NOAA Research and Development Plan

NOAA Science Advisory Board

February 27, 2019

Eric Bayler,
Vice Chair, NOAA Research and Development Enterprise Committee
NOAA R&D Plan

- The NOAA Research and Development Plan is a cross Line Office initiative that will set the foci for R&D at NOAA for the coming years.

  - Identified drivers for the plan
    - Legislative mandates and authorities
    - Department of Commerce Strategic Plan (2018-2022)
    - NOAA priorities

  - Collected internal and external input
    - Public comment period - December 8 - February 8
    - AGU Town Hall
      - Planned AMS Town Hall precluded due to federal shutdown
    - Input from NOAA Councils
NOAA R&D Plan Public Comments

- Public comment period ended February 8
  - Government shutdown likely impacted the number of comments received

- Solicited comments via the Federal Register Notice, town hall presentation, meetings with NOAA councils, social media posts, and internal and constituents emails
  - 67 comments received
    - 41 internal, 23 external, and 3 unknown affiliations
NOAA R&D Plan Framework

- **Vision Area 1:** Reduced Societal Impacts from Severe Weather and Other Environmental Phenomena

- **Vision Area 2:** Sustainable Use of Ocean and Coastal Resources

- **Vision Area 3:** A Robust and Effective Research, Development, and Transition Enterprise

- Comments grouped and addressed by vision area
Summary of Public Comments

- **Vision Area 1: Reduced Societal Impacts from Severe Weather and Other Environmental Phenomena**
  - Support atmospheric chemistry research
    - Utilize recommendations in the NAS report “The Future of Atmospheric Chemistry Research”
  - Connect weather patterns, air chemistry, and air quality predictions
  - Determine cost to value of high performance computing
  - Use deep learning methods in ocean observation and forecasting
  - Determine ways to maximize the value of warning and dissemination systems for tornadoes and other weather hazards
  - Establish a national capability for high precision monitoring of greenhouse gases using commercial aircrafts
  - Use Artificial Intelligence to improve climate change impact quantifications, weather and climate models, and extreme weather event forecasts
  - Prioritize subseasonal-to-seasonal (S2S) predictions and water predictions
Summary of Public Comments Cont.

● Vision Area 2: *Sustainable Use of Ocean and Coastal Resources*
  ○ Explore the Northeast Canyons
  ○ Include 'omics/genomics, eDNA, and unmanned systems as major topics
  ○ Formalize partnerships with marine-focused ichthyological research collections to support the research and archive of fish specimens and training of students
  ○ Research in estuarine and coastal regions must address multi-dimensional, multi-variable questions and interactions among variables at different scales
  ○ Integrate new and evolving capabilities associated with eDNA and ocean sound (measuring changes in ocean soundscapes over time)

  ○ Enhance aquaculture
    ■ Develop novel technologies for offshore aquaculture in U.S. waters
    ■ Use machine learning, flexible fabric, and nano sensors for ocean, fisheries, and aquaculture monitoring systems
    ■ Invest in aquaculture research to reduce losses from disease, predation, ocean acidification, harmful algal blooms, and market crashes
Summary of Public Comments Cont.

• **Vision Area 3: A Robust and Effective Research, Development, and Transition Enterprise**
  - Engineering components need to be met for transitions
  - Utilize technology and data from outside sources at the research level if not ready for the operation level
  - Better integrate datasets across NOAA and share with stakeholders, invest in data architecture for emerging technologies (such as AI), create communities of practice for data innovations and techniques
  - Include AI, machine learning, Big Data, and cloud computing as major topics
  - Employ physics-based data inference, fuse diverse sources of data
  - Develop new computational methodologies for NOAA models that are forward looking and involve interdisciplinary teams
  - Support for a biogeochemical Argo array
  - Strengthen atmospheric composition R&D with connections to JPSS and GOES satellite data
Summary of Public Comments Cont.

● Other

○ Bring in more data scientists and social scientists and provide greater job security through federal positions. Train existing workforce to adopt new technologies

○ Share data and expertise. Specific mentions of industry, private-public partnerships, the academic community, and support for NOAA laboratories

○ Seek stronger connections with the emergency management community on the research, development, and strategic use of unmanned aircraft systems (UAS)

○ Create strategy for sustainable funding of long-term records

○ Fund NOAA long-range research projects and encourage innovation

○ Suggestions to change vision areas
  ■ Include a new vision area regarding societal responses and have the third vision area listed outside the new vision areas
  ■ Include human activities in the first vision statement
  ■ Change first vision area to “Reduced societal impacts from severe atmospheric-oceanic events and other environmental phenomena”
  ■ Change third vision area to “An innovative and effective research, development, and transition enterprise”
Request: Review Outline

- Seeking NOAA SAB consensus feedback at April 23-24 meeting addressing:
  - R&D Plan Outline
  - Comments on framework gaps and areas needing emphasis/de-emphasis
  - Recommended NOAA R&D priorities
Timeline:

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