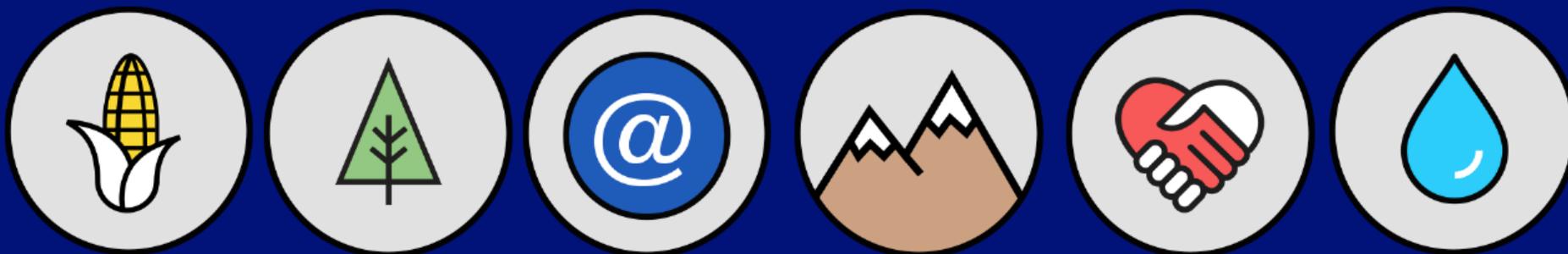


# Communicating the Value of Landsat Imagery Using Case Study Narratives



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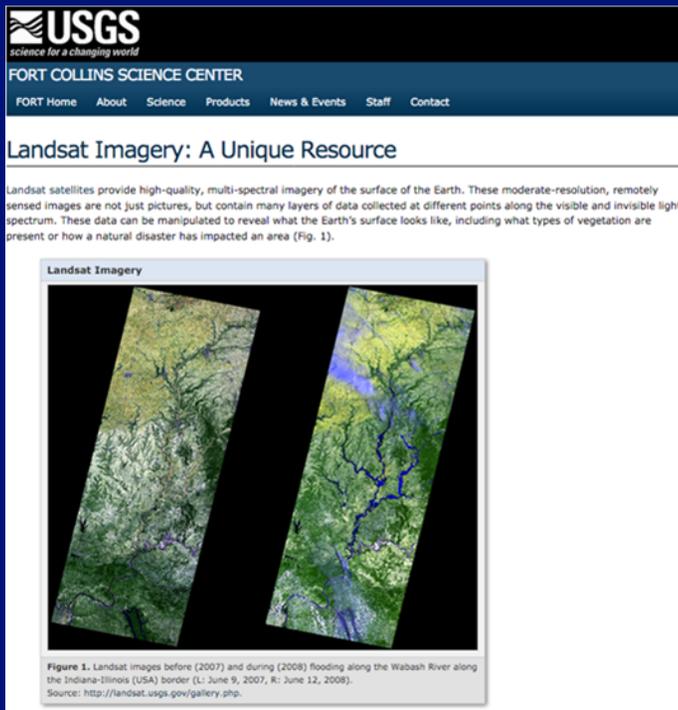
# Presentation Plan

- Introduction
- Project Description
- Methods Employed
- Case Study Approach
- Supply Chain Metaphor
- Evolution



Image credit: NASA

# Project Description



- Working continuously with LRS since 2007 to better understand the users, uses, and value of Landsat imagery
- Goals of this effort:
  1. Identify and classify Landsat imagery users
  2. Better understand the specific uses of imagery
  3. Determine the value of Landsat imagery to the users
- Two main components:
  1. Surveys of Landsat imagery users in the United States and around the world
  2. Case studies of the VALUE of Landsat imagery

