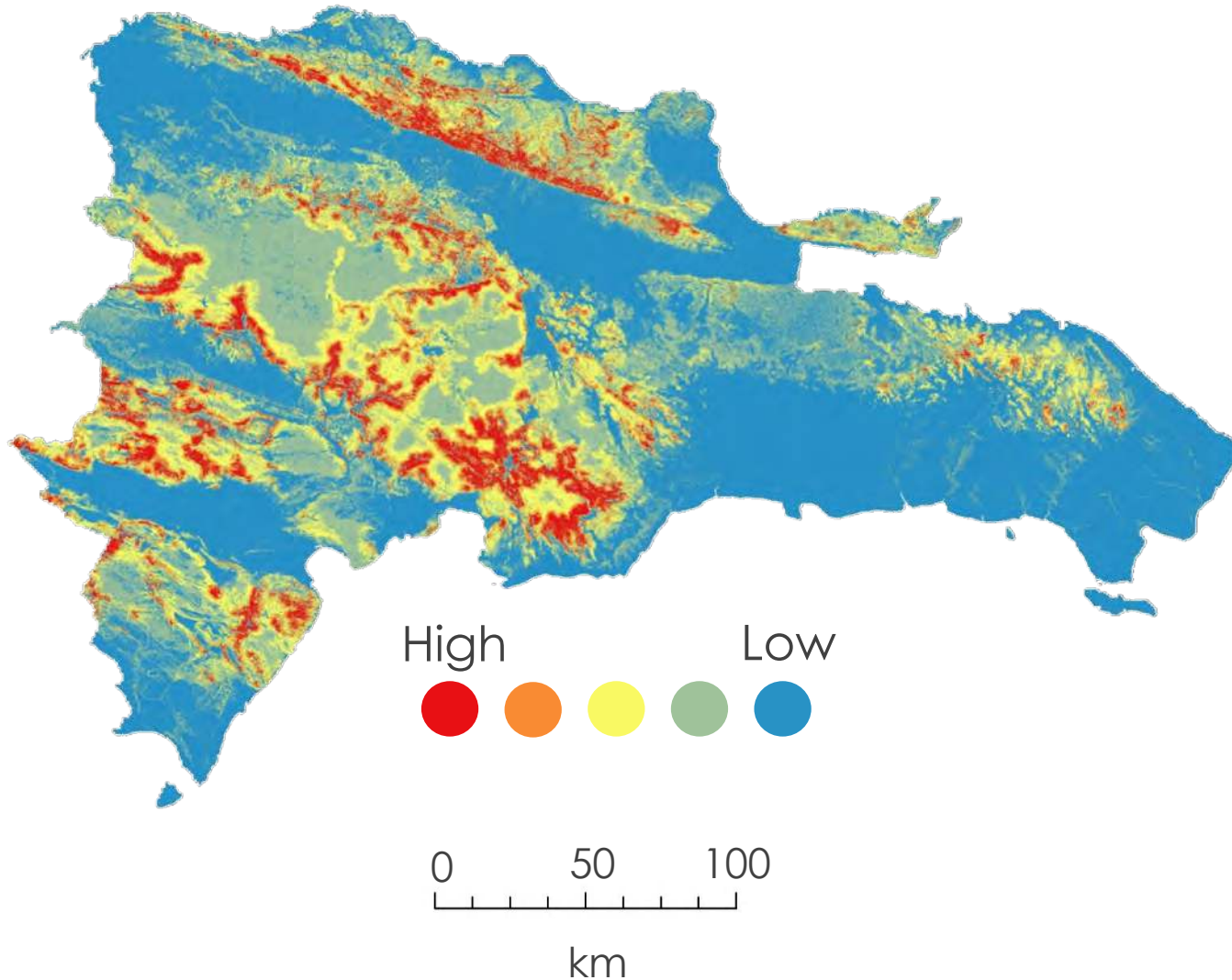
Helping vulnerable neighborhoods detect extreme heat for implementing bus stop modifications to shield riders from extreme conditions.







# Disasters



## Dominican Republic

Applying NASA's Earth observations to identify susceptibility for landslides in the Dominican Republic, in hopes to better prepare communities that are at risk.





# Food Security & Agriculture

## North Dakota & Georgia

Helping agencies like the USDA enhance crop classification methods by incorporating radar.

