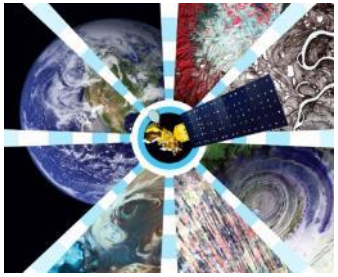
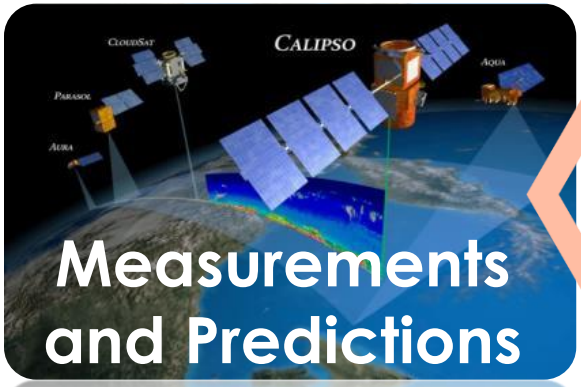
DEVELOP National Program

Great Lakes Workshop

March 13, 2014

What is DEVELOP?



NASA's Applied Sciences' DEVELOP National Program

DEVELOP **addresses environmental and public policy issues** through **interdisciplinary research projects** that **apply the lens of NASA Earth observations** to **community concerns** around the globe. Bridging the gap between **NASA Earth Science** and **society**, DEVELOP **builds capacity** in both **participants** and **partner organizations** to better prepare them to address the **challenges** that face our society and future generations. With the competitive nature and **growing societal role of science** and technology in today's **global workplace**, DEVELOP is fostering an adept corps of **tomorrow's scientists and leaders**.

DEVELOP Website: http://develop.larc.nasa.gov

DEVELOP Office Locations

NASA Centers

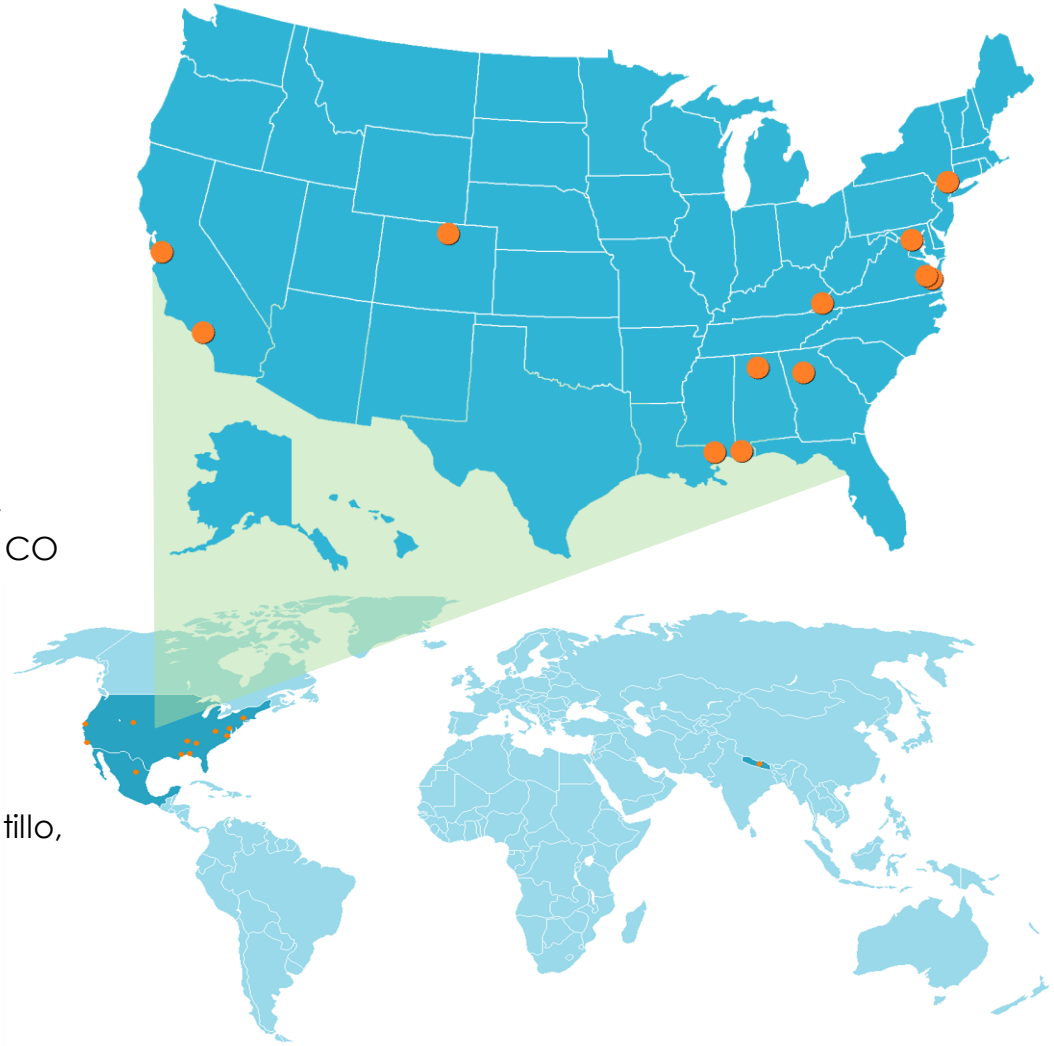
- Langley Research Center – Hampton, VA
- Stennis Space Center – Stennis, MS
- Ames Research Center – Moffett Field, CA
- Goddard Space Flight Center – Greenbelt, MD
- Jet Propulsion Laboratory – Pasadena, CA
- Marshall Space Flight Center – Huntsville, AL

