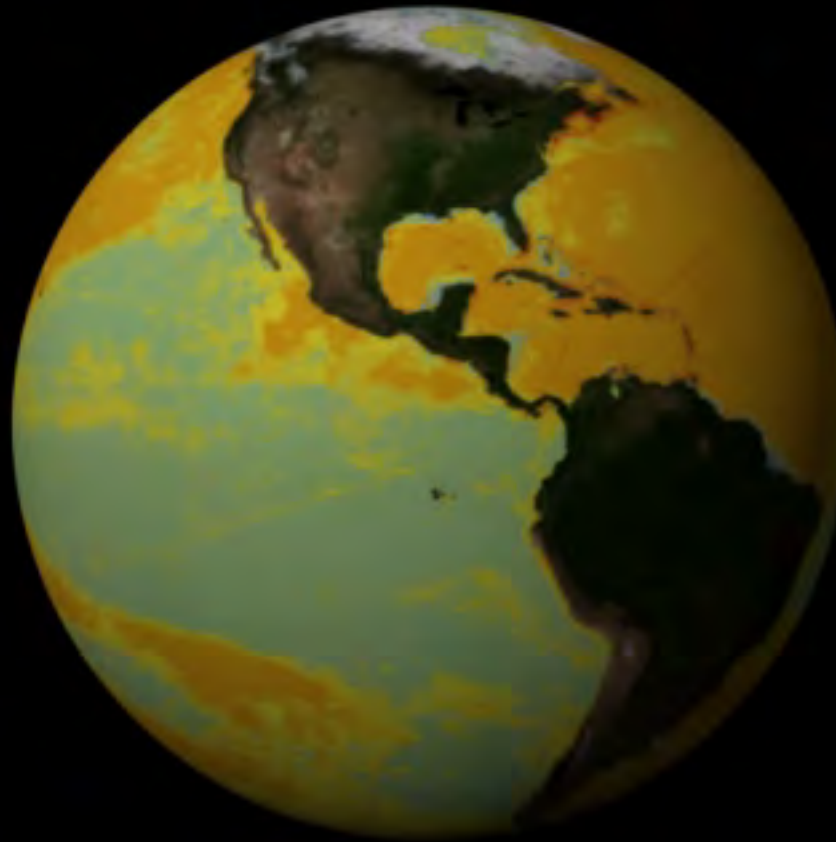


# Big Data and The Future for Ecology

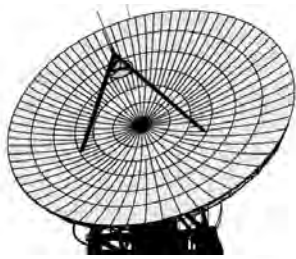
**Stephanie E. Hampton, Carly A. Strasser, Joshua J. Tewksbury, Wendy K. Gram, Amber E. Budden, Archer L. Batcheller, Clifford S. Duke, John H. Porter**

# Challenges at scales individuals can't address



*Halpern et al. 2008. A Global Map of Human Impact on Marine Ecosystems. Science 319: 948*

