



# AGENDA

## IDAHO WATER RESOURCE BOARD

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Cloud Seeding Committee Meeting No. 2-22

Thursday, February 24, 2022

1:00 p.m. (MT)

Water Center

Conference Rooms 602 C&D / Online Zoom Meeting

322 E. Front St.

BOISE

**Brad Little**

*Governor*

**Jeff Raybould**

*Chairman*

St. Anthony

At Large

**Roger W. Chase**

*Vice-Chairman*

Pocatello

District 4

**Board Members & the Public may participate via Zoom**

[Click here to join our Zoom Meeting](#)

Dial in Option: 1(253) 215-8782

Meeting ID: 897 2673 8981 Passcode: 101626

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**Jo Ann Cole-Hansen**

*Secretary*

Lewiston

At Large

**Dale Van Stone**

Hope

District 1

**Albert Barker**

Boise

District 2

**Dean Stevenson**

Paul

District 3

**Peter Van Der Meulen**

Hailey

At Large

**Brian Olmstead**

Twin Falls

At Large

1. Introductions and Attendance
2. Cloud Seeding Program Development
  - a. Statewide Assessment Initial Results
  - b. Requirements for Developing a Cloud Seeding Program
3. Cloud Seeding Program Update
4. Other Items
5. Adjourn

Committee Members: Chair Roger Chase, Jeff Raybould, Pete Van Der Meulen, and Al Barker.

\* Action Item: A vote regarding this item may be made this meeting. Identifying an item as an action item on the agenda does not require a vote to be taken on the item.

#### Americans with Disabilities

The meeting will be held telephonically. If you require special accommodations to attend, participate in, or understand the meeting, please make advance arrangements by contacting Department staff by email [jennifer.strange@idwr.idaho.gov](mailto:jennifer.strange@idwr.idaho.gov) or by phone at (208) 287-4800.



# Idaho Cloud Seeding Program

Idaho Water Resource Board | Cloud Seeding Committee Meeting

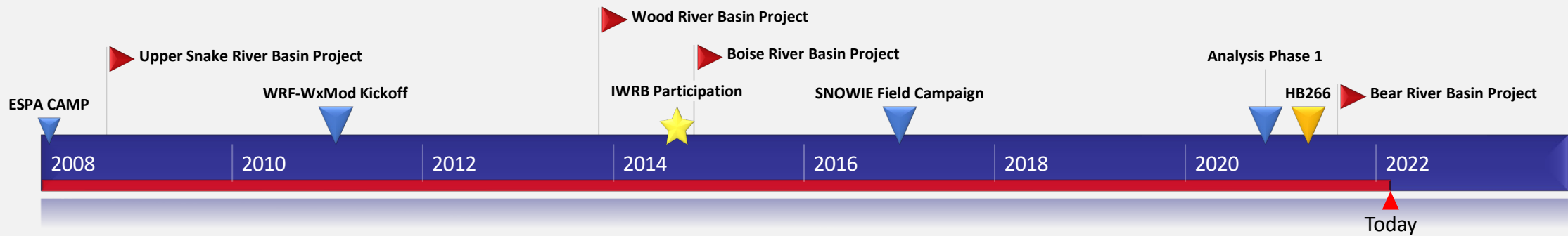
February 24, 2022



# OVERVIEW

- Program Summary
- Cloud Seeding Program Development
  - Statewide Assessment
  - Feasibility and Design
  - Implementation
  - Operations & Maintenance
  - Monitoring
- Cloud Seeding Program Update

# PROGRAM SUMMARY



Upper Snake Pilot Project 5YR

Upper Snake Aircraft Pilot Project 1YR

Capital

Operation's & Maintenance

WRF Model Development

Cloud Seeding Analysis

Statewide Assessment

Bear Pilot Aircraft Project 1YR

Bear Feasibility & Design

# PROGRAM SUMMARY

- Idaho House Bill 266 (*HB266, 2021*)
  - Directed the IWRB to:
    1. Continue analysis of existing cloud seeding projects
    2. Complete an assessment of opportunities for cloud seeding in other basins
    3. Authorize cloud seeding programs in Idaho
- Provides the IWRB authority to:
  - Sponsor or develop local or statewide cloud seeding programs
    - *State funds may only be used in basins where the IWRB finds that existing water supplies are insufficient to support existing water rights, water quality, recreation, or fish and wildlife*

