Bear River Hydrology Model Project

Progress Update

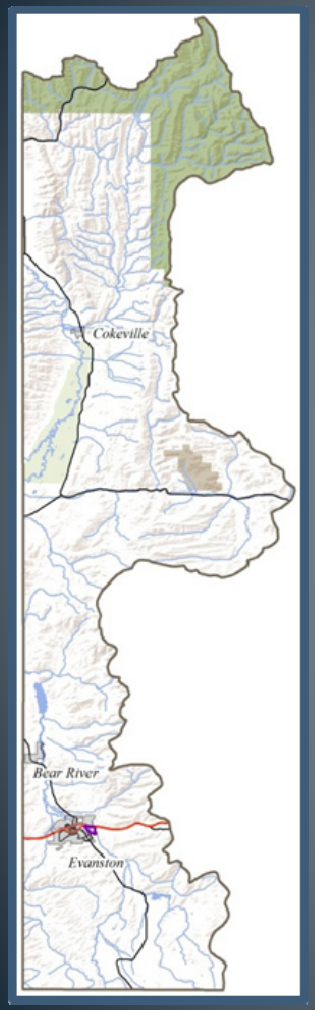
Bear River Basin Advisory Group Meeting

May 21, 2014

Prepared By:

THE STATE OF WYOMING

Water Development Office



Project's Purpose

- Continue the river basin planning process
- Develop a **Decision Support System** (DDS) for the Bear River Basin

Decision Support System

- A water resources management tool
- Helps plan for future water needs and address real-time water supply issues
- Water rights and priority dates are accounted for
- Computer program application: **StateMOD**

StateMOD

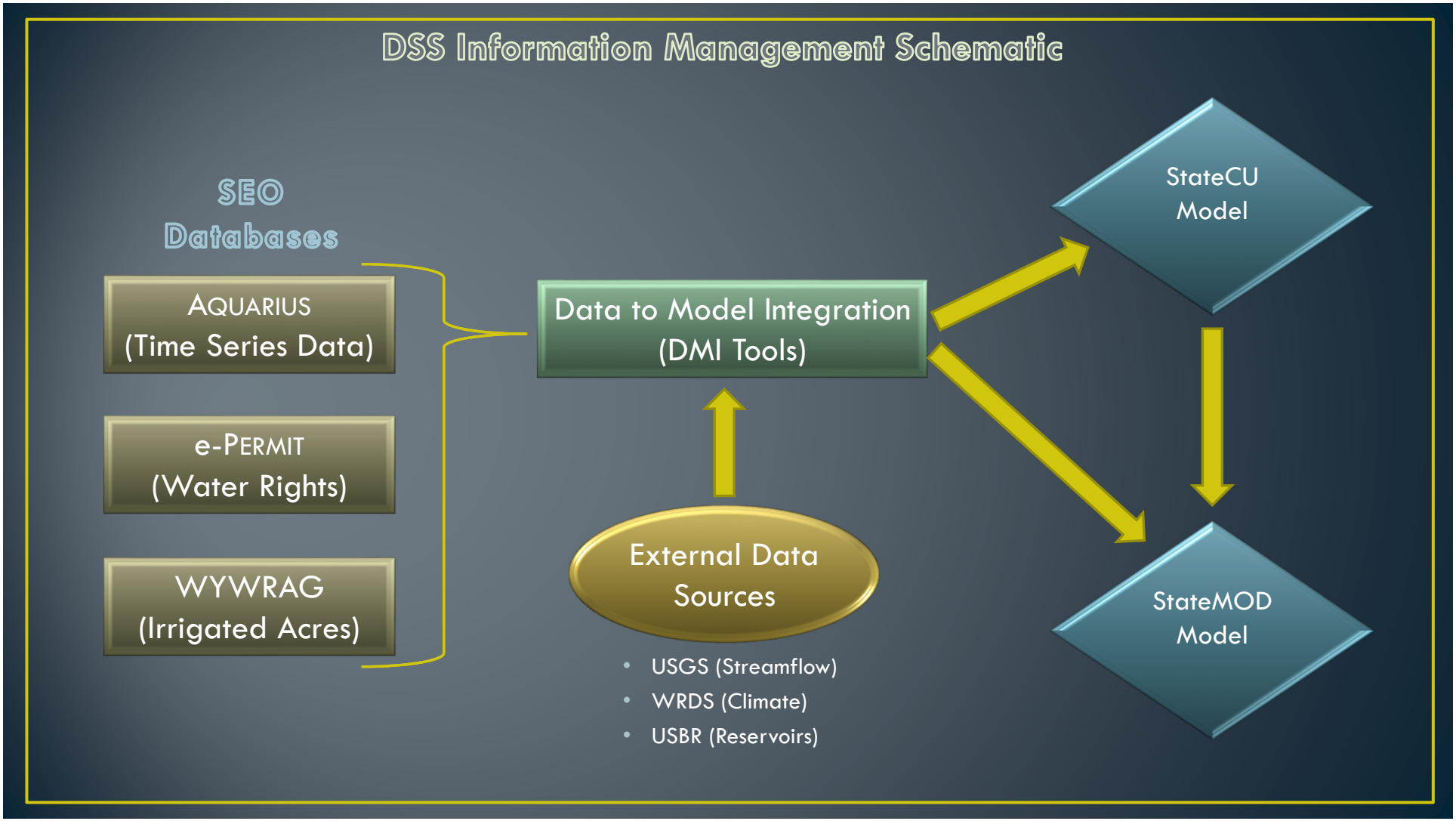
- A public domain, water rights allocation, DSS software
- Developed by the State of Colorado as part of Colorado's Decision Support System tools (http://cdss.state.co.us)

