A Decision Support System for Monitoring, Reporting and Forecasting Ecological Conditions of the Appalachian Trail

YQ Wang

Department of Natural Resources Science
University of Rhode Island
Kingston, Rhode Island

Y.Q. Wang (URI)
Rama Nemani (NASA/Ames)
Fred Dieffenbach (NPS/NETN)
Ken Stolte (USDA FS)
Glenn Holcomb (USGS)
Matt Robinson (ATC, NPS/ATPO)
Casey Reese (NPS/ATPO)
Marcia McNiff (USGS/NBII)
Brian Mitchell (NPS/NETN)
Roland Duhaime (URI)
Forrest Melton (NASA/Ames)
Sam Haitt (NASA/Ames)
Hiro Hashimoto (NASA/Ames)
Chris Damon (URI)
Pete August (URI)
John Clark (URI)
Fu Luo (URI)
Chuck LaBash (URI)
Peter Paton (URI)
Geri Tierney (SUNY)
… … …
Jim Coleman (USGS)
Karen Jenni and Tim Niemann

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APPALACHIAN TRAIL CONSERVANCY Join the Journey™

MEGA-Transect Partners

Appalachian Trail (A.T.)

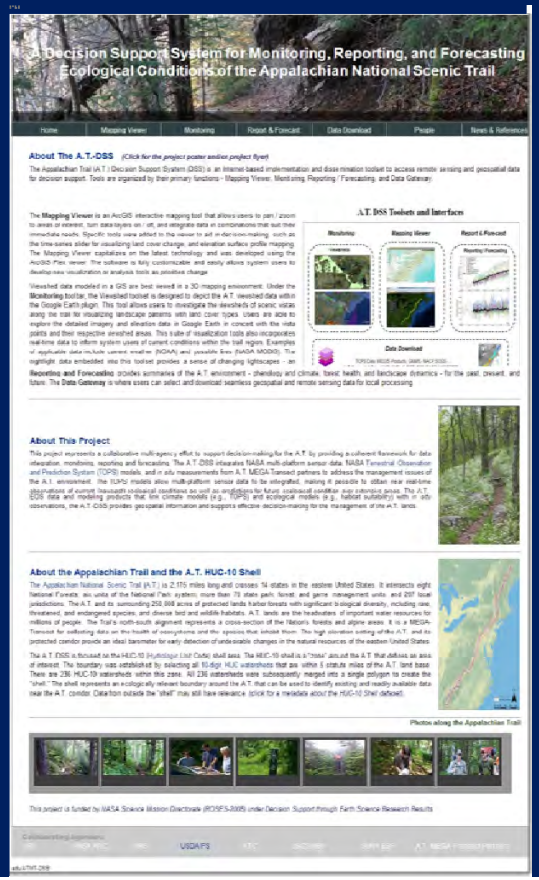
- **2,175** miles **(3,500 km**) long and crosses **14** states in the Eastern U.S.
- Intersecting **8** National Forests; **6** units of the National Park System, more than **70** State Park, Forest, and Game Management units, and **287** local jurisdictions
- **250,000** acres of protected lands harbor rare, threatened, endangered species
- Encompass important water resources

