VALUABLES Consortium Update

Bethany Mabee
Resources for the Future

NASA Health and Air Quality Applications Program Review
September 19, 2018

RESOURCES
FOR THE FUTURE

About the VALUABLES Consortium

Five-year cooperative agreement between RFF and NASA

- Collaborating with the Earth science community to quantify and communicate how satellite information benefits people and the environment when we use it to make decisions
- Our work includes
  - Investigating how people use improved information to make decisions
  - Quantifying how these decisions improve socioeconomically-meaningful outcomes like lives saved or resources conserved
  - Building capacity within the Earth science community so members can play a more integral role in quantifying and building awareness about the societal value of their work

What we do

Our efforts focus on two types of activities:

1. **Conducting case studies** known as “impact assessments”
    a. Apply existing methods and develop new methods
    b. Building the literature on impact assessments on EO for decisionmaking
2. **Developing educational materials and activities** to build capacity within the Earth science community to quantify the value of its work. This includes:
    a. Improving understanding of the terms, concepts and methods related to impact assessments
    b. Developing a value of information (VOI) framework the scientific community can use to design rigorous impact assessments for applied research
    c. Using this VOI framework as the basis for VALUABLES’ tutorials, webinars, and workshops

Why value Earth observations?

Using the value of information (VOI) approach, we can

- Demonstrate return on investment in satellites and data products
- Make informed choices about how to invest limited resources
- Give Earth scientists an effective tool for communicating the value of the their work in socioeconomically-meaningful terms
- Use this framework for quantifying the value of satellite data to help Earth scientists design projects and data applications with an eye toward how they will benefit society.

The challenge

Why aren't we doing this already?

- Economic methods and techniques are not fully established
  - Few existing impact assessments
  - Need to determine "best practices" for impact assessments
- Requires interdisciplinary collaboration between experts and decisionmakers who typically don't work together (e.g., economists, Earth scientists, policymakers, leaders in the private sector)
  - Need to develop familiarity with terms, methods, concepts
  - Need to understand relevant decision contexts
- Capacity building challenges
  - Need to develop capacity building products for activities that aren't routine
- Academic incentives
  - VOI is currently not a "hot" topic in academic economics
  - Do Earth scientists have an incentive to participate in impact assessments?

Who's involved?

VALUABLES leadership and management

Ann Bartuska
Vice President for Land, Water, and Nature

Yusuke Kuwayama
VALUABLES Consortium Director for Socioeconomic Studies

Ross van der Linde
RFF Vice President for Communications

Lawrence Friedl
NASA POC
Director, NASA Applied Sciences

Bethany Mabee
VALUABLES Consortium Community Manager

Core social science expertise

VALUABLES Socioeconomic Valuation Working Group

Rich Bernknopf
Visiting Fellow & Research Professor,
University of New Mexico

Jim Boyd
Senior Fellow

Roger Cooke
Chauncey Starr Senior Fellow

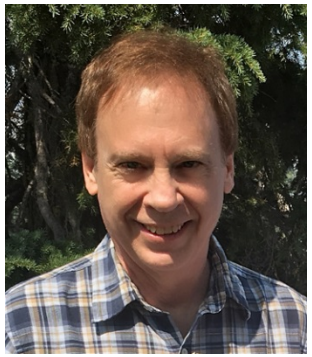
Yusuke Kuwayama
Fellow & VALUABLES Consortium Director
for Socioeconomic Studies

Alan Krupnick
Senior Fellow

Daniel Sullivan
Fellow

Core Earth science expertise

VALUABLES Scientific Council (1 of 2)



Dave Diner
California Institute of Technology
NASA Jet Propulsion Laboratory

Klaus Keller
Pennsylvania State University

Josef Kellndorfer
Earth Big Data LLC

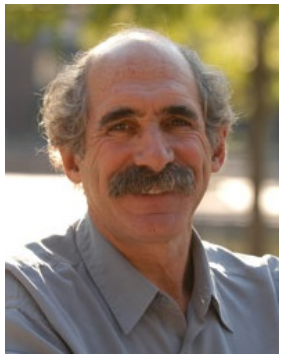
Dalia Kirschbaum
NASA Goddard Space Flight Center

Bob Kopp
Rutgers University

Kyle McDonald
City College of New York
City University of New York

Core Earth science expertise

VALUABLES Scientific Council (2 of 2)