≈ 14 years of on-orbit operations

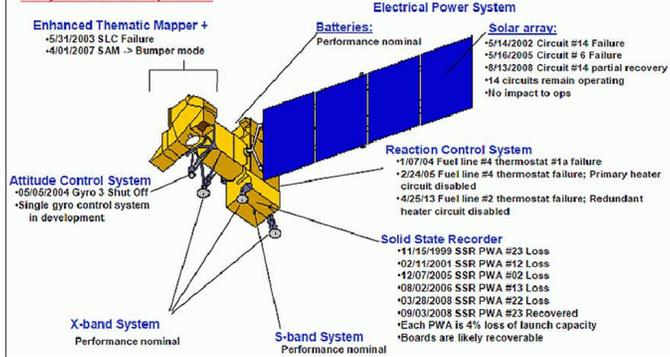


Image credit: NASA

# History

## 2009 Survey

- Open-File Report 2011-1031

## 2012 Survey

- Open-File Report 2013-1269

## 2012-2014 Case Studies

- Book Chapter 2016
- Open-File Report 2014-1108

## 2014 Survey

- Open-File Report 2016-1032

## 2014-2017 Case Studies

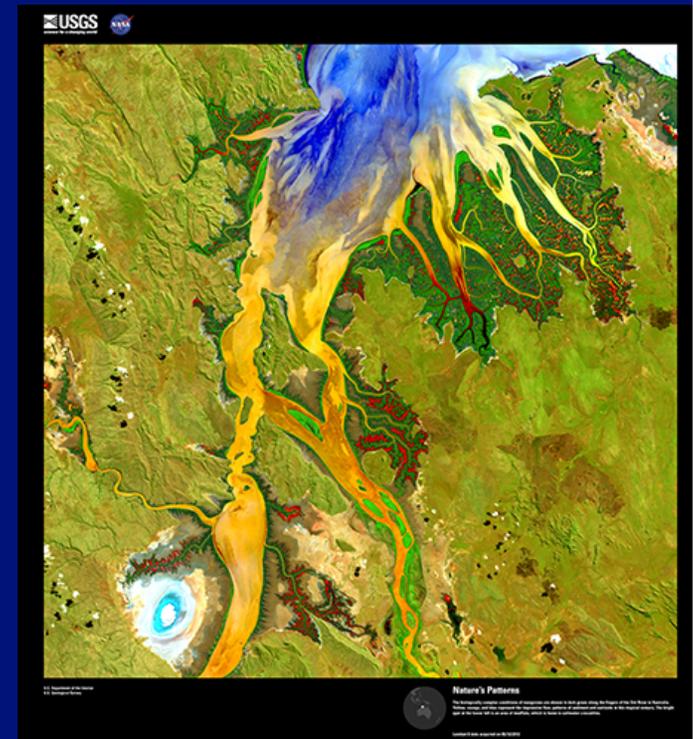
- Open-File Report 2017-1034

## Ongoing 2017

- Survey
- Case Studies

## Case Studies of Landsat Imagery Use

- Originally conceptualized as an economics project
- Total benefit is difficult to estimate
  - Downstream
  - Value-added
- Investigating specific examples of imagery use, users, and benefits
- Qualitative interviews & investigation
- ~35 Case Studies
- Enrich understanding by providing context for the economic-benefit modeling



# Case Studies Organization & 4 Examples



Agriculture



Forestry



Technology



Environment



Humanitarianism



Water

<https://www.fort.usgs.gov/sites/landsat-imagery-unique-resource/landsat-imagery-unique-resource-case-studies>



# Water Exploration - West Darfur



- Over 250,000 refugees in the desert
- Options:
  - Trucking water
  - Millions of U.S. \$ and safety concerns
  - Send in ground crew for survey
- High cost, safety concerns and length of time required
- Use Landsat imagery to assess potential well drilling sites Radar Technology International with the support from UN and U.S. uses Landsat in conjunction with its own WATEX (RTI) to locate potential drilling sites
- Benefits of Landsat use:
  - Successful identification and drilling of 1,800 wells since 2005
  - 98% success rate