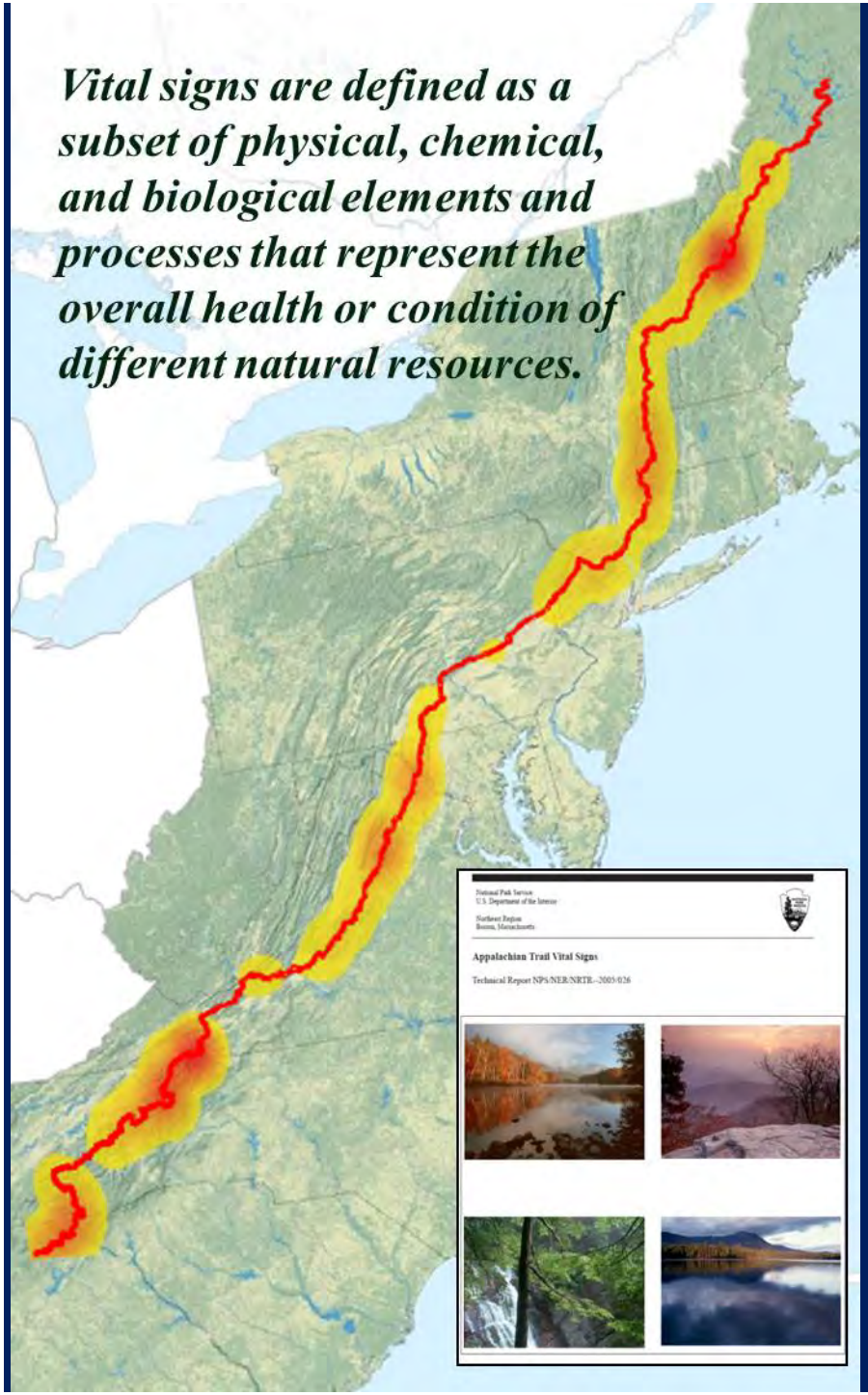
- Millions of people from around the world enjoy the footpath
- More than 6,000 volunteers contribute about 200,000 hours to the A.T. every year.
- More than 10,000 people have reported hiking the length of the A.T

The north-south alignment of the **A.T.** represents a cross-section **MEGA-Transect** of the eastern U.S. forests and alpine areas, and offers a setting for collecting data on the health of the ecosystems.

Objectives of A.T.-DSS

1. Indicator data on A.T. “Vital Signs”
2. Ground monitoring system to complement NASA **TOPS** (Terrestrial Observation and Prediction System)
3. Past, present, and future ecosystem conditions
4. Internet-based implementation and dissemination system

