NWS Enterprise Analysis and Engagement

NWS Partners Meeting
January 26, 2017

NWS Office of Organizational Excellence

NWS Evolve Strategy

NWS Vision:

Weather-Ready Nation: Society is prepared for and responds to extreme weather, water, climate events

The vision is realized through the NWS mission: **Provide forecasts and warnings for the protection of life and property and to enhance the national economy**

To realize the full value of our mission and to Evolve the NWS, NWS will:

Deepen our service to core partners: Testing and implementing the Operations and Workforce Analysis (OWA) recommendations through the NWS Program Management Office (PMO)

Enhance our science and technology capabilities: Advance NWS infrastructure, science, and technology to the "cutting edge" (e.g., next generation modeling and data assimilation systems)

Engage strategically with and grow the broader enterprise: NWS fosters partnerships at all levels, proactively harnesses external advances that benefit the mission, and enables the enterprise to grow

The National Weather Service has a dual mission to provide data, forecasts, and warnings for the protection of life and property and the enhancement of the national economy

National Weather Service's mission statement

"Provide weather, water, and climate data, forecasts and warnings for the protection of life and property and enhancement of the national economy."

NWS is a small government agency with a $1.1B[1] budget serving a critical

…saving lives…

NWS is a **cornerstone of the emergency management community**

- 5,000 employees
- 122 weather forecast offices
- 13 river forecast centers
- 9 national centers

…enabling a thriving weather industry…

$7B **growing weather industry supported by the NWS**

~350 **companies depend on the NWS to some extent[2]**

*"The NWS's key role has been to serve as **the foundation for the tremendous growth** that the enterprise has experienced and will continue to experience."*

*"The weather enterprise is a unique group. **Almost none of us could exist without the NWS and NOAA.**"*

…that unlocks economic value

$32B **total value US households place on the weather information they receive[3]**

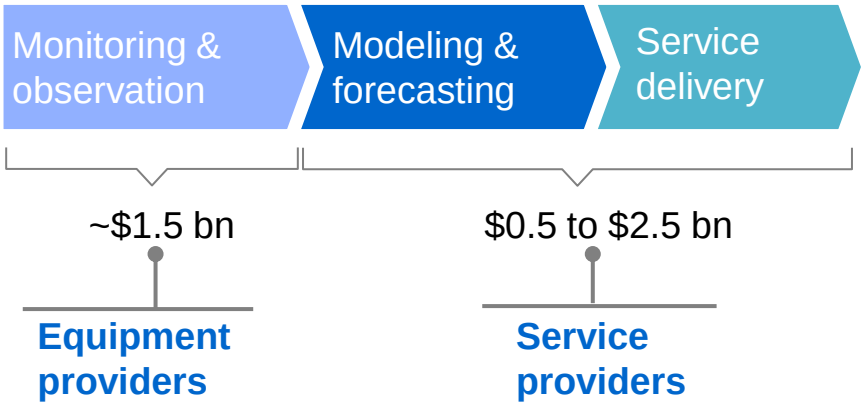
$13B **estimated potential value of weather data to US industry[4]**

*"The NWS is an **enabler of economic development**."*

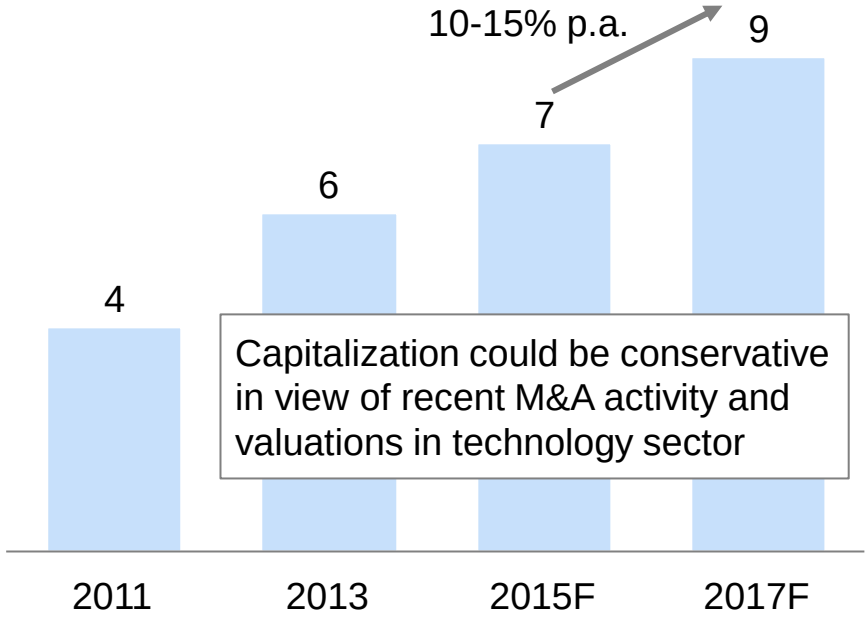
1 NWS 2016 budget only (e.g., excludes NESDIS); 2 Wharton 2013 report "Today's Forecast for the Weather Business" 3 Lazo et al. (2008) "300 Billion Served – Sources, Perceptions, Uses, and Values of Weather Forecasts" 4 Estimated from US variability of US GDP to weather and value of weather data to select industries – see appendix for details