Dr. Alain Gachet, Radar Technology International (RTI), France



## Mapbox: Innovating with Landsat

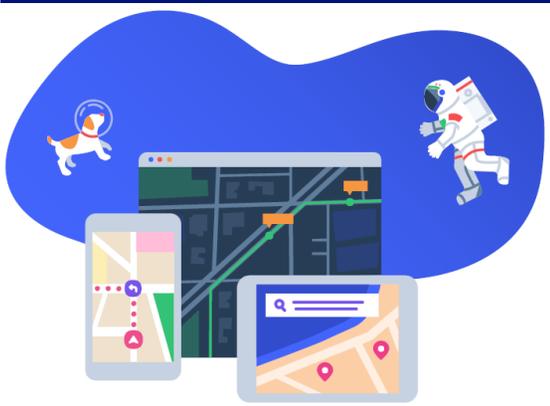


Image: <https://www.mapbox.com/about/>

- Cloud-based map platform startup
- Data platform for mobile and web applications
  - Provides building blocks to add location features like maps, search, and navigation
- ~50 cartographers, data analysts and software engineers,
  - Washington, D.C., San Francisco, California
- Satellite team
  - 5 employees dedicated to using Landsat imagery to develop new products
- Licensing commercial imagery equivalent to Landsat would cost \$4 million per year
  - These costs would prohibit further development of medium-resolution products



## SilviaTerra: Landsat Use by a Forestry Start-up

- Team of 7 foresters, biometricians, and programmers
- Combining expertise in biometrics with the latest developments in remote sensing, big data, cloud computing, and mobile
- Solve forest inventory problems with a fraction of the time and cost of conventional cruising
- “This work could not be accomplished without Landsat’s free availability of red, green, blue and infrared bands”





# E. & J. Gallo: Improving Irrigation Technology and Grape and Wine Quality



- Uses Landsat and METRIC to scan 20,000 acres, looking to increase to 150,000 acres of vineyards
  - “At Gallo, water stewardship is critical to our long-term business growth and has always been a top priority for our company.”
- Improved water management and water budgets
- More efficient seasonal irrigation schedules
- Decrease in water applied by 20-30%
  - Decrease in irrigation cost due to energy savings
- Grape quality improvement
  - Upward movement in the wine program
  - Increase in price per bottle
- Reduce trimming of excess foliage
  - Labor savings

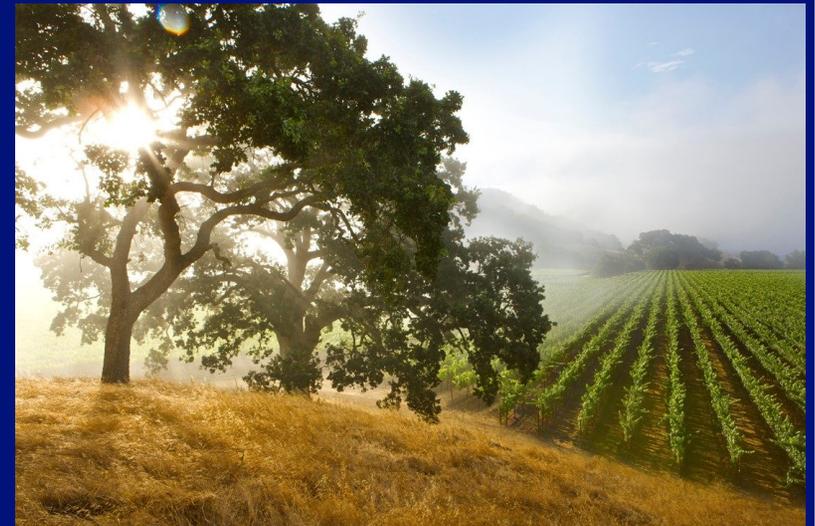


Image credit: E.&J. Gallo

Where do  
we go from  
here?



