



# NOAA S2S Planning

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# Agenda



1. Brief synopsis of The Weather Research and Forecasting Act of 2017
2. Report to Congress
  - a. Timeline
  - b. Process
  - c. Document Outline
3. Some Preliminary Findings
  - a. Current Products
  - b. Continued Development
  - c. Requirements



# Weather Act of 2017

## Section 201



- Short Title - Weather Research and Forecasting Act of 2017
- TITLE II – Addresses “Sub-seasonal and Seasonal Forecast Innovation”
  - Section 201 “Improving Sub-seasonal and Seasonal Forecasts” is the only section in TITLE II
  - Section 201 Amends Food Security Act of 1985
- Scope: Defines and authorizes NOAA’s Sub-seasonal and Seasonal (S2S) forecast responsibilities. Defines:
  - Sub-seasonal - 2 weeks to 3 months
  - Seasonal – 3 months to 2 years
- Authorizes \$26M in each of the years 2017 and 2018 for the NWS to meet the provisions of the Act



## c. Functions

- The Undersecretary, Acting through the Director, National Weather Service shall:
  - Collect and utilize information to make usable, reliable, and timely foundational forecasts of sub seasonal and seasonal forecasts of temperature and precipitation
  - Leverage existing research and models from the weather enterprise to improve these forecasts
  - Determine and provide information on how the forecasted conditions may impact
    - Number and Severity of Drought, fires, tornadoes, hurricanes, ....
    - Snow pack
    - Sea Ice Conditions
  - Develop an Internet Clearing House to provide both forecasts and impact information on both a national and regional level



## e. Cooperation

- Section e.: The Undersecretary shall build upon existing forecasting and assessment programs and partnerships, including—
  - By designating research and monitoring activities related to sub-seasonal and seasonal forecasts at 1 or more Cooperative Institutes
  - By contributing to the ESPC
  - By consulting with Secretary of Defense and Secretary of Homeland Security to determine highest priority S2S needs to enhance national security
- Section g.: Each Federal Agency and Department shall cooperate with the Undersecretary in carrying out these this section as appropriate



# Report to Congress



Section h.: “Reports”, calls for...

- Not later than 18 months after date of enactment (18 Oct 2018), the Undersecretary shall submit to Congress (relevant House and Senate Committees) a report including:
  1. An analysis of how NOAA’s S2S forecasts are used for public planning and preparedness,
  2. NOAA’s goals, objectives, and plans for the continued improvement of an S2S forecasting capability, including products to meet the need described in 1., and
  3. An identification of the needed research, monitoring, observing and forecasting requirements to support continued evolution of NOAA’s S2S Forecasting capability number 2.
- The Undersecretary shall consult with relevant Federal, regional, State, tribal, local government agencies, research institutions, and the private sector in the development of this report.



# Process



- Cross NOAA Line-Office S2S Planning Panel
  - Co-chaired by Fred Toepfer & Dave Dewitt
  - Three subgroups working in parallel
    - Current S2S Products and Services
    - Goals, Objectives and Plans for Continued Development
    - Requirements
  - Writing team working on draft document in parallel