# CLOUD SEEDING PROGRAM DEVELOPMENT

- Statewide Assessment
  - July 2021– Contracted with the National Center for Atmospheric Research (NCAR) to look at opportunities for cloud seeding across the State of Idaho
  - Initial look, more detailed feasibility required for basins of interest
  - Ground and airborne seeding opportunities (Agl)
  - Opportunities for propane seeding

New CS Project

Feasibility & Design

Implementation

Operations & Maintenance

Monitoring & Analysis

# CLOUD SEEDING PROGRAM DEVELOPMENT

New CS Project

Feasibility & Design

Implementation

Operations & Maintenance

Monitoring & Analysis

\* NCAR Presentation

# CLOUD SEEDING PROGRAM DEVELOPMENT

- Prioritizing new projects
  - Develop criteria for Board participation
  - Funding requirements
- Significant stakeholder interest in new projects

New CS Project

Feasibility & Design

Implementation

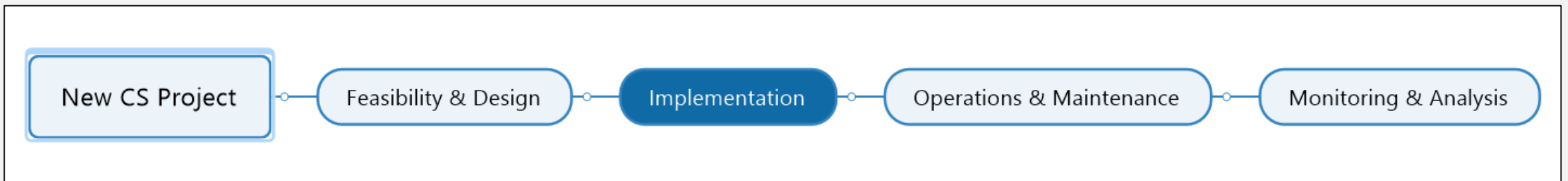
Operations & Maintenance

Monitoring & Analysis



# CLOUD SEEDING PROGRAM DEVELOPMENT

- Implementation
  1. Development of criteria for competitive bid
    - Based on results of feasibility and design study
  2. Request for Proposal (RFP) for an operator
  3. Contract Development
  4. Build out of Infrastructure



# CLOUD SEEDING PROGRAM DEVELOPMENT

- **Implementation**

1. Development of criteria for competitive bid
  - Based on results of feasibility and design study
2. Request for Proposal (RFP) for an operator
3. Contract Development
4. Build out of Infrastructure
  - Airborne
  - Ground

## Considerations

- Seeding equipment
  - Generators
  - Aircraft
  - Weather instrumentation
- Availability of resources
- Siting Equipment
  - Availability of suitable location
  - Accessibility
  - Development of land lease
  - Installation

New CS Project

Feasibility & Design

Implementation

Operations & Maintenance

Monitoring & Analysis

# CLOUD SEEDING PROGRAM DEVELOPMENT

- Operations & Maintenance
  - Typically 3-5 year contract
  - Modeling
    - Forecasting
    - Analysis
    - Reporting
  - Equipment Maintenance

## Considerations

- Existing WRF-WxMod
  - Licensing
  - Operator
  - Expansion of Domain
- Weather Instrumentation
- Coordination of multiple operations

New CS Project

Feasibility & Design

Implementation

Operations & Maintenance

Monitoring & Analysis

# CLOUD SEEDING PROGRAM DEVELOPMENT

- Monitoring & Analysis
  - Ongoing for duration of operation
  - Benefit Analysis
  - Assessment of program design