# Identifying a value is not enough...

## Science Communication



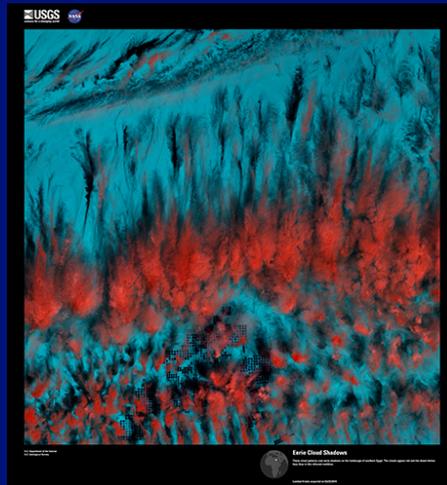
“Purposive intervention by a driving actor or group of driving actors to alter the present state of the relationship between sciences and society toward their desired state”

• Ogawa, 2013

Image credit: [http://www.telephonearchive.com/phones/intl/ericsson\\_eiffel\\_tower.html](http://www.telephonearchive.com/phones/intl/ericsson_eiffel_tower.html)

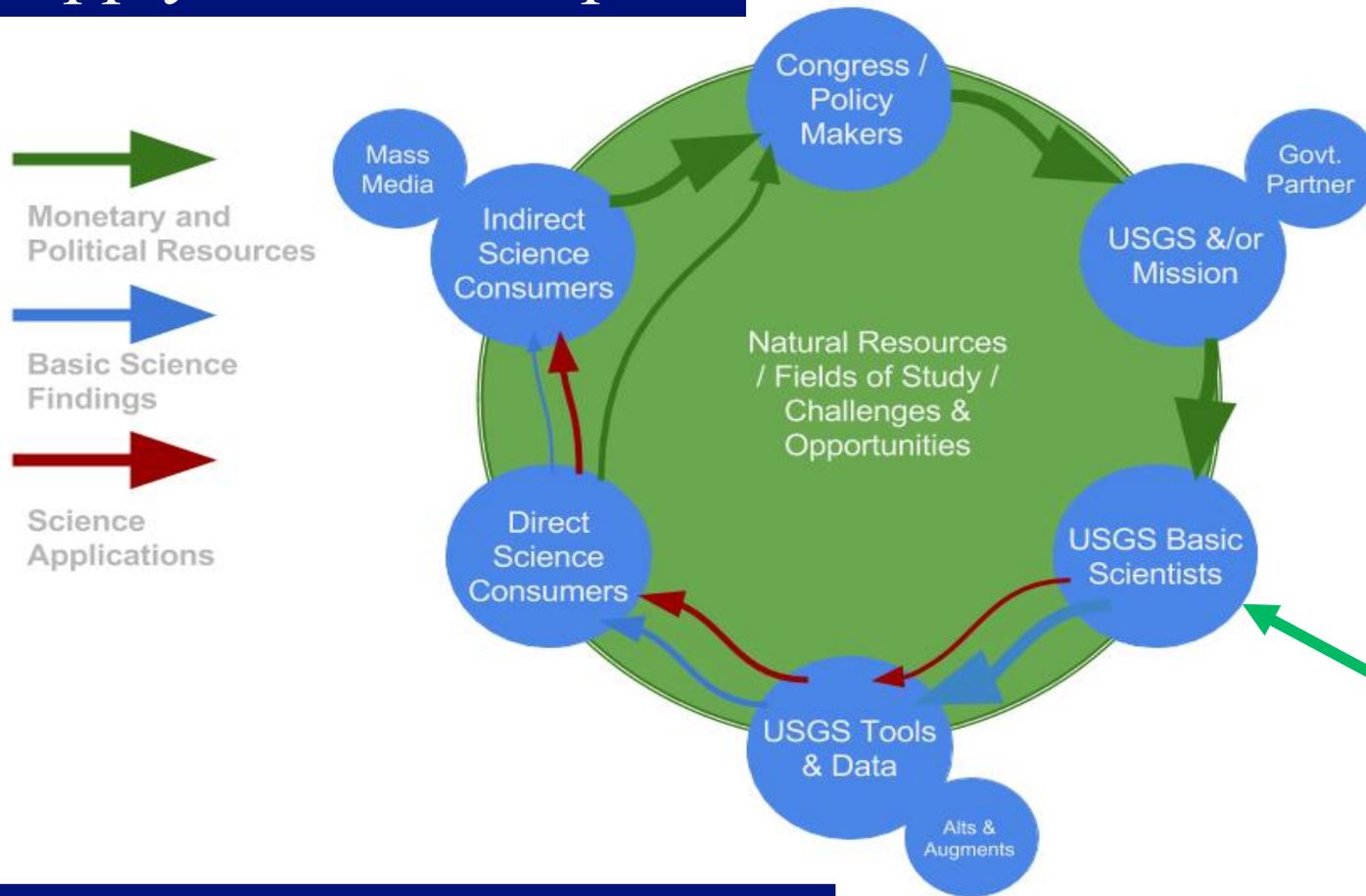
# Understanding what we have done so far

