Improving Weather and Hydrology Forecasts - Challenges and Strategies

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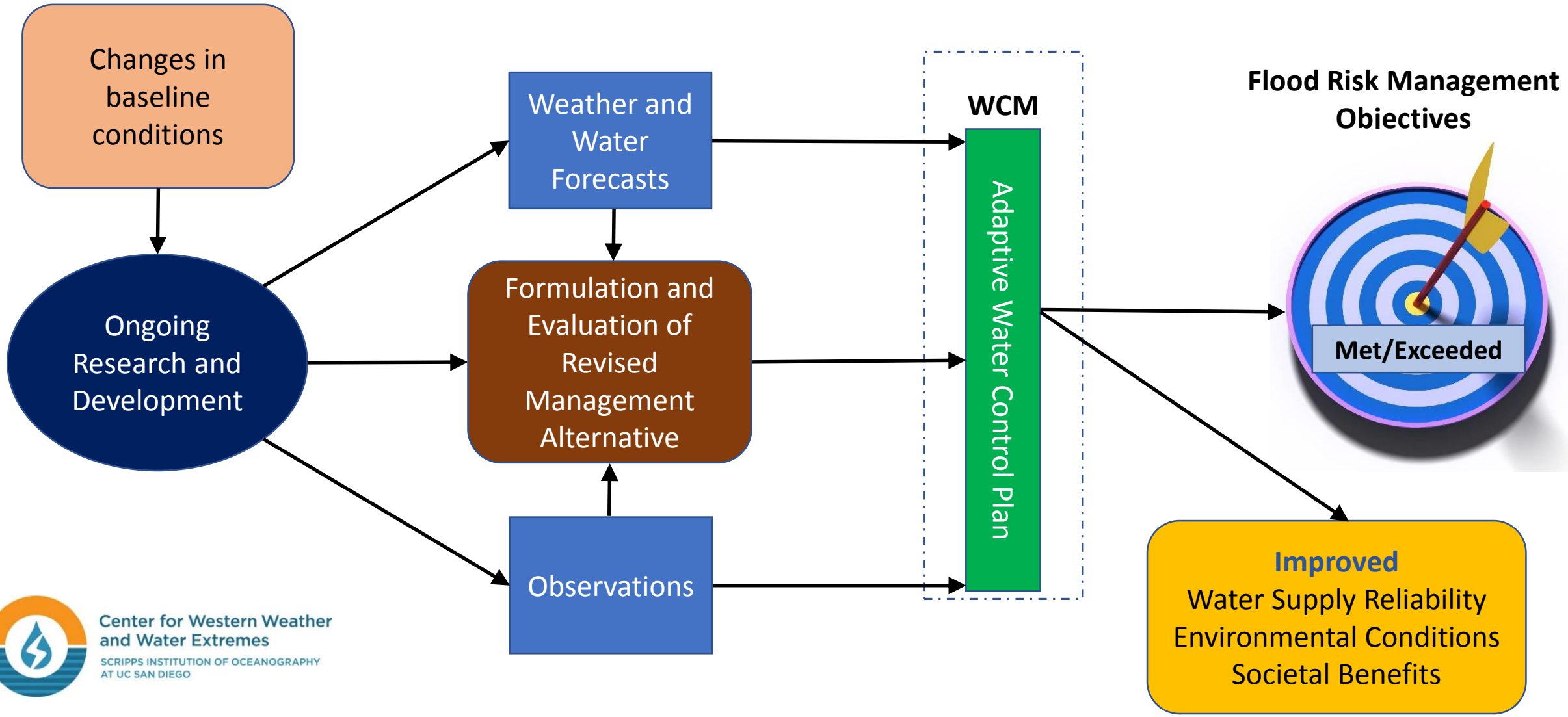
“FIRO is fundamentally an R&D Effort”

- However… Congress, the USACE, and our partners are expecting tangible results
  - A compelling basis to update Water Control Manuals
  - Pathways from research to operations

- And… Researchers are wondering just how their work will eventually contribute to the FIRO as it becomes operational

Model for Adaptive Water Control Manuals



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Outline

- Challenges

- Strategies and what we're doing now

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Challenges – Gate Keepers

Deliver technology that can be integrated into operational processes used by forecasters and water management decision makers

- CNRFC – leverages NOAA weather forecasts, fine-tunes input to hydrology models and produces streamflow forecasts

- USACE – makes operational flood control decisions and approves methodologies (and software) used to demonstrate the effectiveness of Water Control Plans and exercise them in real-time

Challenges – Near-term and Long-term Research Payoffs

- Incremental AND transformative change

- Some research
  - is exploratory
  - is very tactile and has immediate application
  - leads to unexpected results
  - changes the way we approach other research challenges

- FIRO research is clearly targeted, but cannot be uniformly scheduled and charted like a construction project

Challenges – Multiple R&D Fronts

- Weather Prediction - next 2 weeks
- Climate Prediction - S2S, 2 weeks to 2 months
- Hydrology – application and testing of modern gridded models
- Water Resources Engineering
  - Creative reservoir management schemes (e.g. EFO model)
  - HEC suite of software (ResSim, WAT, etc.)

Short-term Activities and Strategies

- Better understanding AR behavior and prediction
  - Knowledge and insight readily consumable by NWS forecasters and others
- Situational awareness tools
  - Suite of AR-centric products on CW3E website
  - Decision Support Systems and Tools
- Enhanced monitoring
  - Better assessment of current watershed and atmospheric conditions
- Improved engineering tools
  - SWA EFO model
  - Investments in HEC suite of planning and operational software (WAT, CWMS)
- WestWRF reforecast
  - Potential to provide more skillful ensemble forecasts covering the first 7 days

Longer-term Activities and Strategies

- WestWRF development
- AR Recon and data assimilation
- Enhanced monitoring (e.g. soil moisture)
- Machine learning (ML) and artificial intelligence (AI)
- Skillful insight into the S2S realm
- Calibration, application, and evaluation of GSSHA and WRF-Hydro

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Summary

- Combination of short-term and long-term approaches
- Combination of incremental and transformative change
- Balanced approach to improving the weather and water forecasts and their application for water resources decision making
- Recognition of pathway to operational use and application by forecasters and water managers

Thank You

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