Regional & Academic Locations

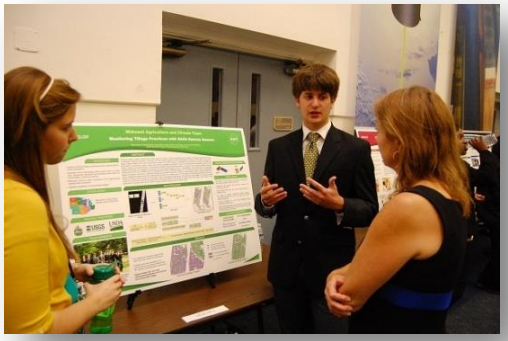
- Wise County Clerk of Court's Office – Wise, VA
- Mobile County Health Department – Mobile, AL
- USGS at Colorado State University – Fort Collins, CO
- International Research Institute – Palisades, NY
- University of Georgia – Athens, GA
- Patrick Henry Building – Richmond, VA

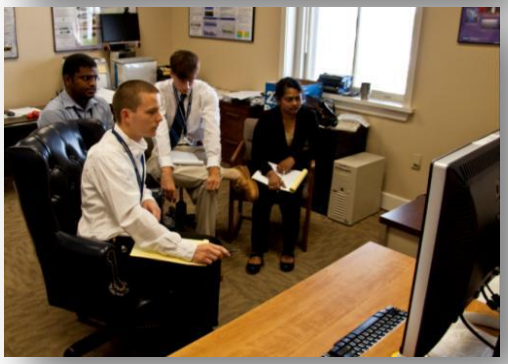
International Locations

- Tecnológico de Monterrey Saltillo Campus – Saltillo, MX
- International Centre for Integrated Mountain Development – Kathmandu, NP