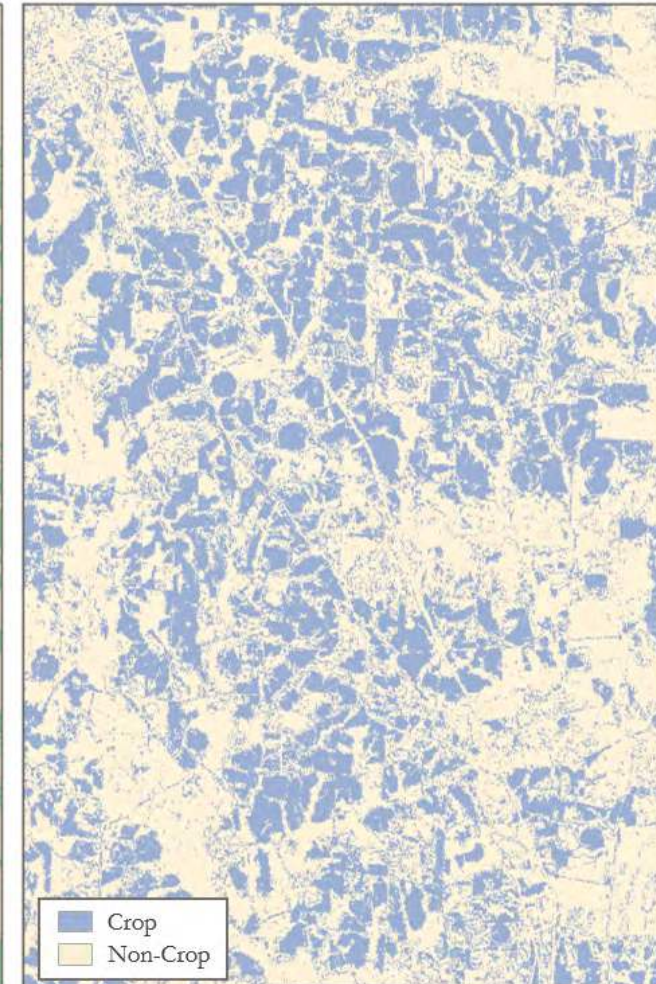
Radar



Cropland Data Layer



Optical







# Ecological Forecasting

## Honduras

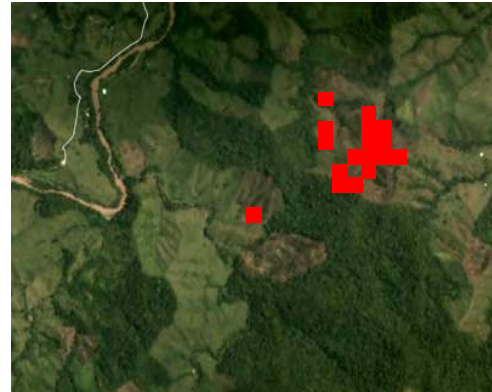
Helping resources managers with millions of acres of forests identify key areas of forest loss due to deforestation.