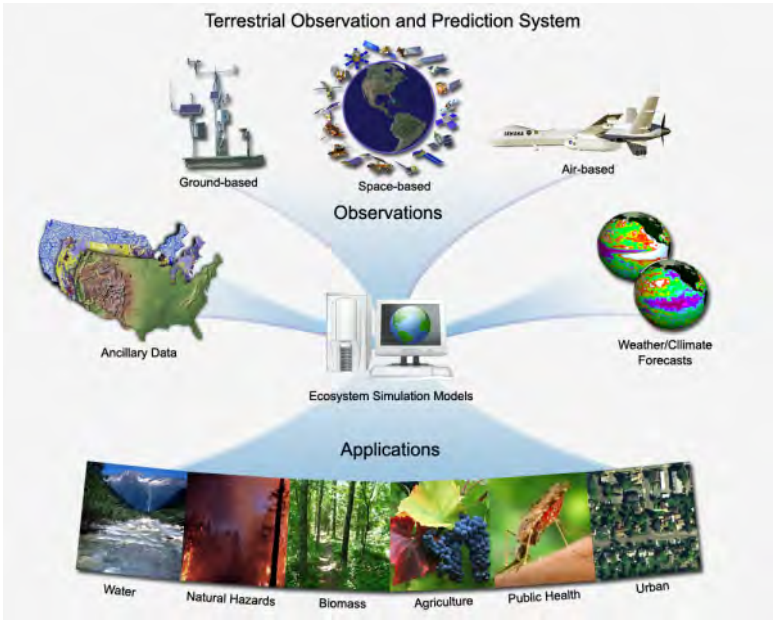




Appalachian Trail Vital Signs

1. Ozone
2. Visibility
3. Atmospheric Deposition
4. Migratory Breeding Birds
5. Mountain Birds
6. Forest Vegetation
7. R.T.E. Species
8. Invasive Species
9. Visitor Usage
10. Alpine and High Ele. Vegetation
11. Landscape Dynamics
12. Phenology
13. Water Resources.

TOPS Data for the A.T. Shell



- MODIS Data Products
  - *Landcover Dynamics (MOD12Q2):* 2001-2011
  - *Snow Cover 8-days (MOD10A2):* 2000 - 2011
  - *Land Cover Type (MOD12Q1):* 2001 - 2004
  - *Vegetation Indices (MOD13A2):* 2000 - 2011
  - *Leaf Area Index FPAR (MOD15A2):* 2000-2011
  - *NDVI (MOD13Q1):* 2000 – 2009
  - *Land Surface Temperature (MOD11A2):* 2000-2011
- GIMMS *(Global Inventory Modeling & Mapping Studies)* NDVI (8-km): 1981-2009
- NACP *(North American Carbon Program)* Modeled Carbon Flux (1-km): 1982-2006
- SOGS *(Surface Observation and Gridding System)* Metrological Data (1-km) from 1976-2008