New CS Project

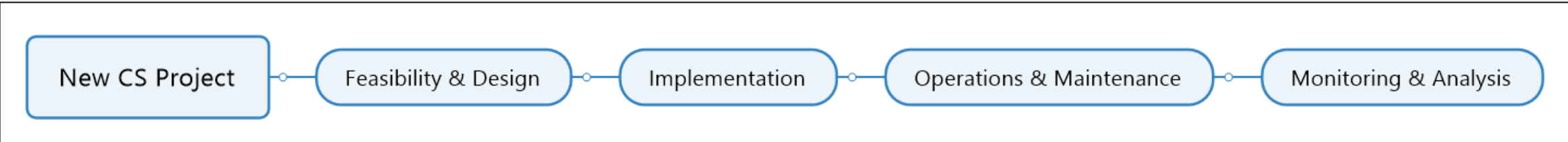
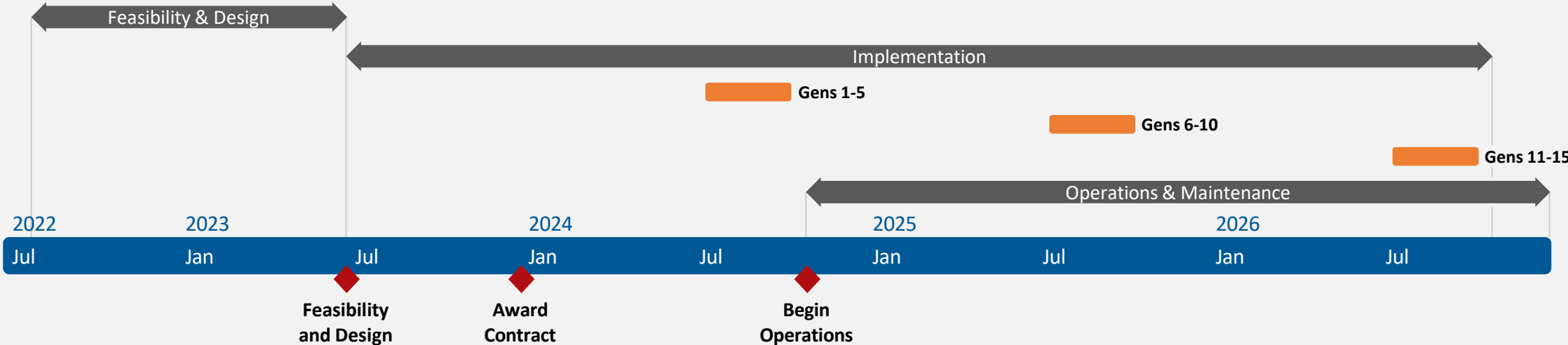
Feasibility & Design