Participants & Projects





Participants: ~350 annually

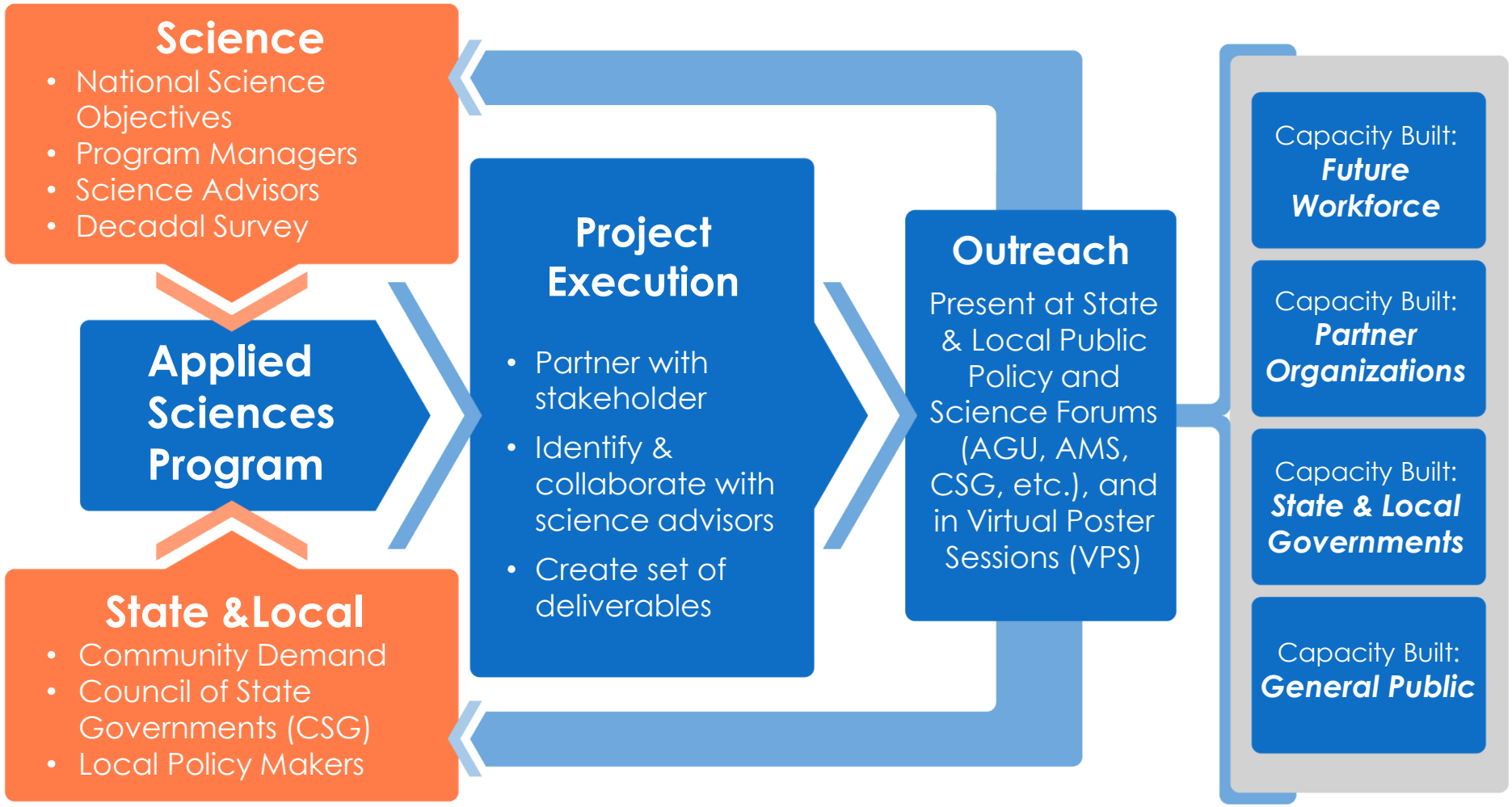
- 18+ (Currently enrolled college students, recent graduates, and early/transitioning career professionals)
- Interdisciplinary backgrounds (different education, skills, experience level, interests, and age)
  - Majority from Earth science majors (Geography, Environmental Science, etc.)
- Competitively selected through a rigorous application and interview process
- US Citizens & Foreign Nationals*

Projects: ~80 annually

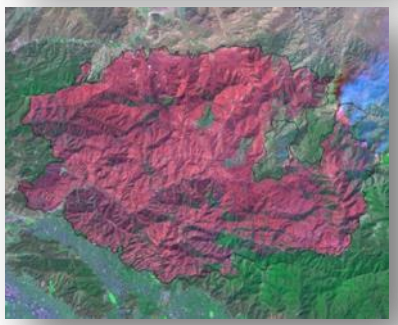
- Conducted during three 10-week terms per year (Spring, Summer, and Fall)
- A project team consist of ~3-6 participants
- Proposals written by/in collaboration with DEVELOP locations, reviewed and approved by DEVELOP NPO and NASA HQ Program Managers

**US citizenship required to apply to DEVELOP locations at NASA Centers*

Project Lifecycle



Project Characteristics



- ✓ **Utilize** freely available **NASA Earth observations**
- ✓ **Highlight the capabilities** of NASA satellite and airborne Earth remote sensing science and technology
- ✓ Address a **community concern** relating to environmental issues
- ✓ **Partner with local, state, federal and/or international organizations** who can **benefit** from using NASA EOS to **enhance decision making**
- ✓ Meet partner needs by **providing decision support tools**
- ✓ Research is conducted by teams with **diverse backgrounds**
- ✓ Science advisors and mentors from NASA and partner organizations provide guidance
- ✓ All projects culminate in a set of deliverables (technical report, poster, presentation, video, etc.)