- Some cases more successful than others
- We want to
  - Replicate success
  - Create compelling cases
  - Successfully communicate messages



- Content Analysis of cases
  - What is being communicated?
  - Who is communicating?
- Develop Framing/Messaging
  - How is it communicated? (process)
- Colorado State University
  - Department of Journalism & Media Communication
    - Mike Humphrey
    - Joe Champ

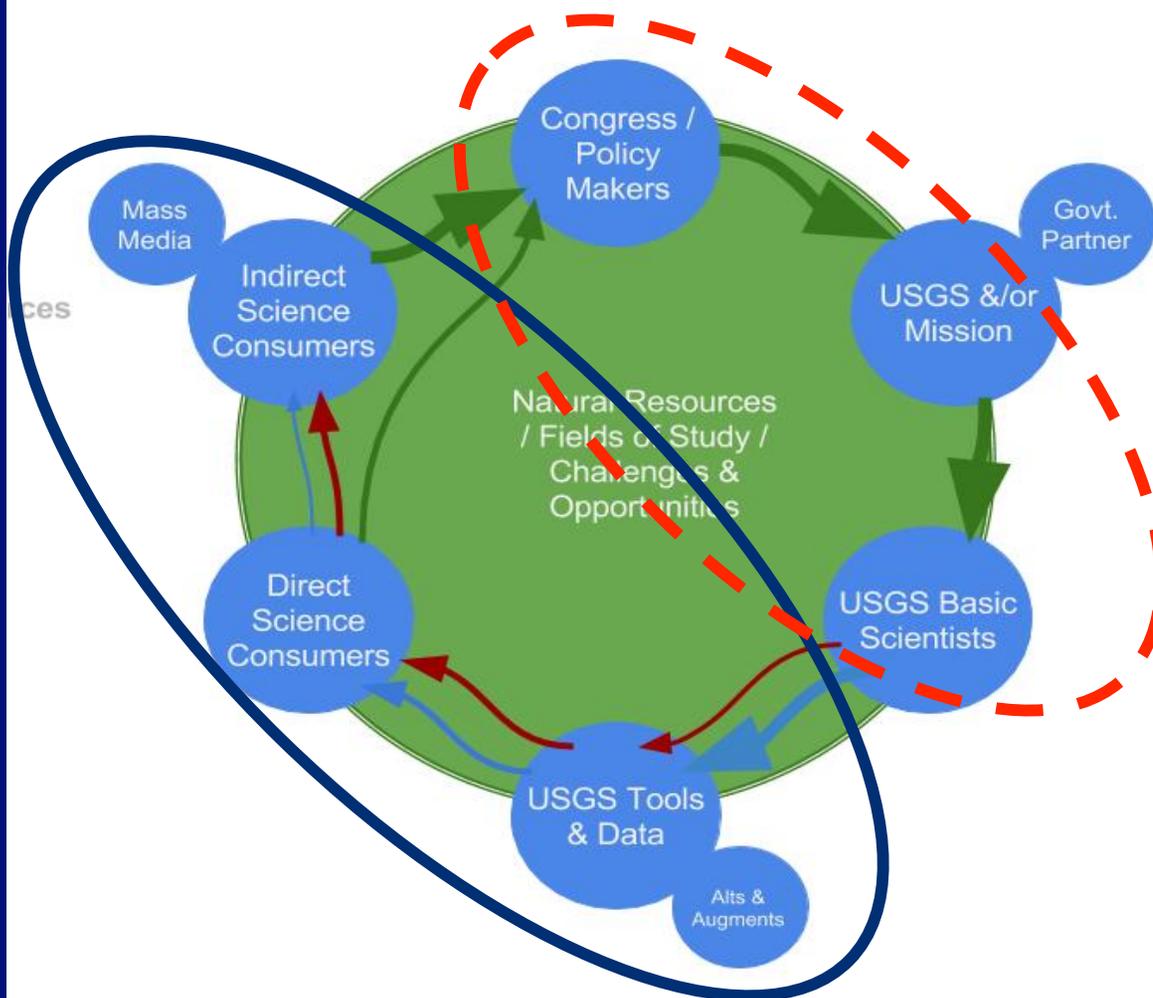
# Supply Chain Metaphor



links  
conceptualized  
as characters or  
actors

*flow of: value, data, communication*

- Cases focused on latter half of the chain
- Little mention of policy, funding, or the scientists
- Can other links, or combinations of links, of the chain be explored?



# Evolution: Framing the Message

## *Narratives of Efficacy*

- People have to deal with thousands of new pieces of information every day, so they need to establish efficient patterns to do this
  - (Heath and Heath, 2007)
- **There is no such thing as an unframed message...**even in science
- Purpose of a frame
  - Demonstrate a linkage between concepts so that after experiencing a message, audiences have the capacity to connect themselves to a scientific discourse
    - (Scheufele & Tweksbury, 2007)



# Gain Frame

- Economic & Societal Benefits
- Why this topic matters to the communication target
- *Very basic frame*

- **Contribute**
- **Achieve**
- **Improve**
- **Save**
- **Create**
- **Enhance**
- **Gain**

- **Expand/Increase**
- **Develop**
- **Pioneer**
- **Supplement**
- **New Tool**
- **Complement Benefit**
- **Success**



Image credit: NASA

## FRAMES (more sophisticated)

- Social progress — Improving the quality of life or finding solutions to problems; living in harmony with nature (not mastery), balance, sustainability
