Framework for Data Informed Science Policy

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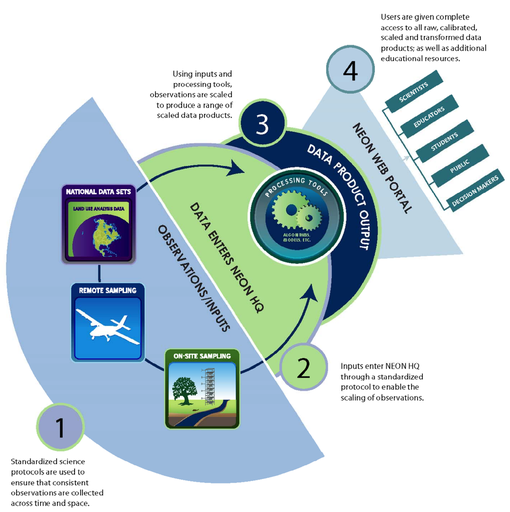
National Ecological Observatory Network

National Priorities: Linking Science to Policy

Fleishman et al. (2011) presented a list of the top 40 high-priority, multidisciplinary research questions directed toward informing some of the most important current and future decisions about management of species, communities, and ecological processes in the United States. The authors were motivated by the need to enhance the availability of policy-relevant scientific information. They reasoned that an informed assessment of the priorities would help scientists focus their limited resources on questions that maximize the utility of research to decision-making. The word cloud depicts a representation of those questions.

Generated by wordle.net, http://goo.gl/PG026 | BioScience 61(4):290-300. 2011, doi: http://dx.doi.org/10.1525/bio.2011.61.4.9

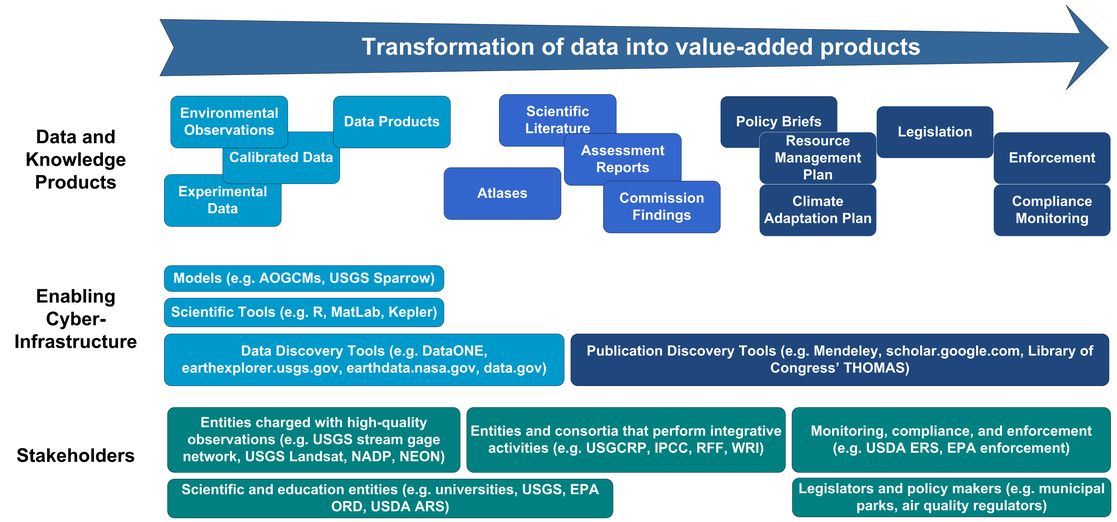
The U.S. National Ecological Observatory Network (NEON) was designed around a set of science questions derived from two National Research Council studies. Although not identical to those in Fleishman et al, there are thematic similarities. NEON is designed as a continental-scale platform for understanding and forecasting the impacts on ecology of climate change, land-use change, and invasive species. We anticipate NEON scientific data and information to be re-purposable for operational needs, including resource management and policy.



Transforming Data into Policy

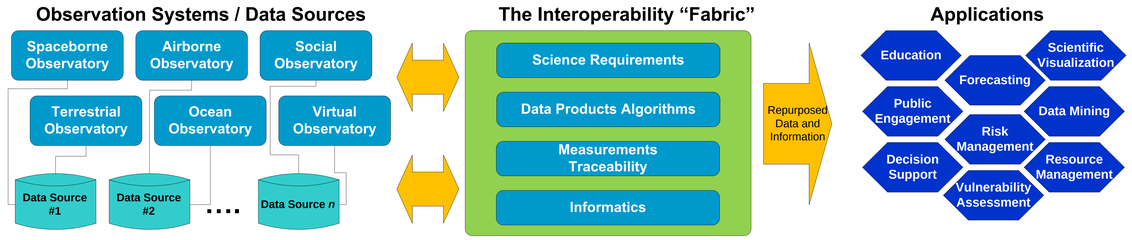
The process of transforming measurements into calibrated data and further into information for science, education and policy can be depicted as a value-chain, where each subsequent step of processing adds complexity to the resultant product.