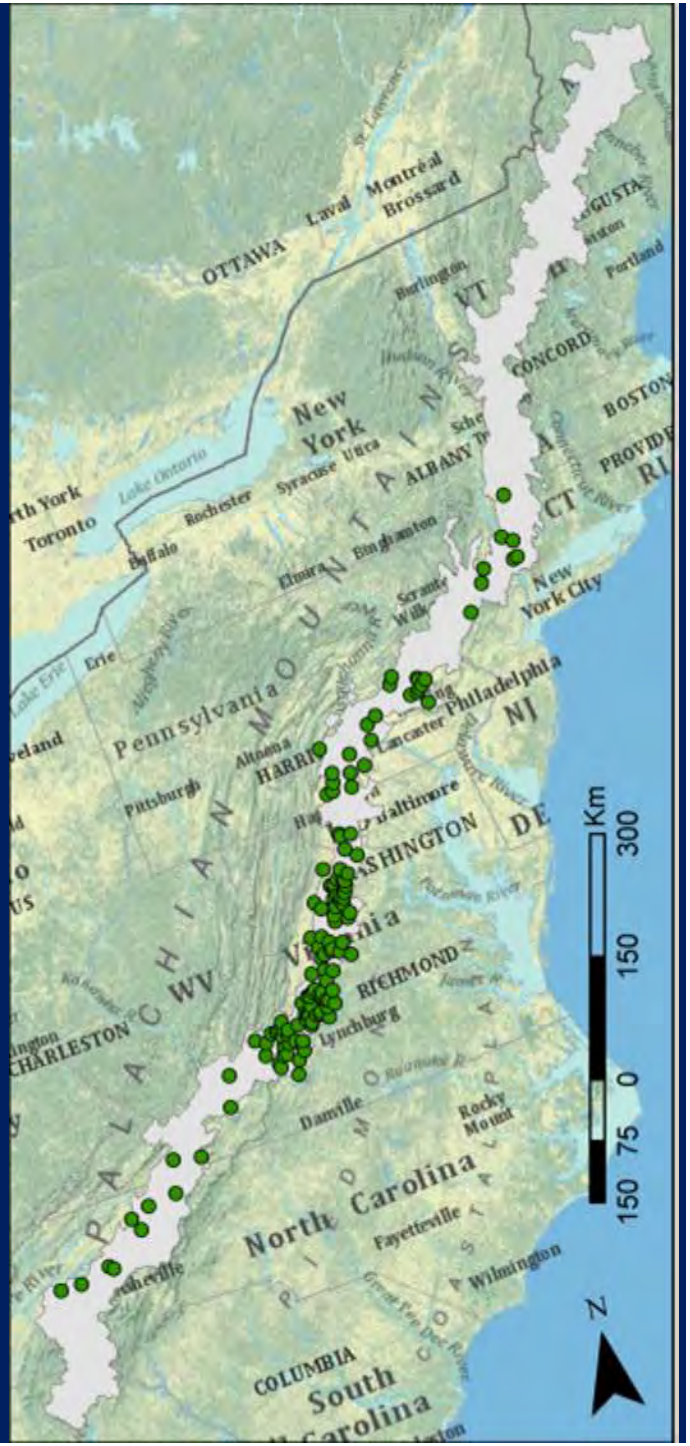
In situ Data and Observations

- Using existing USDA Forest Service's FIA data (>4,000 plots)
- Field observations of selected segments
- Field observation of ecotone plots

Application Prototype: Range Expansion of Tree of Heaven

(*Ailanthus altissima*)

- Large database of *in situ* forest measurements from FIA plots
- Plot locations swapped and fuzzed to protect confidentiality
- *Ailanthus* observed at 136 plots within the A.T. HUC-10 Shell area.