Example Uses of a DSS Model

- Determine water availability for new storage projects
- Size reservoirs
- Assess risk of existing water rights under varying hydrologic conditions
- Consider impacts of various project operations and administrations
- Predict the need for additional regulation
- Assess and help to mitigate demand shortages

Cooperative Effort

Project aims to establish protocol & in-house knowledge to eventually expand DSS models to other river basins in Wyoming

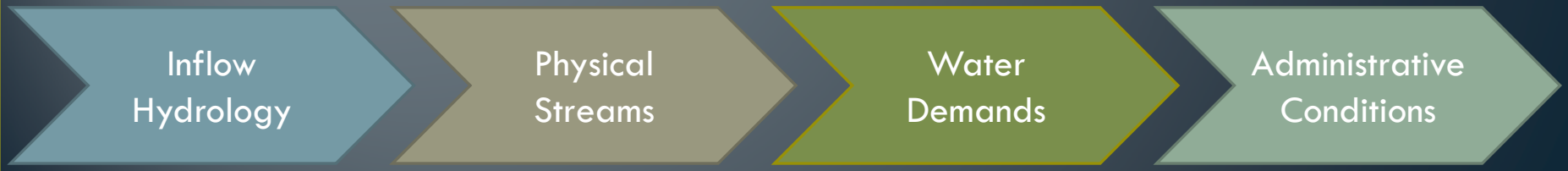

DSS Information Management Schematic
SEO Databases
AQUARIUS (Time Series Data)
e-PERMIT (Water Rights)
WYWRAG (Irrigated Acres)
Data to Model Integration (DMI Tools)
External Data Sources
USGS (Streamflow)
WRDS (Climate)
USBR (Reservoirs)
StateCU Model
StateMOD Model

Progress Thus Far Includes:

- Defining the Model Extent
- Digitize Historic Diversion Data (WRDS)
- Resolve Water Rights Discrepancies (SEO)
- Compiling Input Data
- Reconcile Ditch Names
- Associate PODs with Water Rights & Acreage (SEO)

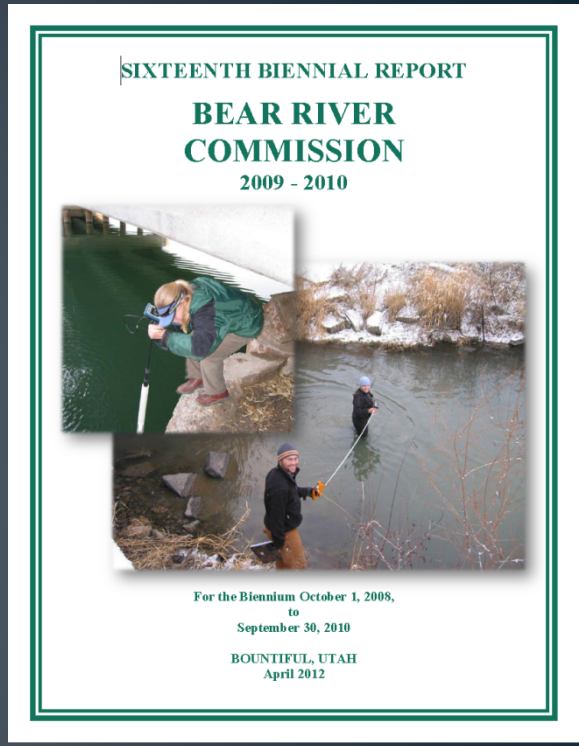
StateMOD Approach

Input File Development



Model Extent

- Upper and Central Divisions
- Streams and Tributaries
- Gaging Stations
- Reservoirs
- Points of Diversion (POD)

