



Science Advisory Board

# Update on Priorities for Weather Research (PWR) Study and Report

20 July 2021

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# An Urgent Directive from Congress:

*Report on Weather Research Priorities* - In lieu of House language on a Weather Decadal, the agreement directs [NOAA's Science Advisory Board](#) to [publish a report](#), not later than [one year](#) after enactment of this Act, that provides policymakers with the relevant information necessary to [prioritize investments](#) in weather forecasting, modeling, data assimilation, and supercomputing over the next ten years; and that [evaluates future potential Federal investments](#) in science, satellites, radars, and other observation technologies, to include surface and boundary layer observations so that all domestic users of weather information can receive data in the most efficient and effective manner possible.

- From the FY21 Omnibus (Dec 2020) Appropriations Act





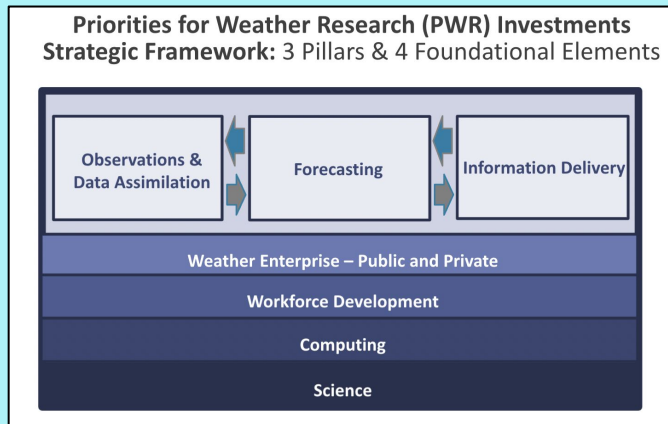
## With Broad Scope:

***Report on Weather Research Priorities*** - In lieu of House language on a Weather Decadal, the agreement directs NOAA's Science Advisory Board to publish a report, not later than one year after enactment of this Act, that provides policymakers with the relevant information necessary to prioritize investments in weather forecasting, modeling, data assimilation, and supercomputing over the next ten years; and that evaluates future potential Federal investments in science, satellites, radars, and other observation technologies, to include surface and boundary layer observations so that all domestic users of weather information can receive data in the most efficient and effective manner possible.

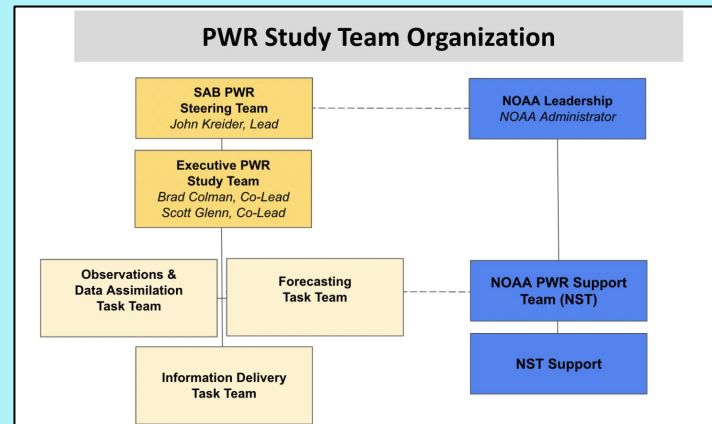
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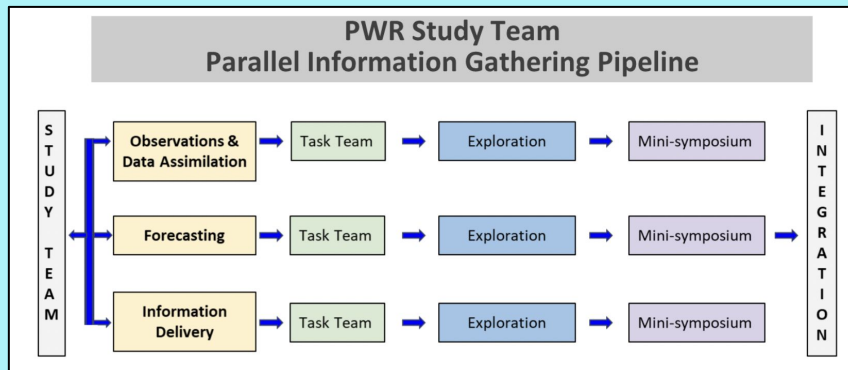
# SAB Approved (15 March) Charge, Organization & Approach