Michael Oppenheimer
Princeton University

Alex de Sherbinin
Columbia University
NASA Socioeconomic Data and Applications Center

David Skole
Michigan State University

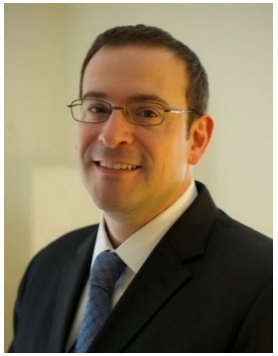
Bruce Wielicki
NASA Langley Research Center

Ben Zaitchik
John Hopkins University

Expertise from private & public sectors, academia

VALUABLES Advisory Group

Anne Connor
Harris Corporation



Mike Fox
Raytheon Company

Larry Meinert
Meinert Consulting, LLC

Lea Shanley
University of North Carolina at Chapel HIll

Chuck Wooldridge
NOAA

Impact assessments

Work that quantifies the value of using satellite data to

Detect harmful algal blooms: Remote sensing can detect harmful algal blooms in recreational lakes and help managers take necessary steps to protect human health.

Enforce air quality standards: Satellite data could be used to improve monitoring of county-level compliance with federal air quality standards and prioritize air pollution control activities that protect human health.

Regulate air emissions from oil and gas development: Monitoring of air quality using satellites can improve our understanding of the relationship between emissions from oil and gas development and infant health outcomes.

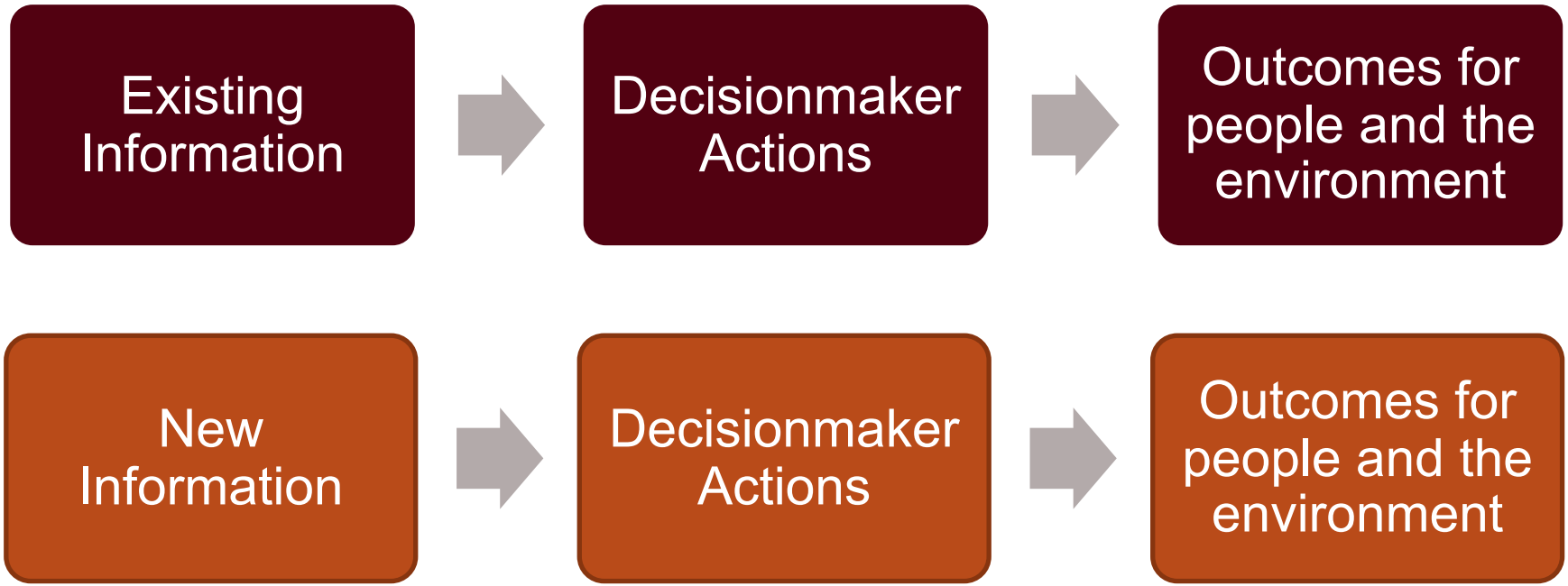
Inform post-wildfire response: The U.S. Forest Service Burned Area Emergency Response (BAER) team uses Landsat imagery to design cost-effective mitigation and recovery plans for the human and natural systems impacted by wildfire.