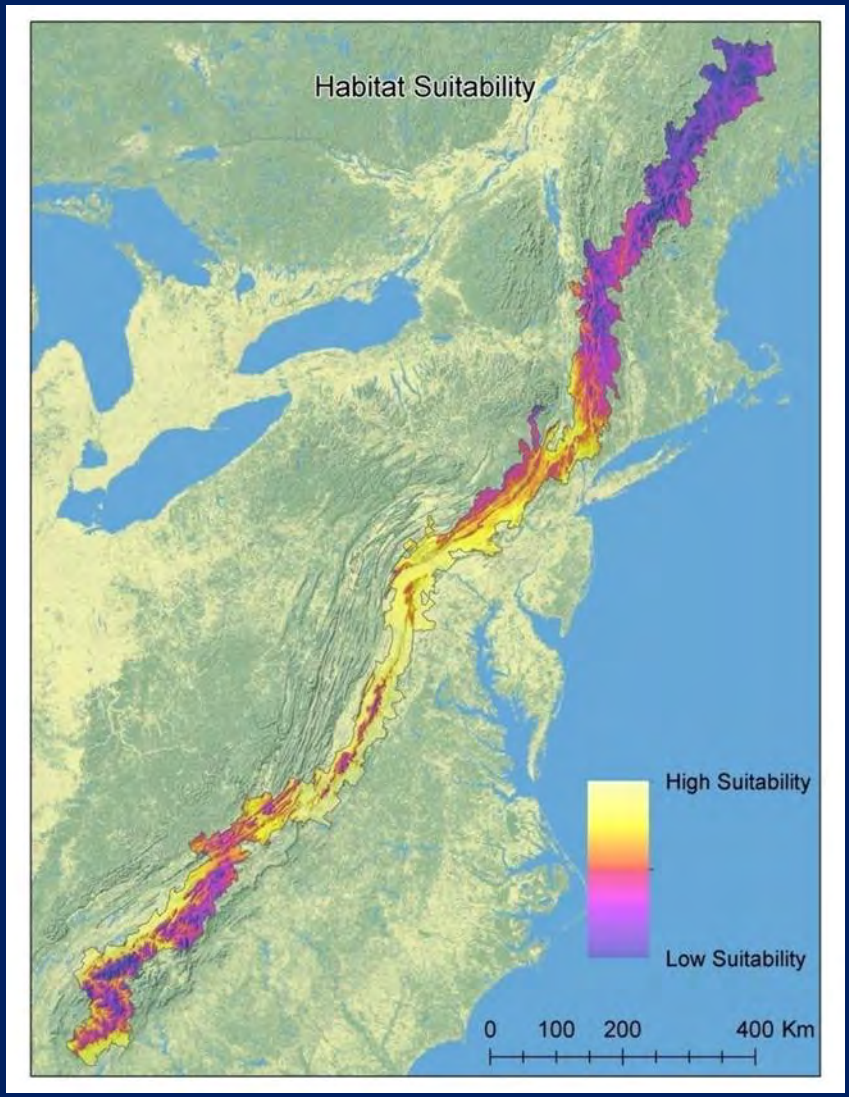


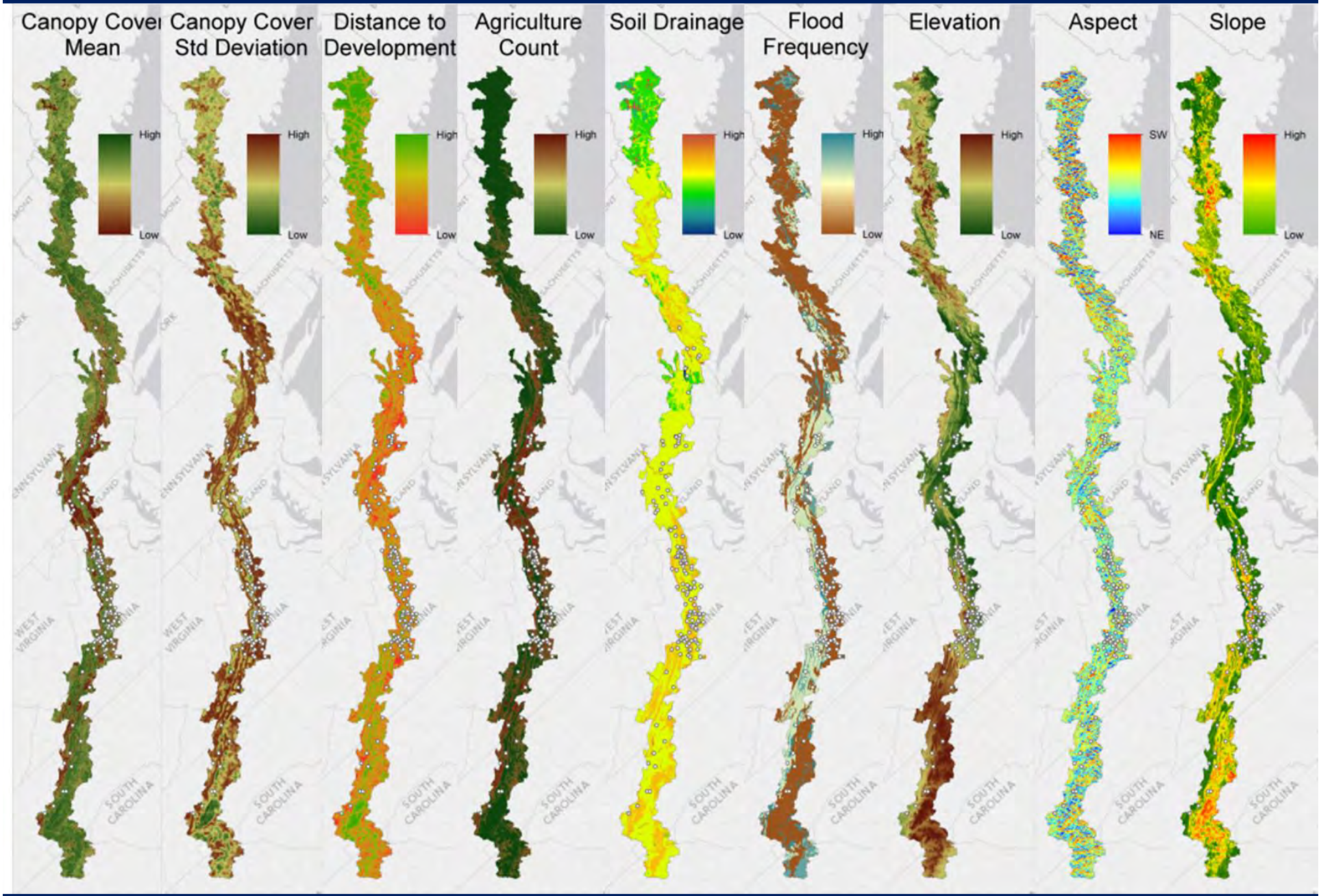
Objectives

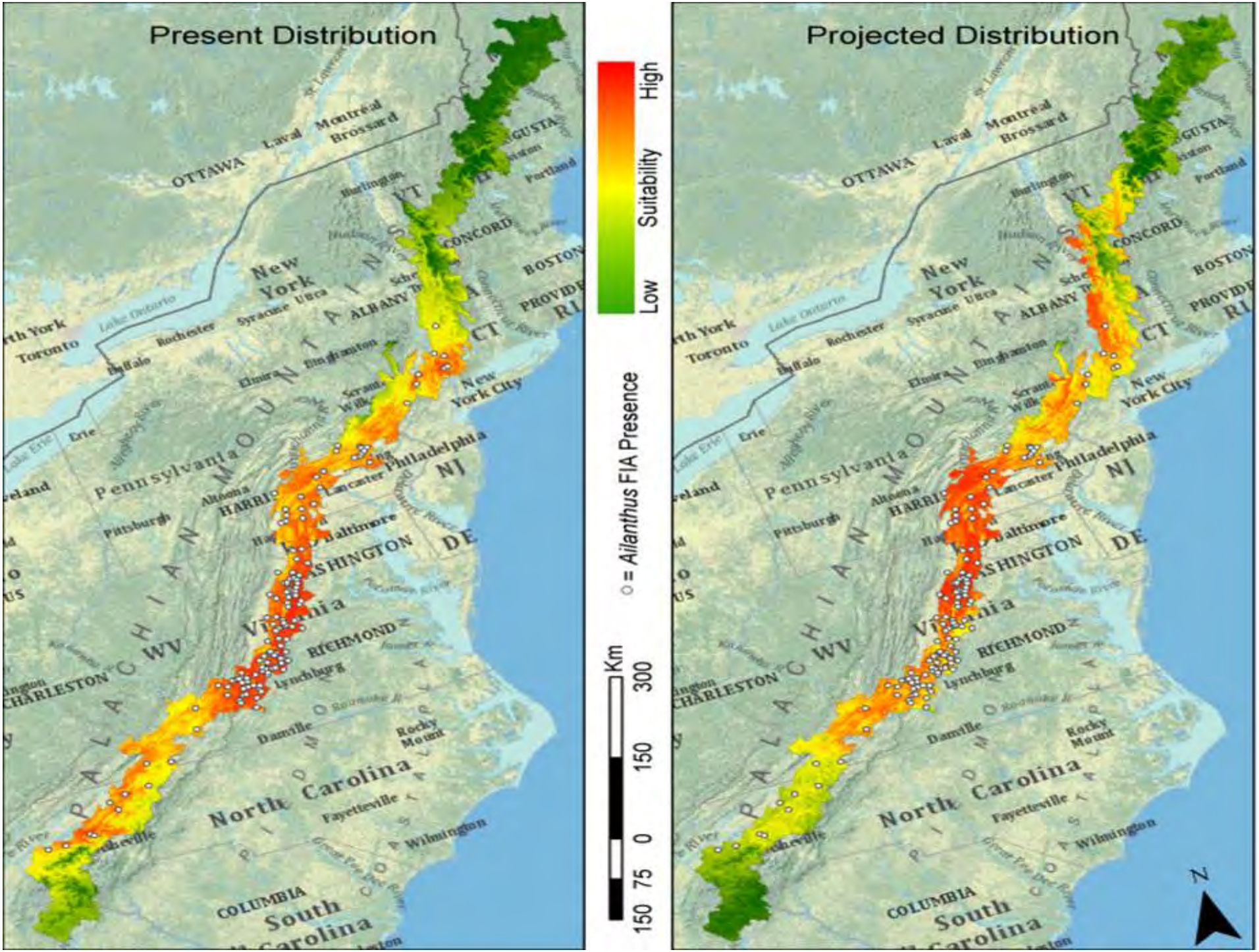
1.Relate the observed distribution of *Ailanthus* to a set of ecogeographical variables.

2.Map the current distribution of suitable habitats and identify high-risk regions.