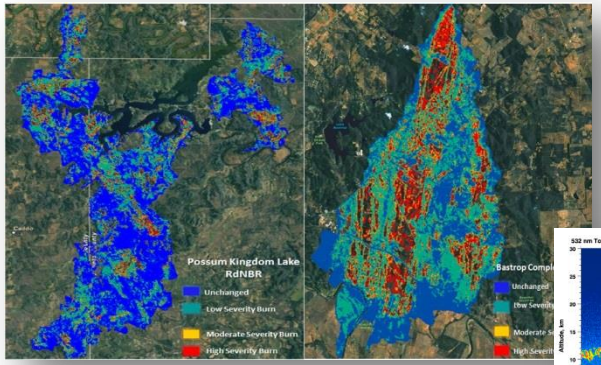
Project Deliverables – 10 Weeks

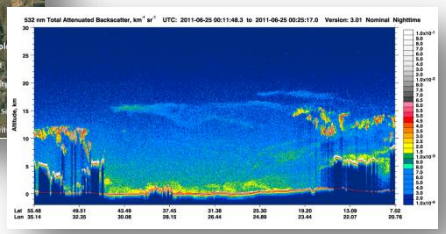
Required Deliverables

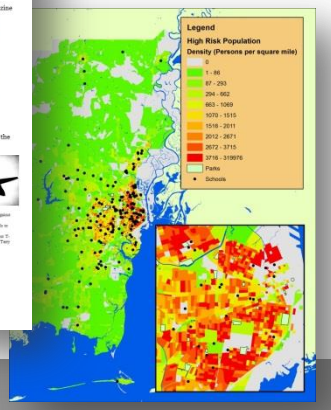
- ✓ Technical Paper
- ✓ Presentation
- ✓ Poster
- ✓ Project Summary
- ✓ Video & Transcript
- ✓ Imagery