The U.S. weather industry is estimated today at over $7 billion in market value and revenues of $2 to $4 billion

Private weather industry revenues (2012)[1], $B



Private weather industry market capitalization projection[2], $B



- In FY2012, NWS's budget was $998 million – comparable to or less than weather service revenue[3]
- With ~5,000 employees, the NWS is a significantly large player in the weather enterprise

Note: Estimates of the commercial weather industry vary greatly and are hard to find, as most companies are private

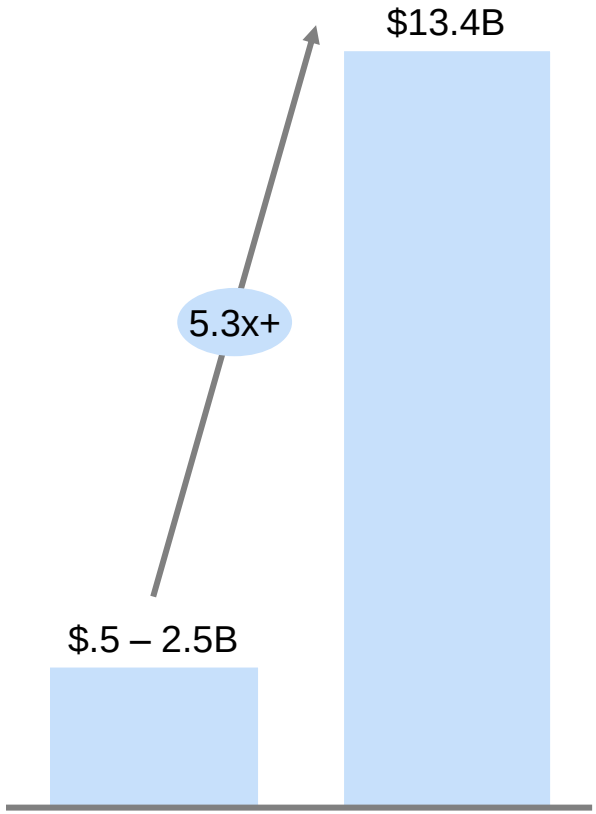
1 AMS estimates; other industry reports estimate global forecasting systems revenues at $1.5bn in 2015 and global forecasting services revenues at $1.1bn in 2016, and US forecasting services at $550m (Market and Market; IBIS Watch)

2 Assumes 10% growth per year as forecasted (F) by UCAR. Estimation is needed given almost all companies in the weather enterprise are private and do not disclose financials

3 Related budgets from NOAA in 2012 included $2B from NESDIS and $449M from OAR, more comparable to the equipment providers part of the value chain. (In order to prevent double counting of private sector providers who sell to NOAA, comparison is not made of full private value chain vs all NOAA weather)

SOURCE: MarketWatch, Princeton, University Corporation for Atmospheric Research (UCAR), Wharton School of Business – Univ. of PA, "Today's Forecast for the Weather Business: Increased Revenues and a Focus on Innovation"; IBIS 2014 Report; AMS "State of the Weather and Climate Enterprise 2012", company interviews

The current value of weather data across industries indicates a significant potential for growth in the demand for weather services



Key growth drivers

New industries are finding value in weather data for daily decision making

"There's a huge opportunity to incorporate weather in manufacturing supply chain logistics... These companies have really never thought about weather before"

– Meteorologist at weather risk mgmt. co

Increased weather volatility is driving use of weather and climate data for long-term decisions

"Insurance companies have started realizing that you can't set a premium based on past weather – it's just not a good enough predictor now"

– Insurance industry adviser

Companies are making more use of data and analytics in all aspects of business

"We're increasingly using all kinds of data to make decisions…weather will be another data source that helps us increase efficiency and safety"