Charge

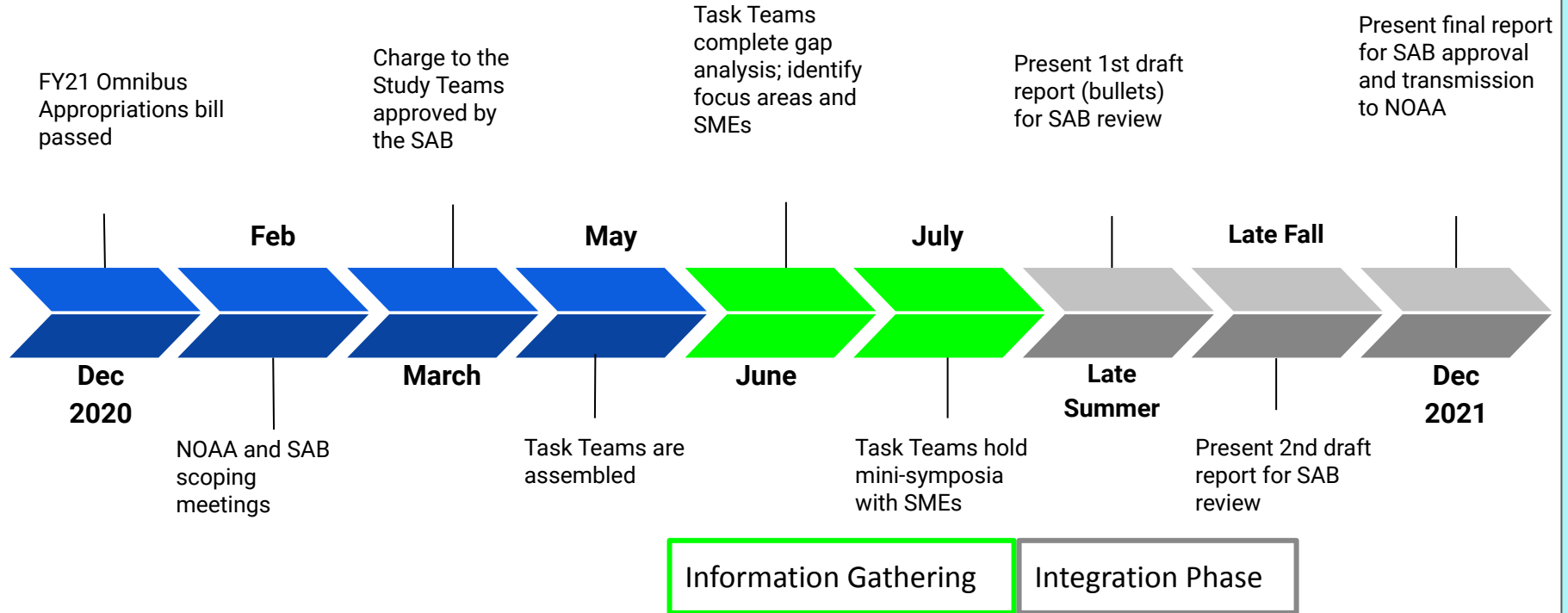


Organization



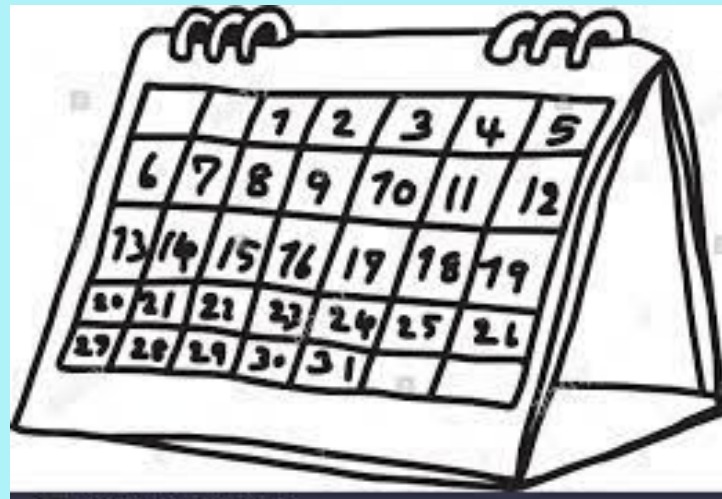
Approach

# PWR Timeline



# Milestones to date

- Built our teams (more on these next)
  - Exec Study Team
  - NOAA Support Team
  - Task Teams
  - Cross Cut Team
  - SAB Management
- NOAA Support Team (NST)
  - Built a NOAA information repository (~ 100 documents)
  - Provided 7 NOAA SME briefings (several more being arranged)
- Task Teams (TTs) organized and executed three mini-symposia; combined:
  - 21 hours of presentations and discussion over 4 days
  - 70 different presenters
  - Participants:
    - Information Delivery - 68
    - Forecasting - 84
    - Obs/DA - 63



NOW → Gathering and defining our first set of priorities

# Impressive Teams and Participants

PWR Study Team <i>(SAB Steering Team, Executive Study Team, Task Teams, Cross-cut Team)</i>	40
AA's on Scoping Team	3
NOAA Support Team	12
External SMEs	51
NOAA SMEs	26
Support Staff	4
<b>TOTAL People</b>	<b>136</b>

Teams	Female	Aca.	Ind.	Gov.
Steering Team	33%	33%	33%	33%
Exec Core Study Team	14%	43%	28.5%	28.5%
Exec PWR Study Team	31%	54%	23%	23%
Task Teams	34%	48%	21%	31%
External SMEs	31%	39%	31%	29%
<b>Combined</b>	<b>31%</b>	<b>42%</b>	<b>28%</b>	<b>30%</b>

# Mini-Symposia Topics

## Information Delivery:

- Engaging and meeting the needs of vulnerable and highly (weather) impacted communities
- Crisis informatics and crisis response research