Implementation

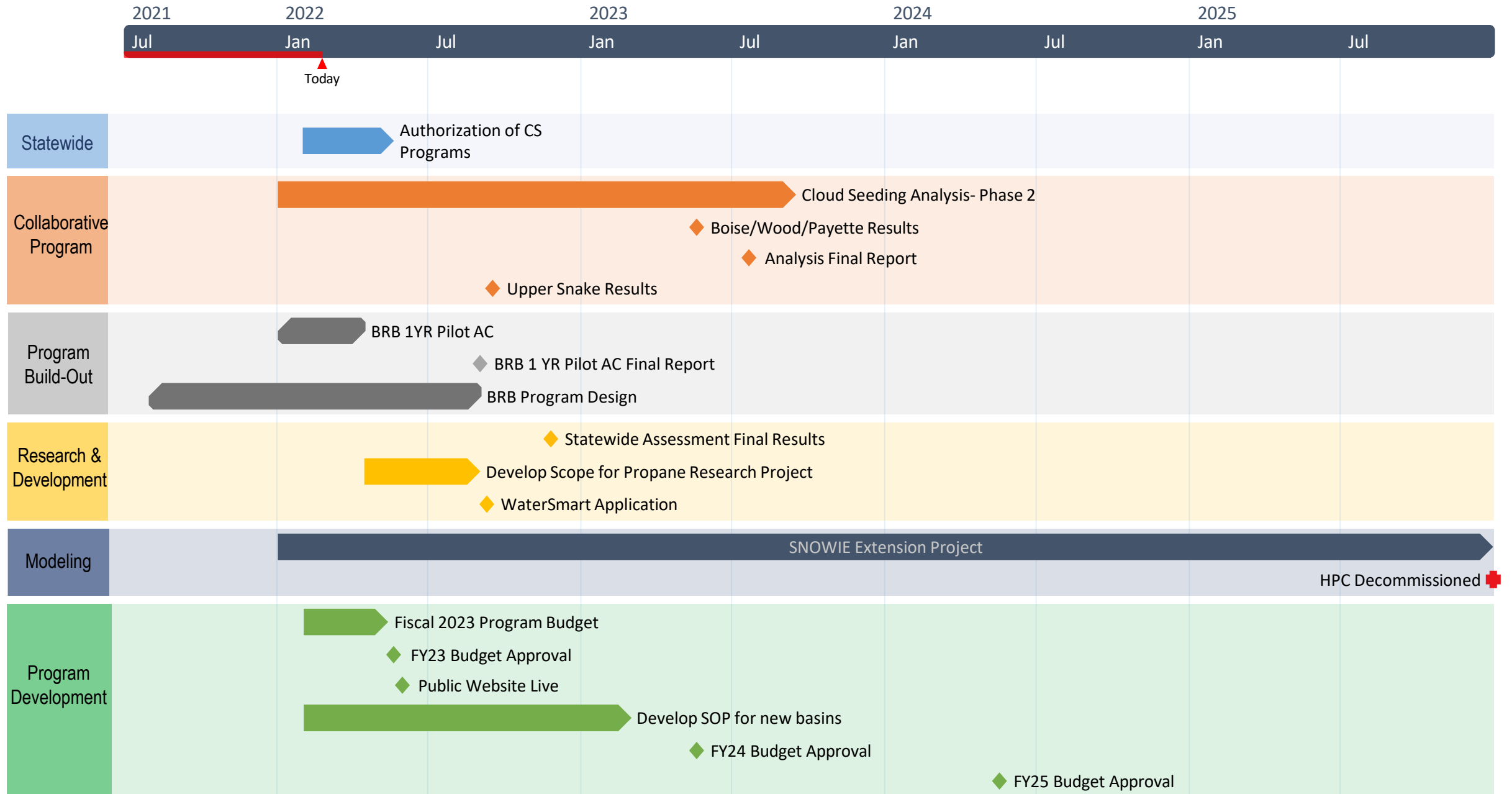
Operations & Maintenance

Monitoring & Analysis

# TIMELINE FOR DEVELOPMENT



# CLOUD SEEDING PROGRAM UPDATE



# CLOUD SEEDING ANALYSIS

- Cloud Seeding Analysis

- Objective: Determine the impact of cloud seeding operations in the Payette, Boise, Wood, Upper Snake River Basins
- Phase I completed 2020; preliminary estimates, several assumptions used
- Phase 2 began early 2021, refine results using sophisticated modeling tools

1. WRF-Hydro model calibration & impacts analysis (NCAR)

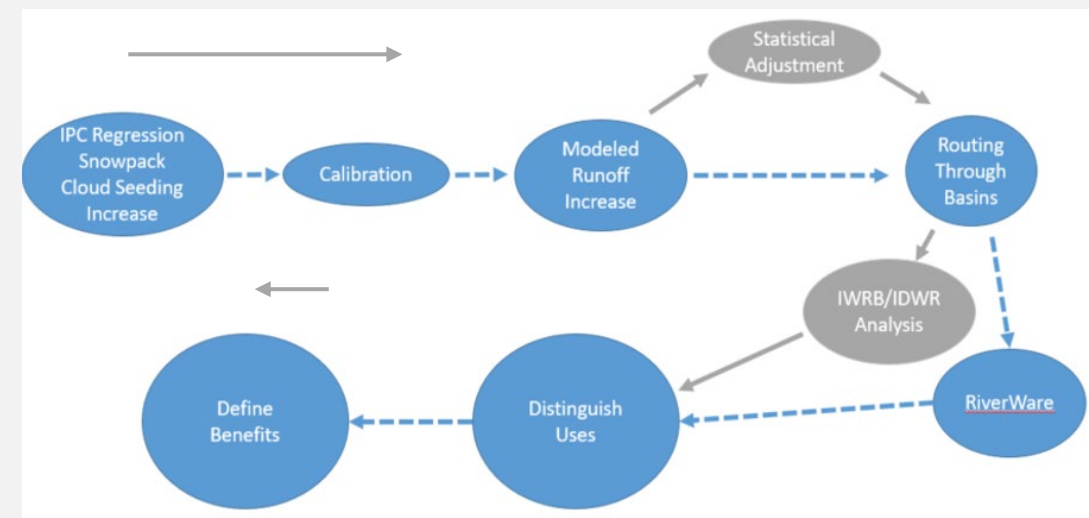
- Physically based hydrologic model used to simulate runoff from snow
- Calibrate model for each region → run historical data with & without CS → determine estimated qty of water generated
- Upper Snake first, then West Central Mountains