– Former railroad co. GM

1 AMS estimates; other industry reports estimate global forecasting systems revenues at $1.5bn in 2015 and global forecasting services revenues at $1.1bn in 2016, and US forecasting services at $550m (Market and Market; IBIS Watch) 2 Weather-related GDP variability is estimated at $1,344B, using AMS (2012) "US Economic sensitivity to weather variability" and US 2011-2014 GDP values. On average, 1% of this variability translates into value able to be captured today given estimates for value of weather data to agriculture and utility sectors from NOAA (2011). 1% of 1,344B = 13.4B

Companies suggested ways NWS could enable the enterprise and

Weather, Water, and Climate Industry views

Enabler of the enterprise

"The weather enterprise is a unique group. Almost none of us could exist without the NWS and NOAA"

"The NWS is an enabler of economic development"

"*The private sector needs to do a better job broadcasting the importance of the NWS"*

"Figure out what is valuable but not covered by the market – climate data, for example – and invest in that"

Market shaper

"The NWS is an important shaper of the market…Think more about how to leverage that role to accelerate innovation…. Be ready to make long-term commitments, or at minimum, signal future needs"

"We would like to see the government drive cutting-edge observation research and innovation"

SOURCE: External interviews, quotes have been edited for clarity

Weather, Water, and Climate Industry views

Provider of warnings and services to EMs

"Public safety is a primary role for the NWS"

"The NWS should focus on generating the best possible warnings"

"Our customers ask for custom alerts or thresholds for different locations"

"If NWS owns the EM segment, the private sector won't invest in public safety"

Potential partner with the private industry?

"*There needs to be a formal process to evaluate private sector capabilities in a systematic way*"

"*Our precise rainfall information… could help with flood monitoring*"

"*There is an immediate opportunity for us to work together to optimize the Geostationary Lightning Mapper… combining our ground-based data with your satellite data*"

SOURCE: External interviews, quotes have been edited for clarity

Insights from NWS leaders and external stakeholders show the potential for future engagement

- **Open collaboration with the weather, water, and climate industry and academia will be increasingly crucial** to the success of NWS's mission and the enterprise going forward:
  - **The private industry and academia are driving major advances** throughout the weather value chain and developing significant new capabilities
  - **These innovations offer potential benefits** for the NWS mission of protecting life and property
  - **The growth of external capabilities poses new questions,** such as equity in access to advances, confusion from conflicting warnings

- **The NWS should proactively consider where its role might change and how to maintain its capabilities**
  - **The role of the NWS is likely to shift as the enterprise grows** – NWS can adopt new ways to uphold its responsibility to protect the public interest and perform valuable activities that the market cannot
  - **NOAA and the NWS have served, and should continue to serve, a critical foundational role** that enables the enterprise to innovate and unlock the economic value of weather information

- Harness external advances that benefit the mission
- Maintain core capabilities needed to uphold responsibility for public safety
- Continue to serve as the enabler of the enterprise

SOURCE: NWS interviews, NWS workshops

Next Steps

- Continue dialogue with the enterprise and incorporate external insights into NWS strategy and operations
- Take advantage of advances in the enterprise throughout the value chain
- Emphasize how the Evolve strategy will enhance NWS's contribution to the national economy and public safety
- Apply insights from work to other line offices and gain support for actions that affect broader NOAA

Open Questions

- Reactions to the analysis presented? Missing or mischaracterized information?
- How do you see NWS role changing in a growing and evolving enterprise?
- Should the private or academic sectors consider any role changes themselves? (i.e. innovation)
- What other ideas do you have on how the NWS can enable the enterprise? Does those ideas differ from today?

Appendix

NWS Enterprise Analysis Summary

- The National Weather Service and NOAA provide the foundation for a thriving, growing weather industry
- We recognize that the private sector is building on this foundation to innovate and drive advances in weather prediction and decisions
- We are excited about the opportunities this creates for our dual mission of ensuring public safety and enhancing the economy
- As the custodians of public safety, we will ensure that these innovations benefit the public and our core partners in emergency management:
  - by harnessing and adopting innovations to deepen our impact-based decision support services (IDSS) and ensure we remain at the cutting edge of science
  - by ensuring that vulnerable communities have access to the best of the enterprise
  - by identifying areas where the private sector can complement our public safety role
- Additionally, in our role of enhancing the economy, we are committed to growing the enterprise and will look for opportunities to partner with the private sector and academia to accelerate innovation:
  - by driving scientific research in valuable new frontiers
  - by facilitating enterprise collaboration around community modeling
  - by continuing to fill gaps in environmental observation, modeling and other areas important to the market
- As the enterprise evolves, we will also continue to evolve to ensure best protection of public safety, enhancement of the economy, and advancement of science
- The NWS and its partners within NOAA will lead the way for the public sector, the weather, water and climate industry and academia to work hand in hand to ensure a Weather-Ready Nation now and in the future, and continue to unlock the economic value of weather