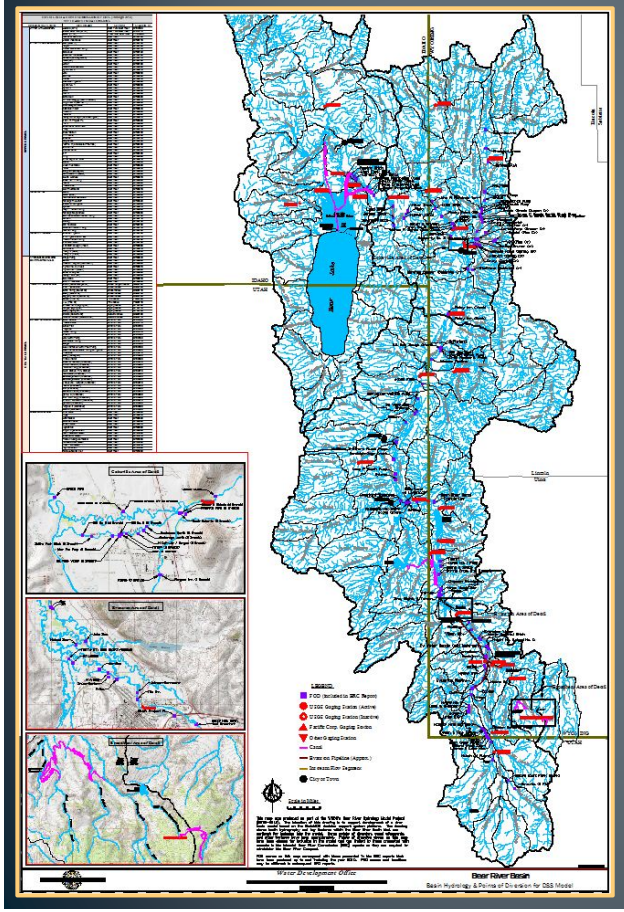


Diversions

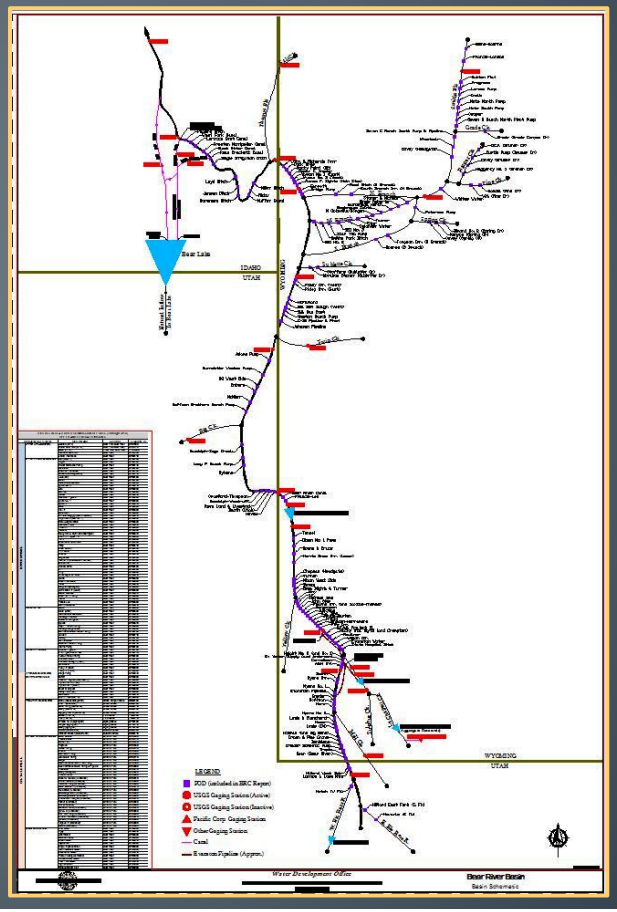
- Inclusive of all diversions presented in the 2009-2010 Bear River Commission Reports as required to administer the Bear River Compact
- Confirmed POD locations, ditch names, and stream order