- Economic development, competitiveness — Economic growth, investment; protecting local, national, or global competitiveness
- Morality/ethics — A matter of wrong vs. right; respecting (or crossing) ethical limits or thresholds; working towards justice for those who have been harmed
- Scientific/ethical uncertainty — The decision is a matter of expert understanding; what's known vs. unknown; invokes or undermines scientific consensus; calls on the authority of “sound science”; “paralysis by analysis”

• Nisbet and Scheufele 2009

# Even more frames... Value of Science



Ecosystem Mission **SCIENCE SOLUTIONS**: Benefits to Society

[About](#) [Case Studies](#) [Contact](#)



## Science Solutions: Hawaiian Energy Independence

Photo © Bob Bangertor

ECOSYSTEM SCIENCE is critical to making informed decisions about natural resources that can sustain our Nation's HUMAN, ECONOMIC, & ECOLOGICAL well-being.

The case studies on this site highlight the tangible benefits to the American public through USGS Ecosystem Science with regard to human, economic, and ecological dimensions.

**Human  
Benefits**

**Economic  
Benefits**

**Ecological  
Benefits**

## The Last Chair:



- What works
  - e.g. Gallo, gain frame, *narratives of efficacy*
- Supply Chain Insights
  - Understand how characters express value
  - Explore cases of value flowing among characters **around and across** the chain
- Communication
  - Continue gain frame
  - Integrate more sophisticated frames into new cases
  - Use sophisticated frames to tailor messages for different targets
  - Website always needs updating
- **Strive for reduction of complexity!**