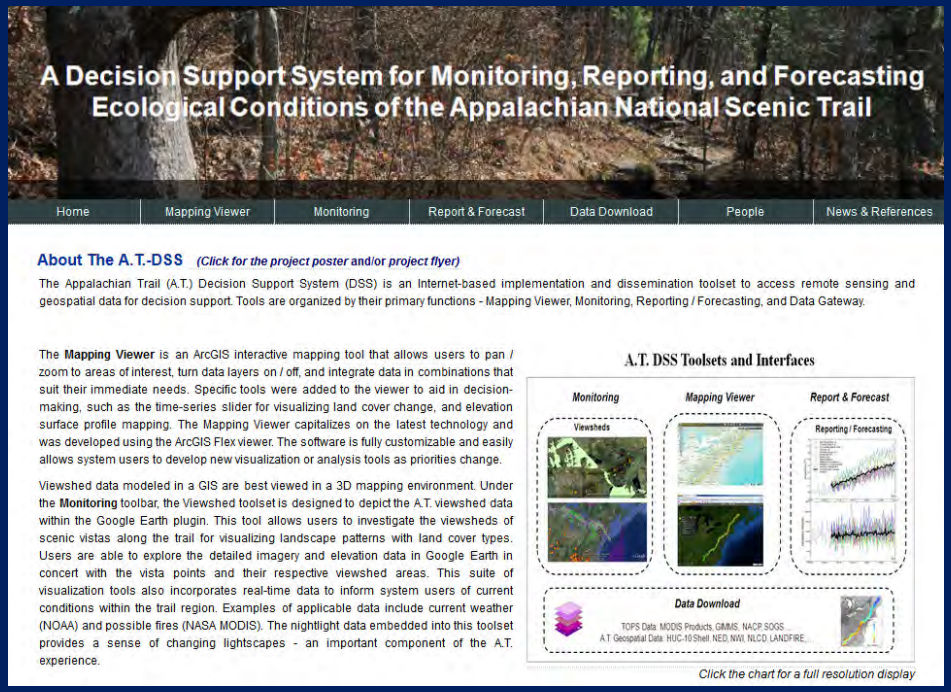
3.Model distribution of future *Ailanthus* habitats.

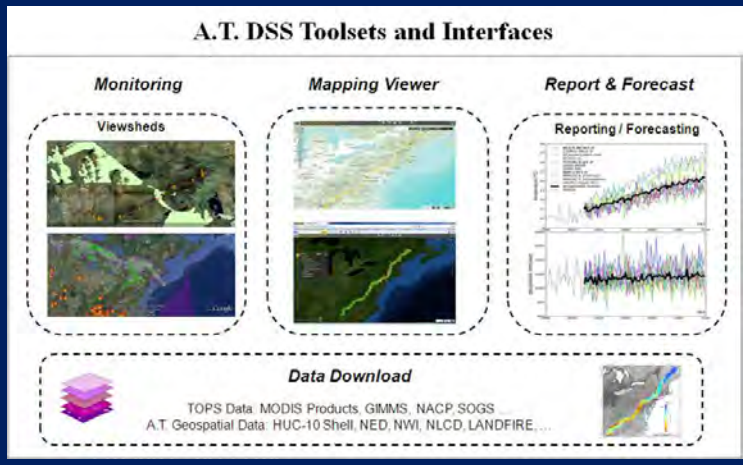


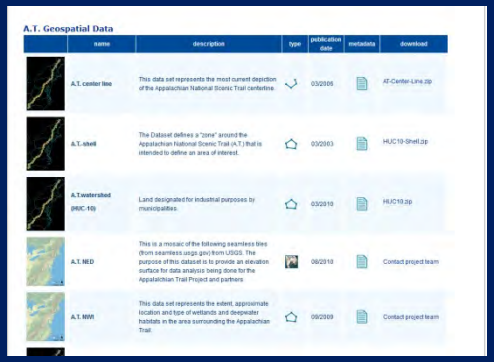

Canopy Cover Mean
High
Low
Canopy Cover Std Deviation
High
Low
Distance to Development
High
Low
Agriculture Count
High
Low
Soil Drainage
High
Low
Flood Frequency
High
Low
Elevation
High
Low
Aspect
SW
NE
Slope
High
Low
WEST VIRGINIA
SOUTH CAROLINA