Basin Map → Basin Schematic → River Network

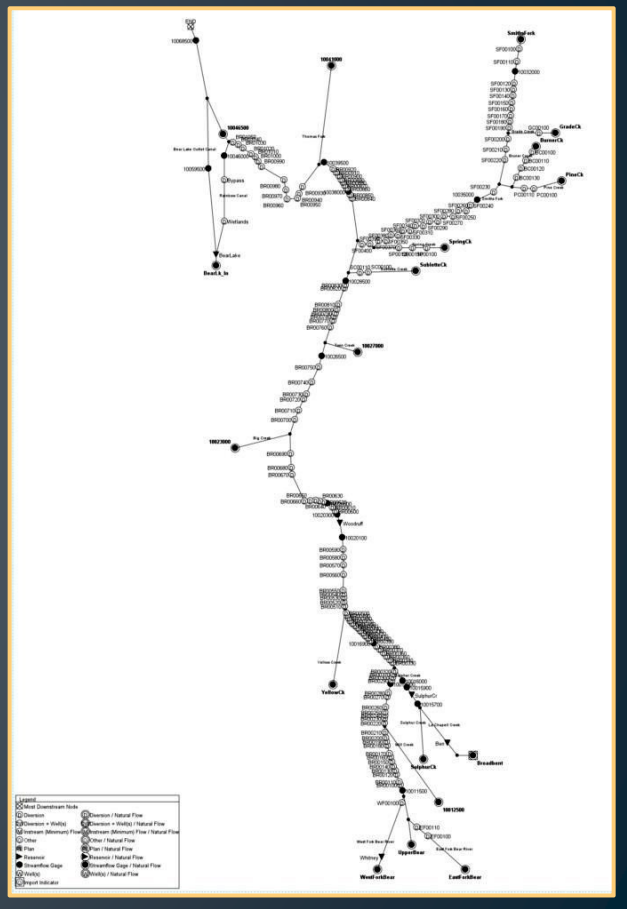
Basin Map



Basin Schematic



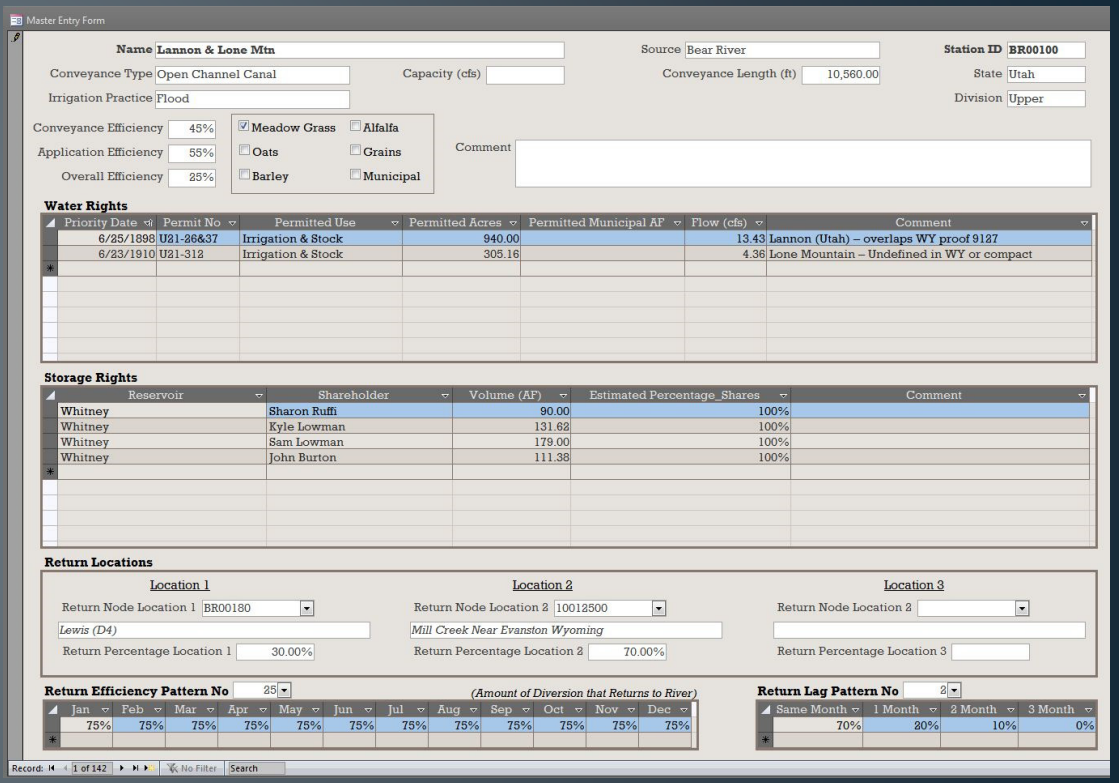
River Network



Input Data

- Streamflow Records
  - USGS
  - Pacific Corp.
- Historic Diversion Records
  - Digitized from Bear River Commission Reports
- Return Flows
  - Location, timing, and amounts
- Reservoir Data
  - End of month storage
  - Volume and area-capacity curves
  - Operating rules
- Water Rights Data
  - SEO mapped water rights and acreages associated with each POD

Diversions Database



Forthcoming Model Development

- Continue Data and Information Gathering
  - Reconcile ditch names, water rights, PODs, irrigated acres
  - Ascertain return flows and locations
  - Compact, basin operation & management
  - Utah & Idaho water rights
- Develop Required StateMOD and StateCU Input Files

StateMOD Model

Base Flow Model

- Natural flows
- Uses historic data
- Distribute gains to tributaries

Calibration

- Includes water rights
- Tweak input data

Future Scenarios

- "What if" model runs
- Determine; size; assess; consider; predict; etc.

Bear River Hydrology Model Project

Thanks for Your Attention!

Questions?

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http://wwdc.state.wy.us