# Process, cont.

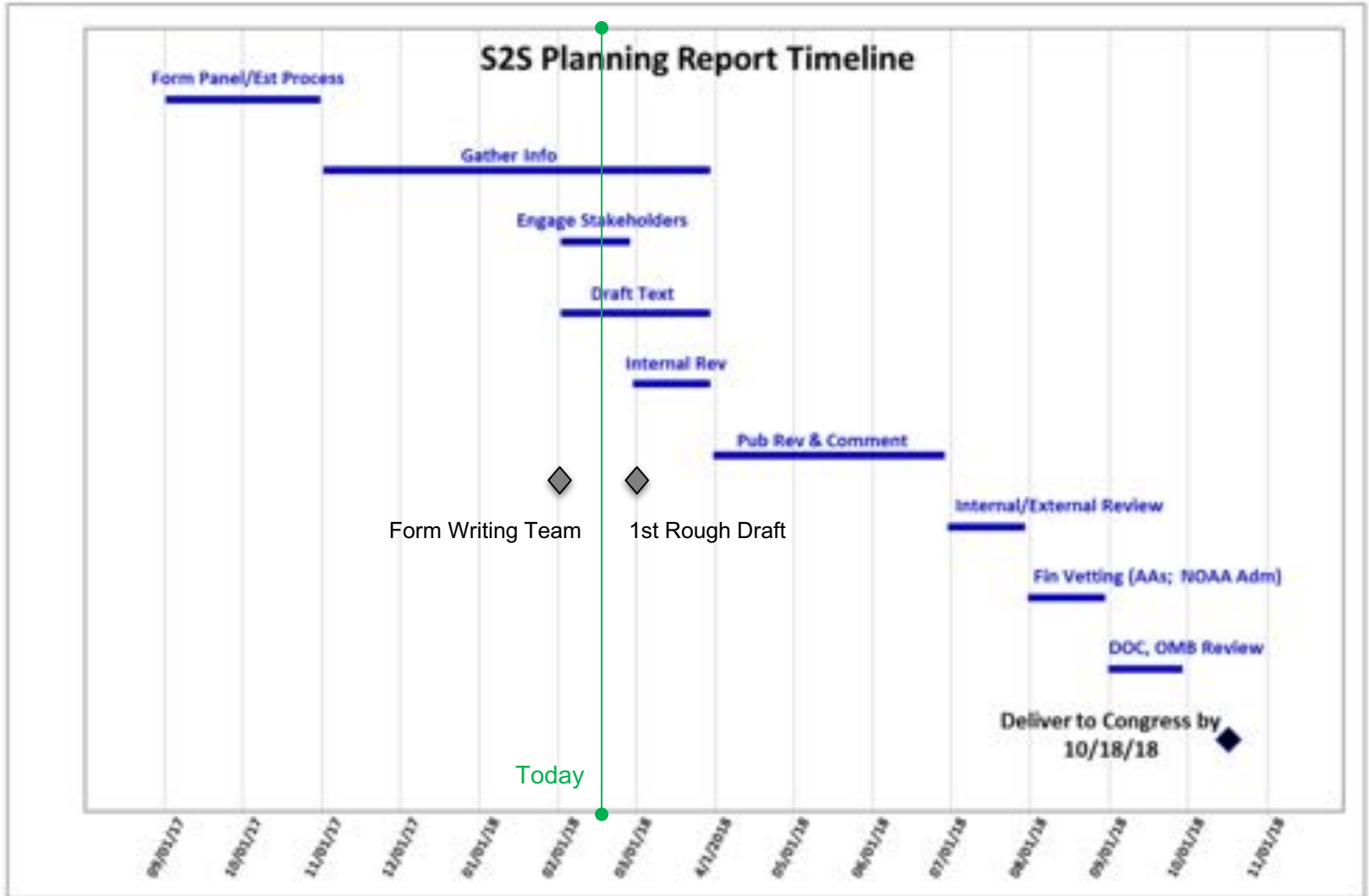


- Mechanisms
  - Outreach at AMS and AGU Conferences (Completed)
  - Surveys (ongoing)
  - Leveraging existing plans and documents (ongoing)
  - Canvassing stakeholders
  - Direct engagement with subject matter experts (ongoing)
  - ICMMSR Review – late spring
  - Federal Register Notice (Spring)
    - Review and comment of draft document





# Timeline





# Draft Report High Level Outline



1. Introduction
2. Current S2S Products and Services
  - 2.1 Current [Products](#) and Usage
  - 2.2 Severe Weather Impacts
  - 2.3 Usage in Planning
  - 2.4 Usage in Preparedness
  - 2.5 Dissemination, Communication, and Coordination
3. Goals and Plans for Continued Development
  - 3.1 S2S Capability Improvement Goals and Objectives
  - 3.2 Forecast System Development Plans
  - 3.3 Product Development Plan
  - 3.4 Improving Dissemination, Communication, and Coordination
4. Needs for Continued Development
  - 4.1 Forecast Requirements
  - 4.2 Monitoring Requirements
  - 4.3 Observing Requirements
  - 4.4 Research Requirements
5. Background and Consultation



# Current Products and Services



## Mission-driven:

- Climate Prediction Center (CPC) Subseasonal to Seasonal (S2S) Products for Public Planning and Preparedness
- A few examples below document how CPC products are used by core partners