<http://www.nceas.ucsb.edu/globalmarine>



# Science project & data size

\$10M

**\$2,865,388,605**

**2% receive ~ 20% of funding**

\$5M

\$1M

**“Dark data”**

Number of awards sorted by size



# How dark is Ecology's "dark data"?

Random selection 100 DEB awards

1 paper from each award

"Reasonable efforts" to locate data online

8% make any non-genetic data public



# Observatories



NEON Inc. – Image: Nicolle Rager-Fuller, National Science Foundation



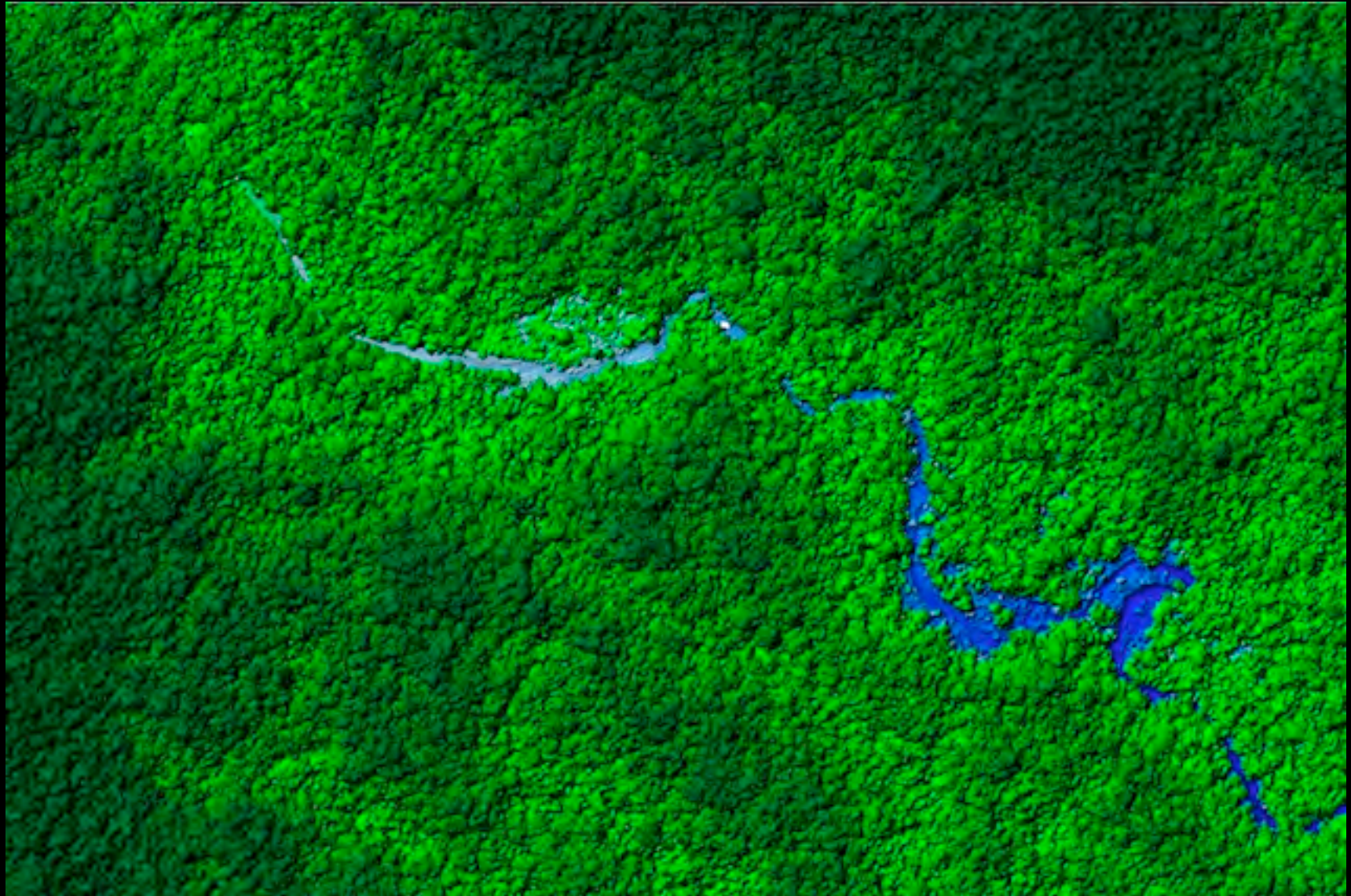
# Citizen Science



Channel Islands National Marine Sanctuary – Naturalist Corps - <http://oceanservice.noaa.gov/images.html>