- Localized communication of geospatial weather information (maps)
- Probabilistic weather information and communication of uncertainty
- Enterprise integration
- Workforce development for NOAA's weather information delivery research needs
- Cloud services
- Data representation and data infrastructure layer
- Aviation weather research for NOAA's weather information delivery research needs
- Data access and visualization software issues with NWS
- Integrating across priorities for weather information delivery research

## Forecasting:

- Earth System Modeling
- Global NWP/CFS
- Reanalysis/Reforecast
- Hydrology, Water Cycle, Water Quality
- Air Quality/Fire Weather
- High Impact Weather (hurricanes, winter weather, WoF)
- Coastal Modeling
- Cross-cuts (AI/ML, Post Processing, HPC)

## Observations & Data Assimilation:

- Under-utilized ground based remote sensing data
- Coupled Earth system data assimilation
- Regional and global reanalysis
- Pacific atmospheric river observing system and DA
- Novel methodology & holistic infrastructure development for DA
- Cross Cut (Grants program, HPC for Data Assimilation)
- Under-utilized satellite data
- Ocean ML observation and coupled DA for hurricanes and S2S
- National BL Observing system and DA for weather and S2S
- Cube Sats observation and data assimilation
- Cross Cut (Weather Enterprise Integration, Partnership with academia)
- Next generation diverse radar observation system and DA