Optional Deliverables

- ✓ Brochure
- ✓ Tutorial
- ✓ Journal Article



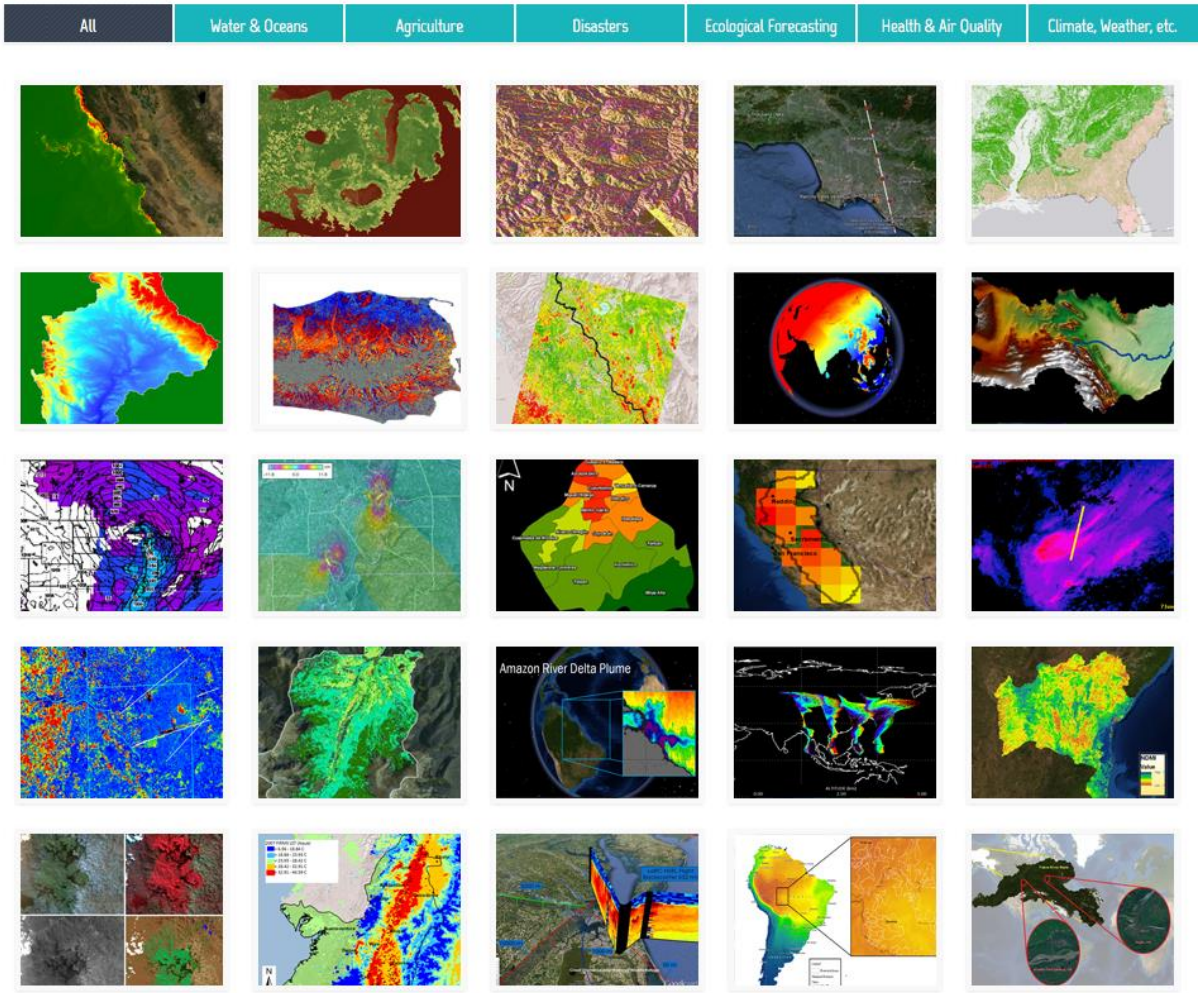




Benefits to Partners & End-Users

- Introduction to new methods to augment current practices: **Cost-saving & time-saving**
- Enhanced **decision support** through use of NASA EOS
- **Increased exposure** to NASA Earth Science technologies and capabilities
- Introduction to **NASA's Applied Sciences Program** and its contributions to local communities, the country, and the world
- **Hands-on training** with practical applications of remote sensing and NASA Earth science
- Improved remote sensing and geographic information science (GIS) capabilities
- Interaction with bright and **innovative young professionals**
- Opportunities for **networking with the NASA community**
- **Strong recruiting pool** of early career professionals with a knowledge of Earth observations and their capabilities

- Lake Champlain Water Resource



Previous Project Example

Lake Champlain Water Resources

Community Concerns

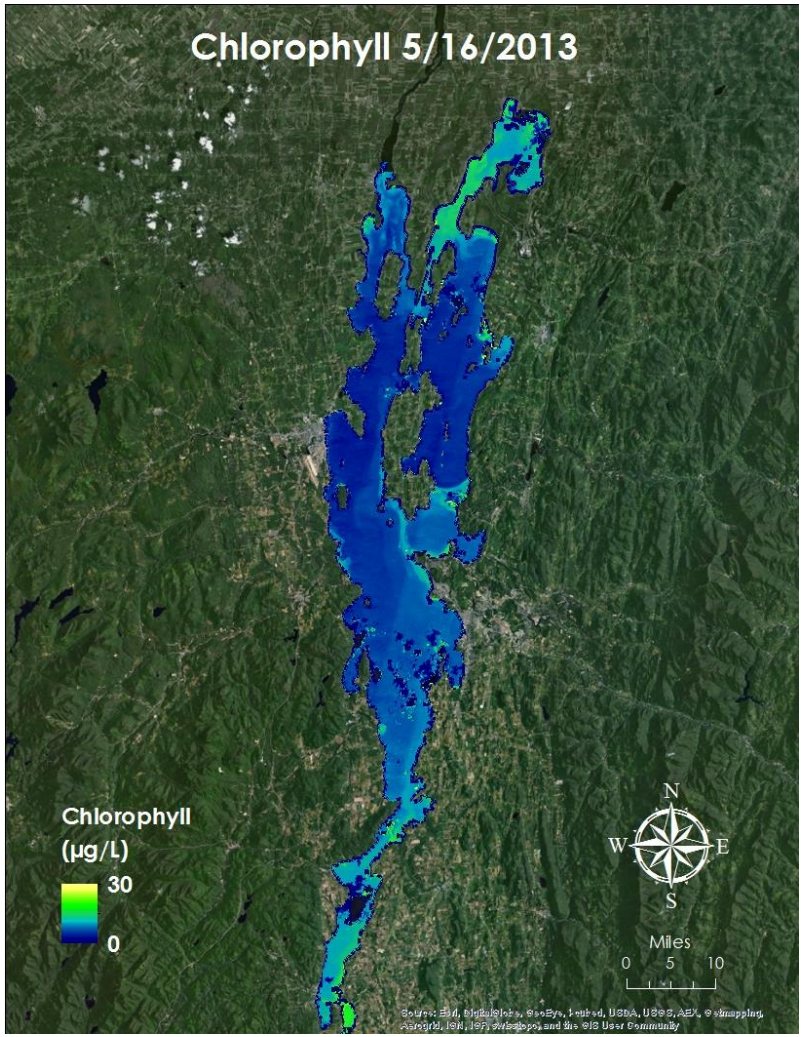
- More than 145,000 people rely on Lake Champlain for drinking water.
- During Harmful Algal Blooms (HABs), toxins accumulate in aquatic organisms at high trophic levels.
- Algae can overpower native species and provide nutrients for invasive species.

