



UNITED STATES DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND  
ATMOSPHERIC ADMINISTRATION



# Assessing the Economic & Social Benefits of NOAA Data

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NAS/OECD Conference  
Paris  
February 2008



# Outline

- Background: NOAA as a major producer & user of Publically Supplied Data (PSI)
- US Policy toward Access & Reuse of PSI—the Economic Rationale
- Measuring Benefits of PSI—Challenges and Methods
- Examples of Economic Benefits of NOAA's PSI generated products and services



# NOAA: An Operational Science and Management Agency

**NOAA's Mission:** " To understand and predict changes in Earth's environment and conserve/manage coastal and marine resources to meet the Nation's economic, social, & environmental needs."

Operating units include:

- National Weather Service—forecasts/observational infrastructure, severe weather watches/warnings; hydrological services
- National Environmental Satellite & Data Service—Met satellites and atmospheric data center
- National Ocean Service—hydrographic/geodesy/maritime services; coastal mgmt. information
- National Marine Fisheries Service—management of commercial fisheries and protected marine species
- Ocean & Atmospheric Research---Applied research supporting mission and operational requirements



# NOAA as a Producer and User of Digital Networks

- Earth observational data is intrinsic to NOAA's mission and virtually every activity—from foundational research, to operational forecasting and warnings, to regulatory decisions.
- NOAA operates over 90 operational and research observing systems, and 100 real and near real time information systems
- These systems inform decisions throughout the economy—satellite, buoy, ship & aircraft obs; weather forecast, tide & currents; climate predictions; spatial/temporal references like nautical charts and GPS augmentations; marine populations



# NOAA Observation Systems





# Information Management Systems, Alphabetically

- Accumulative Landings System
- Advanced Weather Interactive Processing System
- Alabama Trip Ticket
- Alaska Fisheries Information Systems Network
- All Hazards Warning Collection System
- Atlantic Ocean Marine Mammal Survey
- Atmospheric Integrated Research Monitoring Network
- Bioprofiles by NMFS/SEFSC Panama City
- Caribbean IMS
- Centralized Automated Data Acquisition System
- Cetacean Survey of Gulf of Mexico
- Climate Data Online
- Coastal Change Analysis Program
- Coastal Ecosystem Data Access and Delivery Services
- Comprehensive Large Array Stewardship System
- Continuous Operational Real-Time Monitoring System
- Cooperative Gulf of Mexico Shark Pupping and Nursery Project
- Cooperative Tagging System
- Coral Reef Information System

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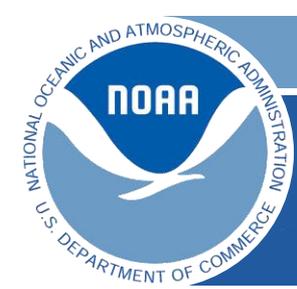
# US Policy Toward Access and Reuse of PSI

- OMB Circular A-130: “The open and efficient exchange of scientific and technical government information, subject to applicable national security controls and proprietary rights of others, fosters excellence in scientific research and effective use of funds.
  - Set user charges for information products at a level sufficient to recover costs of dissemination but no higher; exclude costs associated with original collection and processing of information “



## Economic Rationale for Open and Free Access to NOAA PSI

- NOAA Information Systems have high “Public Goods” characteristics
- Difficult to exclude users, making it difficult for private sector to recoup capital costs and therefore supply the service
- Once produced, data can be provided to additional users at zero marginal cost; to charge would be economically inefficient
- NOAA therefore provides capital infrastructure (satellites, observing stations, distribution systems, etc.)
- Policy is for private “value added” industries to provide forecasts and information tailored for their customers, as appropriate



# Economic Rationale (continued)

## Caveats to Public Goods argument:

- First, public goods theory provides a rationale for publically supplied information, but it doesn't tell us **how much** to produce
- Hence, cost-benefit analysis is needed to decide how much to produce by **comparing net benefits** among data/observing systems and other public goods
- Second, recent advances in the technology and economics of observing systems require close, often case-by-case examination of whether the public goods argument is sound and justifies government funding



# Measuring Benefits of NOAA Data

- Raw data in and of itself does not provide value
- Value is acquired as an **input** to a production process that produces information with economic value
- Economic benefits are derived from the resulting information products and services that result in improve economic decisions
- The value of the data itself is embedded in the value of the final information product or service



# Measuring the Value of NOAA Data (continued)

NOAA data and products and services are used in both the private sector and public sector:

- Leads to private sector productivity gains and creation of new products, services, and business lines, e.g. efficiency gains from enhanced geodesy and GPS; spawning of value added weather industry
- Helps meet NOAA's mission/legislative mandates; protection of life and property, management of coastal/marine resources, improve economic performance in private sector, e.g. maritime commerce, energy, transportation



# Benefits from NOAA Data

- Information products inform economic decisions
- Decisions affect economic outcomes

**Observations data**

**Models**

**Products**

**Dissemination**

**Decisions**



## Methods of Measuring Economic Benefits—Value of Information

- NOAA has made a number of quantitative estimates of the value of its information products and services using the “Value of Information” (VOI) methodology
- Essentially, VOI says information products and services have value if they affect someone’s (firms, individuals, government entities) decisions and change consequences.
- Value of the information is the increase in expected benefits (or reduction in costs) when the information is available **and used**, versus when it is not available.



## Estimating Benefits (continued)

- Much of NOAA's information is operational in nature (including research)
- Covers the full range of weather information together with ocean conditions and forecast information
- Uses range from preparing for severe storms to business decisions, e.g. how much electricity to produce for tomorrow's a/c,
- to routine individual decisions e.g. planning for weekend events



## Estimating Benefits (continued)

- There are several ways to estimate the Value of Information of products & services
- Modeling decisions, with and without information, and of the expected consequences of these decisions.
- Asking people for self-assessments -- i.e., surveys to obtain value estimates.
- Data from actual events -- i.e., observed effects of, for example, weather phenomena with and without forecasts or warnings.



## Estimating Benefits (continued)

- Note that benefit estimates of information products and services are not the same as estimates of benefits of publically supplied data
- Data is crucial, but not the only, input into creating the value of the product
- However, benefit estimates provide a first order estimate of the value of the data and help prioritize investments in observing systems and information policy



## Benefits of NOAA Information: Examples

- Economic benefits of new investments in US coastal ocean observing systems from improved coastal marine information is estimated at over \$700 million annually
- Benefits of real-time oceanographic data (PORTS) in the Houston/Galveston Bay port is \$15 million annually
- Benefits to world ship routing from NOAA polar satellite data is estimated at \$95 million annually
- Installation of NWS Doppler radars reduced tornado fatalities & injuries by 40% from the levels in late 80's and early 90's



# Benefits of NOAA Information (continued)

- Average value of all US daily weather forecast information is around \$109 per household; \$11.4 in total
- NOAA real-time data supplies a burgeoning private weather service industry with well over \$700 million in value added annually
- US's \$8-10 billion and growing annual Weather Derivatives financial industry relies on NOAA's seasonal weather data and records
- NOAA's forecasts and warnings and associated emergency responses result in \$3 billion in a typical hurricane season
- US electricity generators save \$166 million annually using 24-hr temperature forecasts



# Summary

- NOAA is a major US producer and user of operational public information used throughout the economy
- US policy of open and free access to information has boosted economic efficiency and spawned new business lines and industries
- NOAA uses economic analysis to judge the benefits and costs of new and improved data and observing systems and respective government/private roles.



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Thank You.  
Questions?

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