Predict ice sheet decline: Data from GRACE-FO and other satellites can help experts form more accurate expectations about ice sheet decline, leading to more cost-effective adaptation strategies in the presence of sea level rise.

What do we mean by “value”?

- VALUABLES aims to quantify improvements in **socioeconomically meaningful outcomes** that result from the use of Earth observations in decisions.
- What is a **socioeconomically meaningful outcome**?
  - One that matters to people or to the environment.
  - Some examples:
    - Number of lives saved
    - Percent increase in firm profits
    - Acres of forest conserved
    - Percent increase in crop yields

Identifying a theory of change



Impact (VOI) = Outcomes − Outcomes

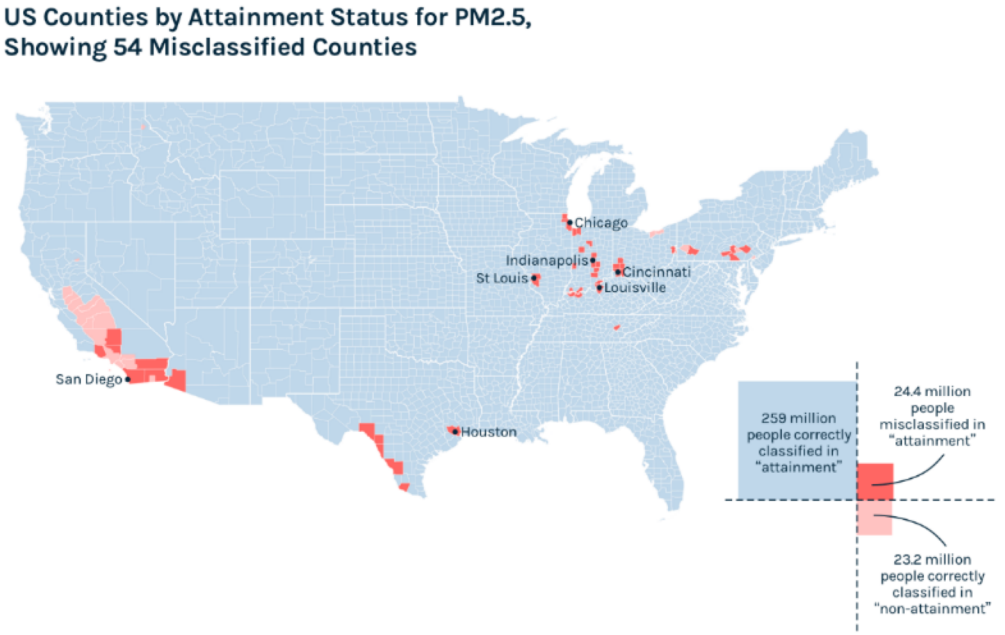
Example: Sullivan and Krupnick (2018)

"Using Satellite Data to Fill the Gaps in the U.S. Air Pollution Monitoring Network"

Research question:
What would the societal benefits be if we used satellite data to enforce CAA as opposed to ground-based air quality monitors?

Societal value of the satellite data:

- Over 5,400 premature deaths between 2016-2017
- Benefits valued at $49 billion



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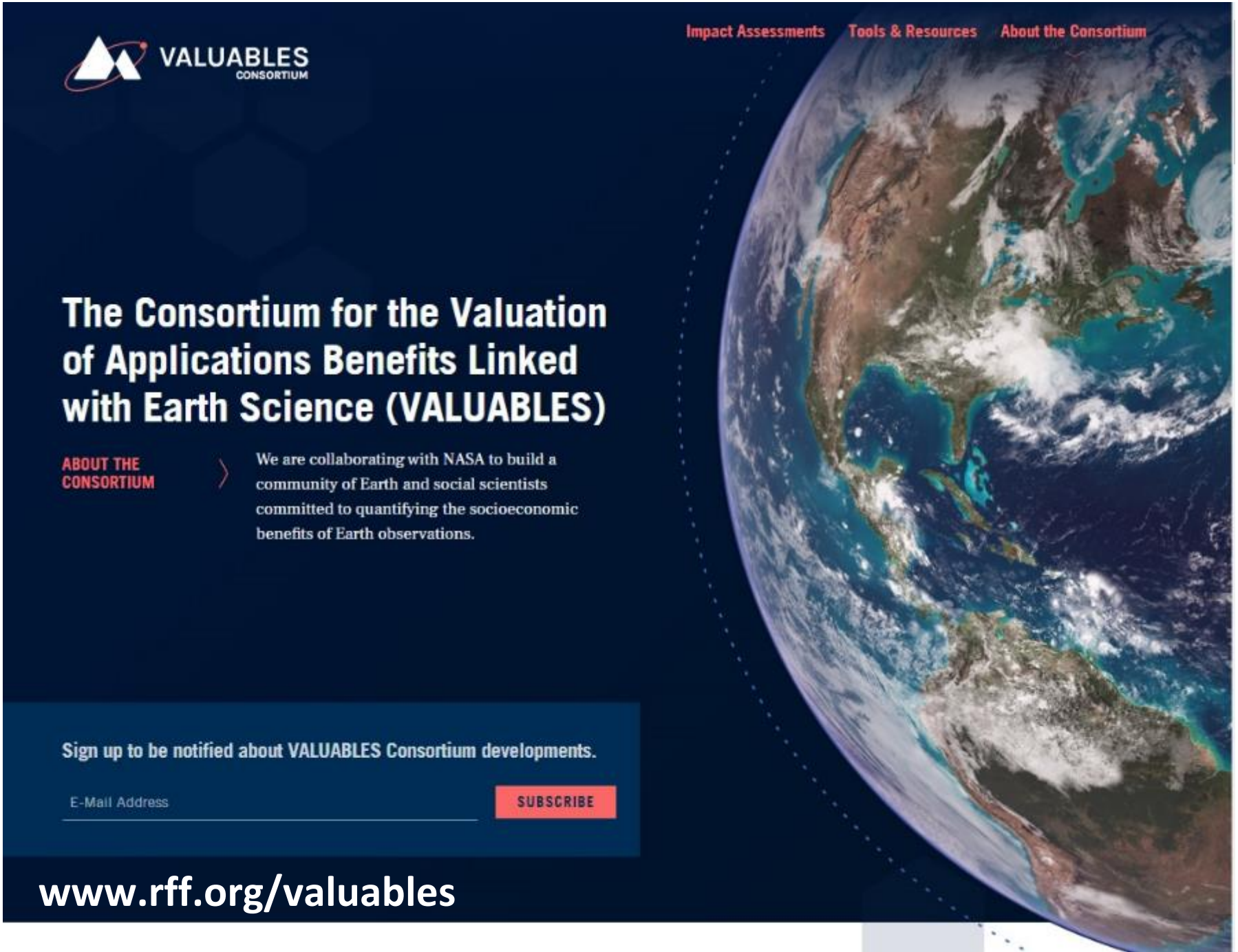
Source: Daniel M. Sullivan and Alan Krupnick *Using Satellite Data to Fill the Gaps in the U.S. Air Pollution Monitoring Network*. Resources for the Future Working Paper. August 1, 2018.


VALUABLES
CONSORTIUM
Impact Assessments
Tools & Resources
About the Consortium
The Consortium for the Valuation of Applications Benefits Linked with Earth Science (VALUABLES)
ABOUT THE CONSORTIUM
We are collaborating with NASA to build a community of Earth and social scientists committed to quantifying the socioeconomic benefits of Earth observations.
Sign up to be notified about VALUABLES Consortium developments.
E-Mail Address
SUBSCRIBE
www.rff.org/valuables

A look at what's ahead

Social media:

- VALUABLES Twitter account

Community resources:

- Web-based series of "explainers"
  - Value
  - Impact assessments

Events:

- American Geophysical Union (AGU) Fall Meeting – Dec. 2018 in DC
- Annual VALUABLES workshop – Feb. 2019 in DC

VALUABLES at AGU's 2018 Fall Meeting

December 10-14, 2018 in Washington, DC

- **eLightning session:**
  - "Quantifying the value of Earth science information by identifying how it changes societal outcomes"
  - Case studies from application areas including air quality management, disaster response, water resource management, and climate observation
- **Half-day, interactive workshop:**
  - "Measuring the societal value of my research: A value of information approach to quantifying the socioeconomic benefits of Earth science"
  - Attendees will learn how to set up a study that quantifies the benefits of Earth science information using a VOI framework.

Details to be announced via our email list.

Connect with us

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Sign up to receive email updates at **www.rff.org/valuables**.

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