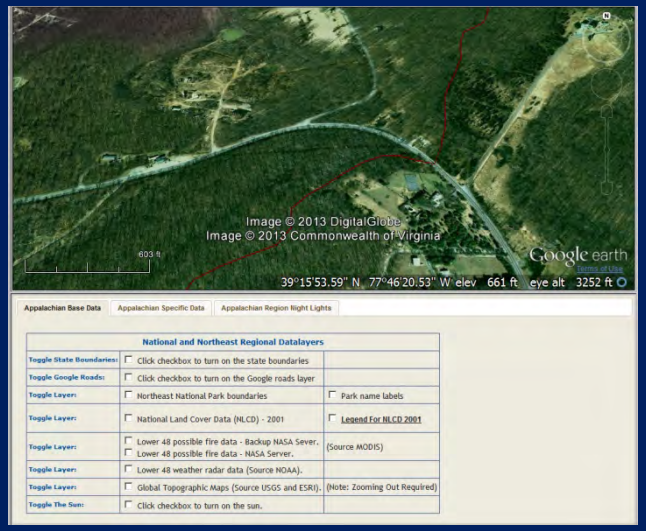

Present Distribution
Projected Distribution
High
Suitability
Low
= Ailanthus FIA Presence
Km
150 75 0 150 300
N
OTTAWA
Laval
Montreal
Brossard
Burlington
VT
Portland
CONCORD
BOSTON
New York
Syracuse
Utica
ALBANY
CT
RI
Toronto
Rochester
Buffalo
Elmira
Binghamton
New York City
Erie
Pennsylvania
Philadelphia
NJ
Pittsburgh
Altoona
Lancaster
Baltimore
DE
WASHINGTON
Virginia
WV
RICHMOND
CHARLESTON
Lynchburg
Danville
Rocky Mount
North Carolina
Fayetteville
Wilmington
COLUMBIA
South Carolina

A.T. DSS Web Site



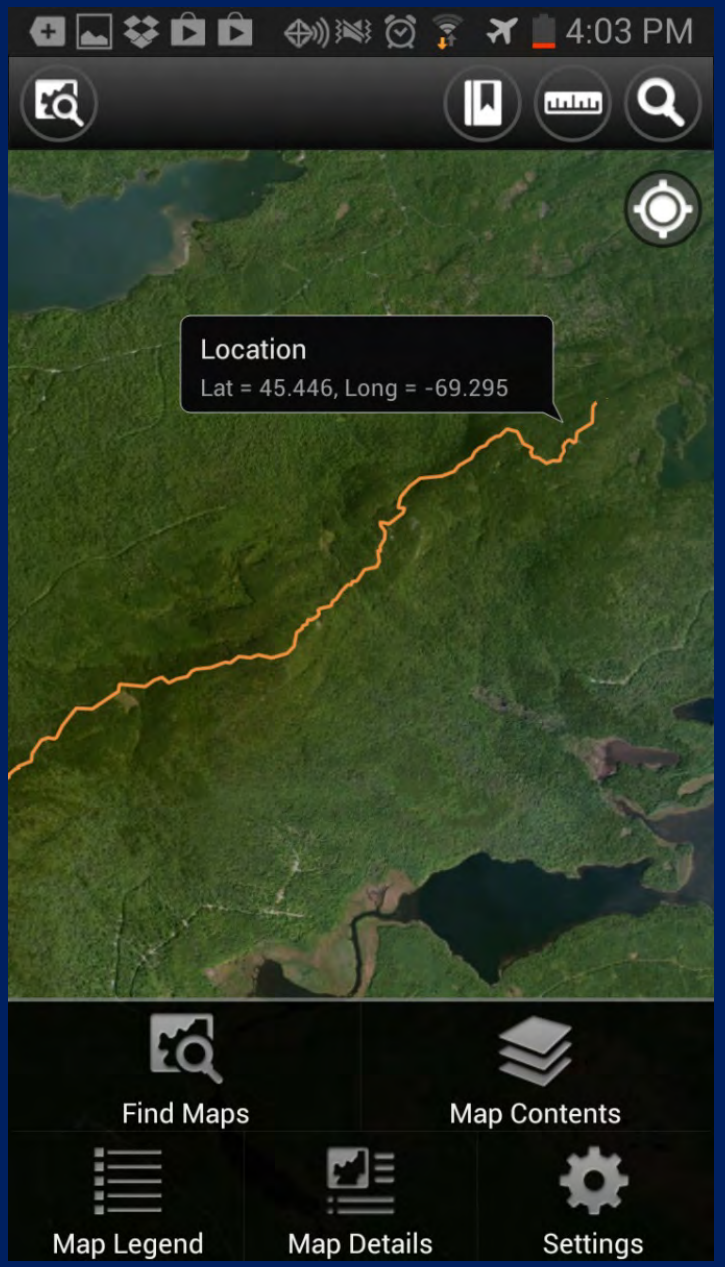






http://www.edc.uri.edu/ATMT-DSS/

A.T. DSS Goes Mobile



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