# Remote sensing





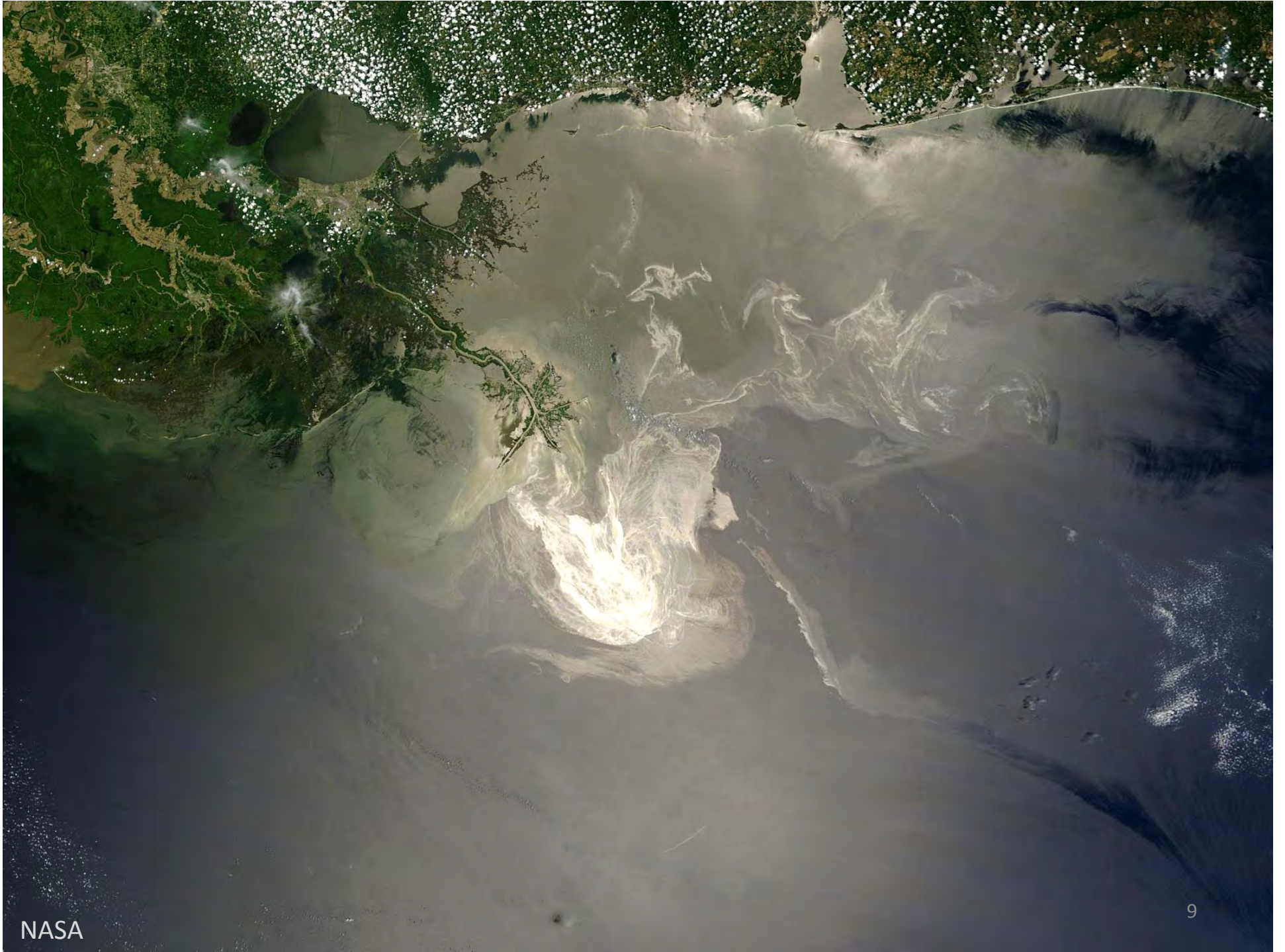
# Collectively Ecology may have “big data” – we just aren’t using it