April 2018

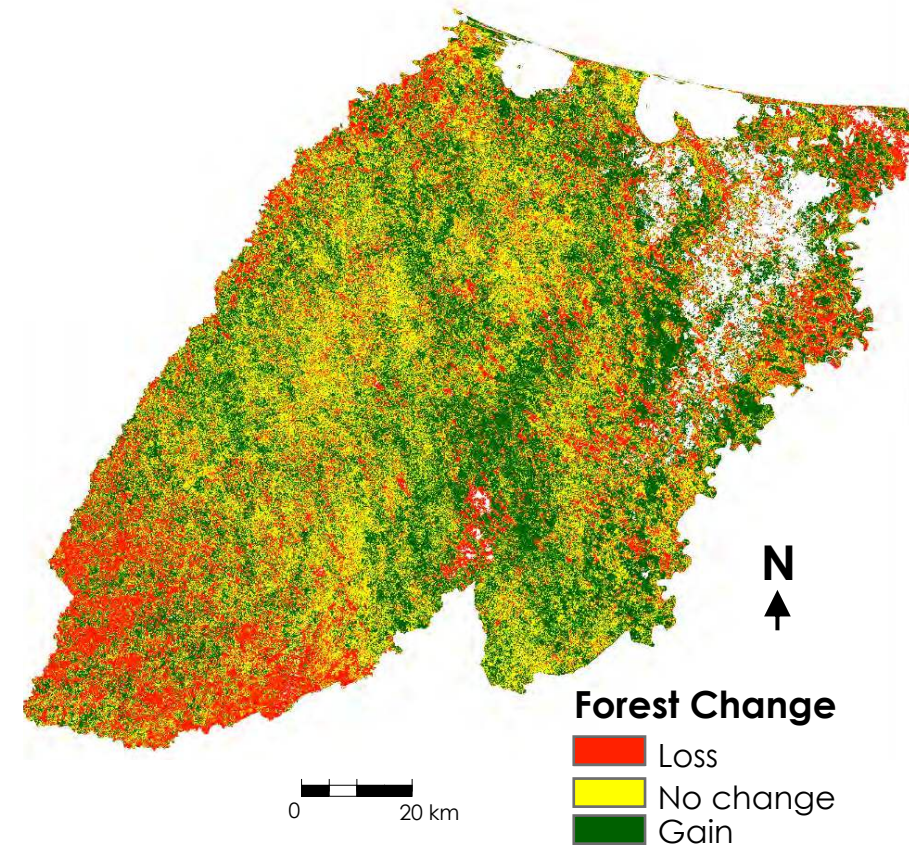


May 2018



Forest Disturbance

NDVI Difference between 2000 and 2011 in Rio Platano Biosphere Reserve







# Become a DEVELOP Project Partner!

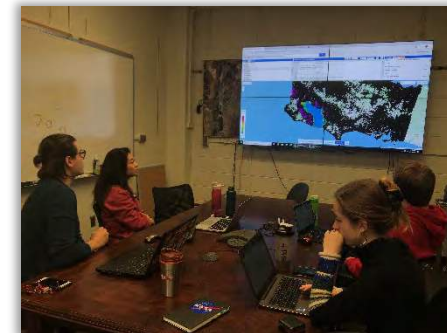
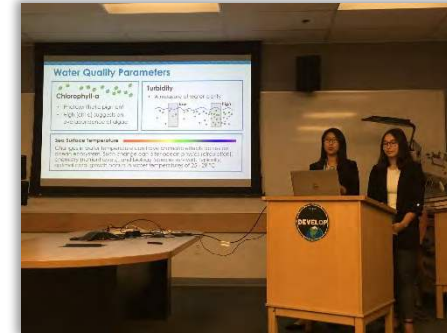
## Why?

- Work with motivated aspiring Earth scientists
- Obtain real world results in 10 weeks
- Learn the power of freely available NASA data

## How?

- Email – [SHELBY.INGRAM@SSAIHQ.COM](mailto:SHELBY.INGRAM@SSAIHQ.COM)
- Submit a project idea form through our website

**We would love to tap into the planning efforts in GA!**



# Find DEVELOP on Social Media!



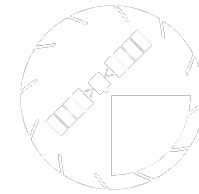
**DEVELOP National Program:**  
features projects, node highlights &  
accomplishments, VPS  
announcements  
[www.facebook.com/developnationalprogram](http://www.facebook.com/developnationalprogram)



Articles & Important Events: Tweet  
**@NASA\_DEVELOP** or  
**#NASADEVELOP**  
[http://twitter.com/#!/nasa\\_develop](http://twitter.com/#!/nasa_develop)



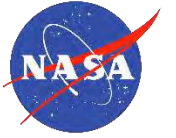
**NASA DEVELOP National Program:**  
VPS and promotional videos  
[www.youtube.com/user/NASADEVELOP](http://www.youtube.com/user/NASADEVELOP)





# Thank You!

National Aeronautics and  
Space Administration



Visit the DEVELOP website: <http://develop.larc.nasa.gov>

-OR-

Email us at: [NASA-DL-DEVELOP@MAIL.NASA.GOV](mailto:NASA-DL-DEVELOP@MAIL.NASA.GOV) OR [SHELBY.INGRAM@SSAIHQ.COM](mailto:SHELBY.INGRAM@SSAIHQ.COM)