2. RiverWare model refinement (IDWR/IPC)

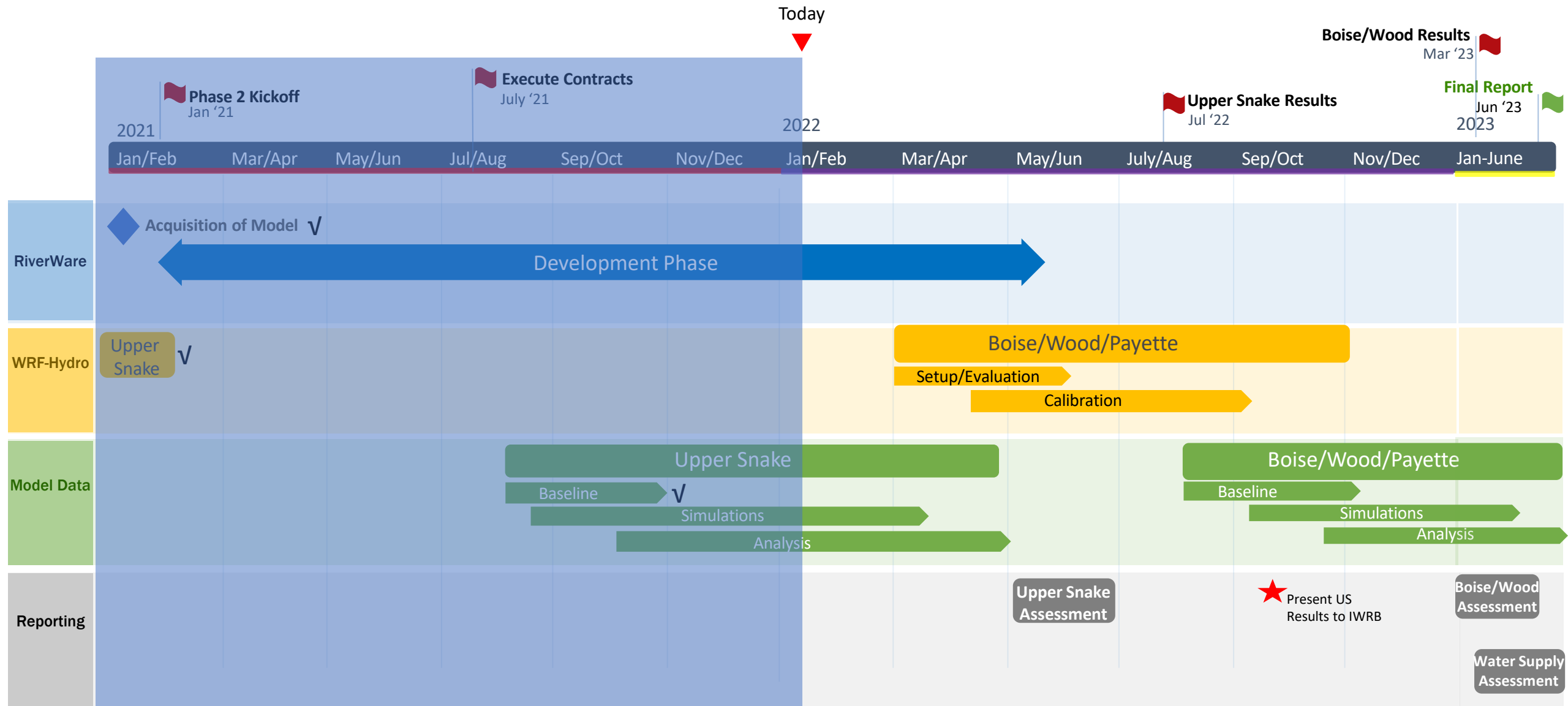
- System operations model
- Modified version of the BOR Snake River RiverWare model

3. Route WRF-Hydro data through RiverWare → Determine impacts

	In-Basin Use	Hydropower	Spill Out of State	IWRB Recharge	Captured by Reservoirs
Snake	32%	13%	33%	12%	10%
Boise	17%	45%	30%	-	7%
Wood	29%	20%	28%	1%	22%



# Cloud Seeding Analysis Project Schedule



✓ Complete



# Secondary Fund Program Costs

- Paid through IWRB's Secondary Aquifer fund
    - \$5M annually from General Fund
    - \$5M annually from Cigarette Tax (will decline in future)
  - Average IWRB Recharge Program costs (2017-2021) **\$6.20M**
  - Average IWRB Cloud Seeding program costs (2017-2021) **\$1.62M**
  - Average Hydrology cost (2017-2021) (modeling, monitoring, technical studies) **\$0.52M**
- TOTAL \$8.34M**

**Remaining from the \$10M - \$1.66M**