# United States Department of Agriculture (USDA)



- **The Joint Agriculture Weather Facility (JAWF)**
  - Develop impact assessments of growing season weather conditions on crop and livestock production prospects
  - Develop crop-weather assessments for the World Agricultural Outlook Board (WOAB) World Agricultural Supply and Demand Estimates
- **The USDA Climate Hubs**
  - Develop and deliver science-based, region-specific information to agricultural and natural resource managers that enable informed decision making
- **The USDA Risk Management Agency (RMA)**
  - CPC observed precipitation data used as benchmark Rainfall Index (RI) and Pasture, Rangeland, Forage (PRF) insurance program to determine claim payments



# United States Agency for International Development (USAID)



- The Famine Early Warning System Network (FEWS Net)
  - uses CPC products to help decision makers plan for and respond to food insecurity over vulnerable regions
- The Disaster Risk Reduction Program of the Office of Foreign Disaster Assistance (OFDA)
  - uses CPC products to increase preparedness for response and recovery to weather-related disasters



# National Integrated Drought Information System (NIDIS)



CPC products used in development of drought early warning system products, including the Drought Monitor:

- Provides a simple, accurate way to communicate drought conditions to federal, state, and local government officials
- Is used by states to trigger drought response measures and by policy makers to allocate relief dollars



# Plans for Continued Development of S2S Forecast Capability



1. For improved S2S forecasts and products
2. For diagnosing and forecasting increased potential for droughts, fires, tornadoes, hurricanes, floods, heat waves, coastal inundation, winter storms, high impact weather, or other relevant natural disasters; snowpack evolution; and sea ice

NOAA is leveraging “in-house” efforts as well as existing research and models from across the weather enterprise



# Coupled Model Development



FY17				FY18				FY19				FY20				FY21				FY22	
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	
Bench mark testing GSM+MOM5+OCES																					
	Replace MOM5 with MOM6 & Couple to FV3																				
		Physics Testing of Coupled system (deterministic) FV3+MOM6+OCES																			
	Developing MOM6 DA capability																				
		Adding GOCART (Aerosol) and Aerosol DA in GSI																			
	Add WW3 (model + DA) to coupled system and improve ocean-wave physics																				
	Adding Sea Ice (OCES) DA capability																				
	Observation Processing of New data sets (additional atmospheric + Marine + land ) for coupled DA																				
		Testing with NOAA-MP + Land DA																			
		Testing of coupled system (FV3+MOM6+OCES+GOCART+WW3+NOAH-MP) with fully coupled DA																			
		Reanalysis & Reforecast Phase																			
		Evaluation + Validation + Transition to operations/implementation																			





# Goals and Objectives



Four major goals and objectives identified:

**1. Advance Prediction Skill, e.g.**

- Reduction in number of negative skill events
- Improved impact analyses

**2. Expand Information Content, e.g.**

- Better probabilistic/uncertainty info and risk communication
- New products for specific types of extreme weather events

**3. Expanded Service Capacity , e.g.**

- New/tailored products for existing and new customers: including support for National Security Needs

**4. Improved Scientific and Technical Capabilities , e.g.**

- Improved understanding, modeling, post-processing of physical processes
- Sources of predictability



# Needs for Continued Development



- Forecasting Requirements
- Observing Requirements
- Monitoring Requirements
- Research Requirements
  - e.g. Improved understanding, modeling, post-processing of physical processes
  - e.g. Sources of S2S predictability: blocking, global patterns (PNA, NAO, MJO, PDO, ENSO, IOD), Arctic sea ice, soil moisture, tropical convection, and stratosphere-troposphere exchange



# BACKUP SLIDES

Overview of the  
Weather Research and Forecasting Act of 2017



# Topics

## Section 201 Weather Act



- What it is
- What it Requires
- What we Need to do
- Where we Stand
- Issues



# Section 201, Weather Act

## What it is



- Short Title - Weather Research and Forecasting Act of 2017
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# Section 201: What it Does



- Section 201 amends Section 1762 (Weather and Climate Information in Agriculture) of the Food Security Act of 1985 (Public Law 98-198; 15 USC 313)
- Amends Subsection **a. Findings** and **b. Policy** and adds Subsections **c. Functions** through **i. Definitions**



## a. Findings

- Accurate and timely reporting of weather information can prevent damage to agricultural and silvicultural operations
- Maintenance of our current weather and climate analyses and information dissemination systems and Federal, state, and private efforts to improve these systems is critical to mitigate damage from atmospheric systems
- Agricultural and silvicultural weather services should be maintained
- Efforts should be made to expand use of weather and climate information



## b. Policy

- It is, therefore, the policy of Congress that it is in the public interest to maintain an active Federal involvement in providing and improving the use of weather and climate information, among users and private providers of this information.