Partners & End-Users

- Vermont Department of Environmental Conservation
- Lake Champlain Basin Program
- Lake Champlain Committee


http://www.newswise.com/images/uploads/2013/03/27/algae-waves.jpg

Lake Champlain Water Resources



Project Outcomes

- Term One
  - Methodology for tracking algae blooms with NASA Earth observations
  - Ten-year time series of algae blooms and sediment in Lake Champlain
- Term Two
  - Analysis of land cover change
  - An evaluation of the change in bloom severity over a decade, compared with environmental factors

Benefit for End-Users

- Consistent, holistic view of the lake
- Visual representation of the relationship between environmental factors and HABs
- Visual tool for influencing public policy

DEVELOP in the Great Lakes

DEVELOP & Great Lakes and St. Lawrence Cities Initiative

- Engaged since 2008, 10 projects conducted, including:
  - Great Lakes Disasters: Utilizing NASA Earth Observations to Model Flood Impacts and Erosion Vulnerability in Order to Enhance Flood Mitigation Efforts in the Great Lakes Region (Spring 2013)
  - Great Lakes Water Resources: Using NASA EOS to Monitor Near-shore Storm-water Runoff and its Effects on Water Quality within the Great Lakes to Enhance the Decision Support Tools Used by Policy Makers from the Great Lakes and St. Lawrence Cities Initiative (Fall 2012)
  - Lake Michigan Water Resources: Monitoring Nearshore Stormwater Runoff within the Great Lakes (Spring 2012)
  - Lake Michigan Ecological Forecasting: Decision Support for Asian Carp Population Assessment and Management in the Great Lakes (Spring 2011 - Summer 2011)
  - Great Lakes Water Resources & Ecological Forecasting: Land Use Land Cover Change in the Greater Toledo, Ohio Region and Its Affect on Algal Blooms in Western Lake Erie (Spring 2010)
  - Lake Erie Ecological Forecasting: Mapping Algal Blooms and Aquatic Vegetation in Lake Erie (Fall 2009)
  - Great Lakes Water Resources: Mapping Algal Blooms in Lake Erie (Summer/Fall 2008 & Summer 2009)

- DEVELOP regularly attends the GLSLCI Annual Meeting and presents projects highlighting use of NASA Earth observations in the Great Lakes

Partnering w/DEVELOP

Project Partner (10 weeks)

- Project activity takes place at an established DEVELOP node
  - **Partner Provides: Project Idea, Advising**
  - **DEVELOP Provides: Participants (pay and limited travel), Project Management (NPO)**
- *Steps forward:*
  - Express interest to DEVELOP NPO, complete a project proposal, begin communication with the DEVELOP node that will conduct the project (DEVELOP NPO will make connection)

Interested in partnering with DEVELOP?

- Email interest to:
  - Dr. Kenton Ross, Kenton.W.Ross@nasa.gov
  - Lauren Childs-Gleason, Lauren.M.Childs@nasa.gov
  - Jamie Favors, James.E.Favors@nasa.gov
  - Dr. Christine Lee, Christine.M.Lee@nasa.gov
- Complete the pilot project proposal template & submit **by April 18th, 2014** to be included in the fall 2014 term project review process
- Any questions? Contact Lauren.M.Childs@nasa.gov

Thank You

DEVELOP National Program

http://develop.larc.nasa.gov/