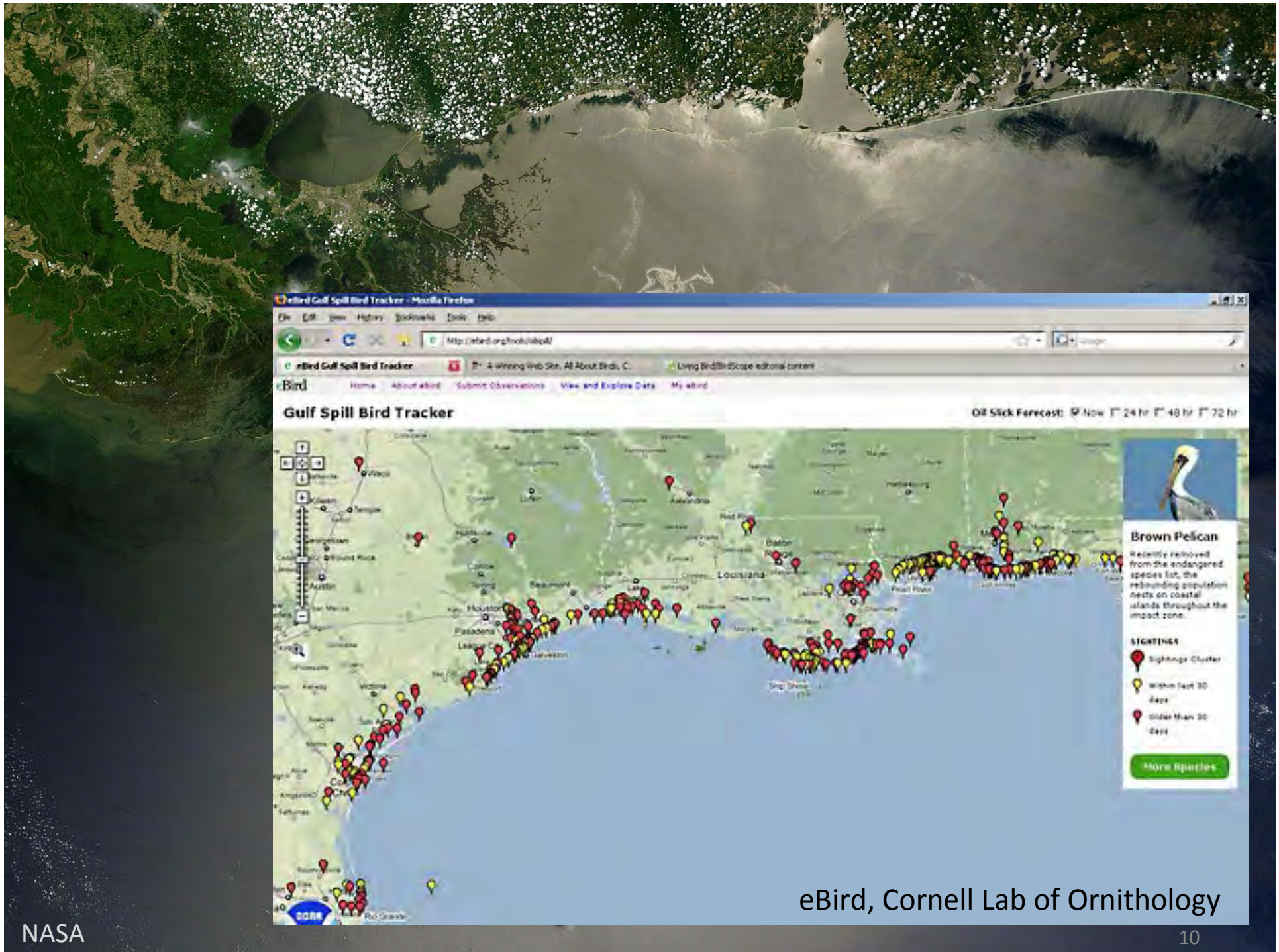
Christopher Kopp

Wolkovich et al. 2012. Warming experiments underpredict plant phenological responses to climate change. *Nature* 485: 494.











# How do ecologists move into the information age?

Institutional incentives

Cyberinfrastructure

Cultural change

Training



Johann Friedrich Greuter: Socrates and His Students

# How do ecologists move into the information age?

Organize & archive data for posterity

Collaborate with heterogeneous data

Share data

*Shift your  
local culture*



Johann Friedrich Greuter: Socrates and His Students



## Read:

Borer et al. 2009. Some simple guidelines for effective data management. ESA Bulletin 90: 205-214