## d. Communication

- The Director, National Weather Service, shall:
  - Provide the information (forecasts and impacts of forecasted conditions) to the public, including public and private entities engaged in planning and preparedness
  - “Public” includes National Weather Service Core Partners at the Federal, regional, State, Tribal and local levels of Government



## f. Forecast Communication Coordinators



- Undersecretary shall foster effective communication, understanding, and use of S2S forecasts by intended users in (d.) This may include assistance to state forecast communication coordinators.
- For each state that requests assistance, the Undersecretary may provide assistance to an individual in that state to enable local interpretation and planning
  - To serve as a liaison between NOAA and other Federal users, the weather enterprise, the state, and relevant interests in the state
  - Receive forecasts and impact information and disseminate such within the state to counties and tribal governments
  - Matching funds may be required
- Assistance is limited to \$100K per year per state



## g. Other Federal Partners



- Each Federal Agency and Department shall cooperate with the Undersecretary in carrying out these this section as appropriate



## h. Reports

- Not later than 18 months after date of enactment, the Undersecretary shall submit to Congress (relevant House and Senate Committees) a report including:
  1. An analysis of how NOAA's S2S forecasts are used for public planning and preparedness,
  2. NOAA plans for the continued improvement, including Goals and Objectives driving improvement, of an S2S forecasting capability, including products to meet the need described in 1., and
  3. An identification of the needed research, monitoring, observing and forecasting requirements for number 2.
- The Undersecretary shall consult with relevant Federal, regional, State, tribal, local government agencies, research institutions, and the private sector in the development of this report.



# i. Definitions

- **Foundational Forecast** – basic weather observation and forecast data, largely in raw form, before further processing is applied.
- **Core Partners** – Government and non-Governmental entities directly involved in the preparation of or dissemination of, or discussion involving hazardous weather or emergency information put out by the NWS
- **Sub-seasonal** – 2 weeks to 3 months
- **Seasonal** – 3 months to 2 years
- **State** – a state, territory, possession, commonwealth or DC
- **Undersecretary** – Undersecretary of Commerce for Oceans and Atmosphere
- **Weather Industry** and **Weather Enterprise** – interchangeable terms and includes individuals, and organizations from public, private and academic sectors, both providers and primary consumers of weather information



# What we need to Do



1. **Continue** current effort to provide sub-seasonal and seasonal foundational forecasts of temperature and precipitation
2. **Continue** current effort to develop sub-seasonal and seasonal foundational forecast capability for temperature and precipitation
3. **Continue** effort to improve sub-seasonal and seasonal modeling capability
4. **Establish** an organized effort to better define how forecasted conditions impact hazardous weather etc., snowpack, and sea-ice



# What we need to do (continued)



5. **Develop, Define, and Document** research requirements
6. **Define, Develop, and Implement** an Internet Clearing House
7. **Continue** to provide forecast S2S forecast and projected impact information to the public
8. **Designate** one or more Cooperative Institutes (CI) as S2S related CI
9. **Continue** to contribute to the Earth System Prediction Capability



# What we need to do Continued – 2



10. **Define and execute** an activity to consult with DOD and DHS to determine highest priority S2S forecast needs
11. **Develop and implement** a program to foster effective communication and use of S2S forecasts
12. **Develop and implement** an effort to work with State Forecast Communication Coordinators





# What we need to do

## Continued -3



**13. Cooperate** with other Federal Partners as appropriate

**14. Prepare, coordinate and deliver** required report

- Identify S2S forecast needs for public planning and preparedness
- Document NOAA's current S2S forecast capabilities including products and update plans for forecast/product improvements to meet needs for public planning and preparedness
- Identify needed research, monitoring, observing and forecasting requirements
- Consult with relevant research institutions and private sector during the development of this report



# Where we stand



- Panel has been formed to develop program and write required report
  - Cross-NWS and OAR membership
  - Charter under development



# Issues



- NWS Extended Forecast budget line eliminated in FY18 President's Budget
  - Funding restored in House and Senate Marks
- CPC dis-established in FY18 President's Budget