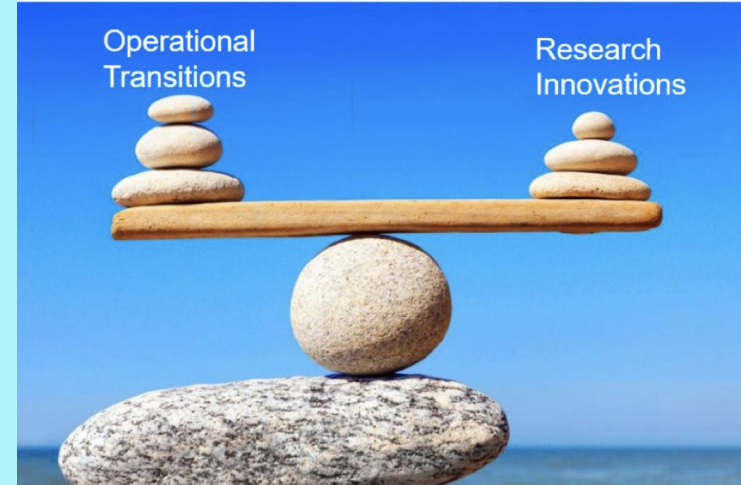
>30 Dedicated Sessions over 4 Days



# Setting priorities - seeking a balanced portfolio

## High prioritization

- All should have high reward and benefit (gap filling, core, or innovation)
- Strong linkage to NOAA - identified REQUIREMENTS & aligned with Mission Service Areas (MSAs)
- High relevance to NOAA - “in their wheelhouse”
- Reflects a favorable balance between probability of success and reward
- Clearly advantageous to achieving NOAA’s weather mission
- Favorable context with respect to Enterprise and changing external world



# Report Outline

- Omnibus Act language - the request from Congress (*1 page*)
- Executive Summary (*2 pages*)
- Introductory Sections (*3 pages*)
  - Context, Scope, Strategic Framework (3 Pillars + 4 Cross-cuts)
- **External Context** and Overarching Themes (*5 pages*)
- Priorities:
  - **Narratives that capture value and impact (interleaved)**
  - Pillar 1: Observations and Data Assimilation (*7 pages*)
  - Pillar 2: Forecasting (*7 pages*)
  - Pillar 3: Information Delivery (*7 pages*)
- Foundational Element Cross-cut Priorities (*5 pages*)
  - Science, Computing, Workforce, Weather Enterprise, JEDI
- Immediate Priorities & Common Challenges (*2 pages*)
- Concluding Remarks (*1 page*)
- Appendices
  - Approach, NOAA Document Repository, ...

***Total:  
~40 Pages +  
Appendices***

# Rapidly Changing External World

- **Evolving End-User Needs**
- **Evolving Societal Vulnerabilities**
- **Justice, Equity, Diversity & Inclusion**
- **Global Community**
- **Perception, Governance, Budget, ...**

Executive Study Team  
identifying relevance,  
trends, risk, opportunities  
over the next decade





## **An example narrative - Water cycle extremes and their cascading impacts**

- Links to NOAA's MSA's and Precipitation Grand Challenge
- Includes aspects from all three pillars - we will weave in various priorities as we tell the story
- Impact and value are clear and compelling
- Communicating through storylines will be effective with the targeted audience and elevate the report's impact



# Our PWR Teams' Next Steps and Timeline

- **Cross Cut Topics:** Team is preparing for the 4 August Deep Dive on these topics; deliverable is a breakdown of two sets:
  - Priorities that we want to include but integrate better in one of the TT sections
  - Priorities that fit better in a separate cross cut section
- **Priorities:** TTs will continue this work in preparation for final working sessions with Exec Core Study Team in mid-August
- **Extended Outline:** Core PWR Study Team will work with TT co-leads, and Bonnie Morehouse (technical writer support), to extend outline in preparation for delivery to the SAB in late August



# Potential Challenges and approaches

- **Maintaining the pace** - balanced by the overarching view that this report will be impactful
- **Cross-cuts spin up** - Cross-cut team consists of one designated cross-cut representative from each Task Team, one Task Team co-lead, both Exec Study Team co-leads, and one EISWG SME
- **Information gathering completion** - filling remaining gaps, refining requests for NST briefs, developing need for compact Q&A exchanges
- **Integration phase transition** - dedicated times set aside for the full Exec PWR Study Team throughout August for integration
- **Prioritization** - guidance on a balanced portfolio; but, compelling and passionate opinions abound!

# SAB Timeline and Participation

- Special SAB Meeting (25 August): SAB will be asked to provide feedback and guidance on extended report outline
- PWR Team will deliver first draft of report for SAB review by mid-October
- Review process with SAB continues for additional alignment
- SAB Meeting - TBD (after review process) - Final brief and report approval decision prior to submission to Congress

# Discussion