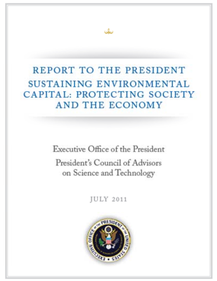
Traceability of this process affords transparency and accountability. Informatics is a key enabler of this traceability. Traceability is key to the US Global Change Research Program's National Climate Assessment (USGCRP NCA).



The "interoperability fabric" enables this value-chain by establishing well documented and traceable requirements, well documented and fully transparent algorithms for models and data products, measurements calibrated using traceable global standards, and informatics.

NEON provides a national baseline for critical environmental data. There are several classes of questions that our Federal partners are tasked with answering that would benefit from capitalizing on that national baseline. Interoperability between observation systems nevertheless remains a challenge.




REPORT TO THE PRESIDENT
SUSTAINING ENVIRONMENTAL CAPITAL: PROTECTING SOCIETY AND THE ECONOMY

Executive Office of the President
President's Council of Advisors on Science and Technology

JULY 2011

The 2011 White House report "*Sustaining Environmental Capital: Protecting Society and the Economy*" argues that informatics is key to integrating the nation's environmental observation infrastructure. It calls for the creation of an informatics entity called EcoINFORMA as a means to integrate the socio-economic data with biological, geophysical, and Earth observation data.

The authors further recommend that the data and information architecture developed out of this effort should be made available to international networks to assist in the development of a global system of social markers of ecological change for use in ecosystem modeling.

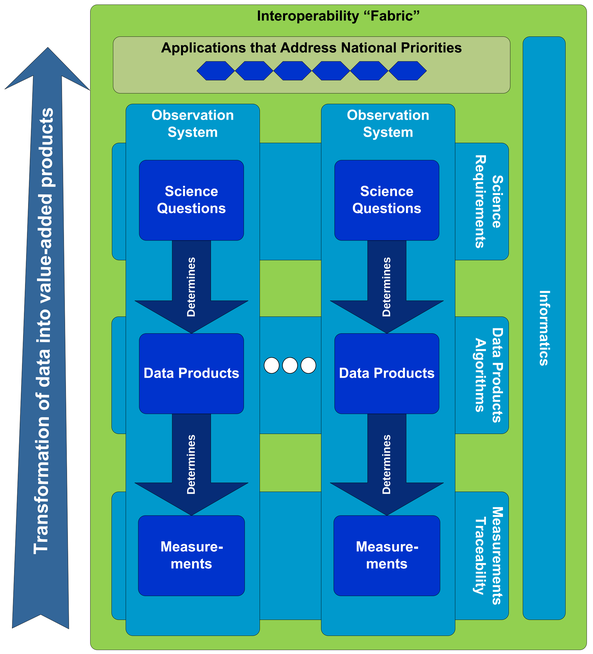
EcoINFORMA Informatics Capabilities

- Data use in decision-support tools
- Data Integration and Interoperability
- Data Access and Preservation

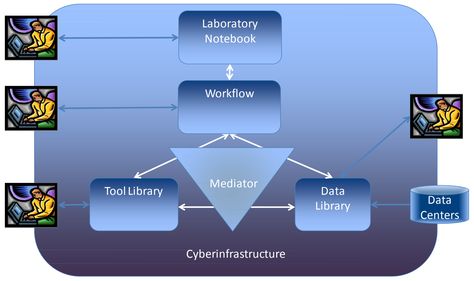
Integrated Conceptual Framework

The illustration below unifies the concepts expressed on the previous panels into a representation of how interoperability, especially the informatics component, is essential to enabling science informed environmental policy.

The White House is a supporter of the related area "Science of Science Policy" (SoSP). SoSP is an emerging field of interdisciplinary research, the goal of which is to provide a scientifically rigorous, quantitative basis from which policy makers and researchers can assess the impacts of the Nation's scientific and engineering enterprise, improve their understanding of its dynamics, and assess the likely outcomes.
(Source: www.scienceofsciencepolicy.net)



Many of the concepts herein are encapsulated in an Earth Science Collaboratory (ESC) framework proposed by members of the Federation of Earth Science Information Partners (ESIP). ESIP members, led by individuals from NASA's Goddard Space Flight Center are evolving the ESC framework into a reference architecture for community use.



Credit: Chris Lynnes, NASA GSFC

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