

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

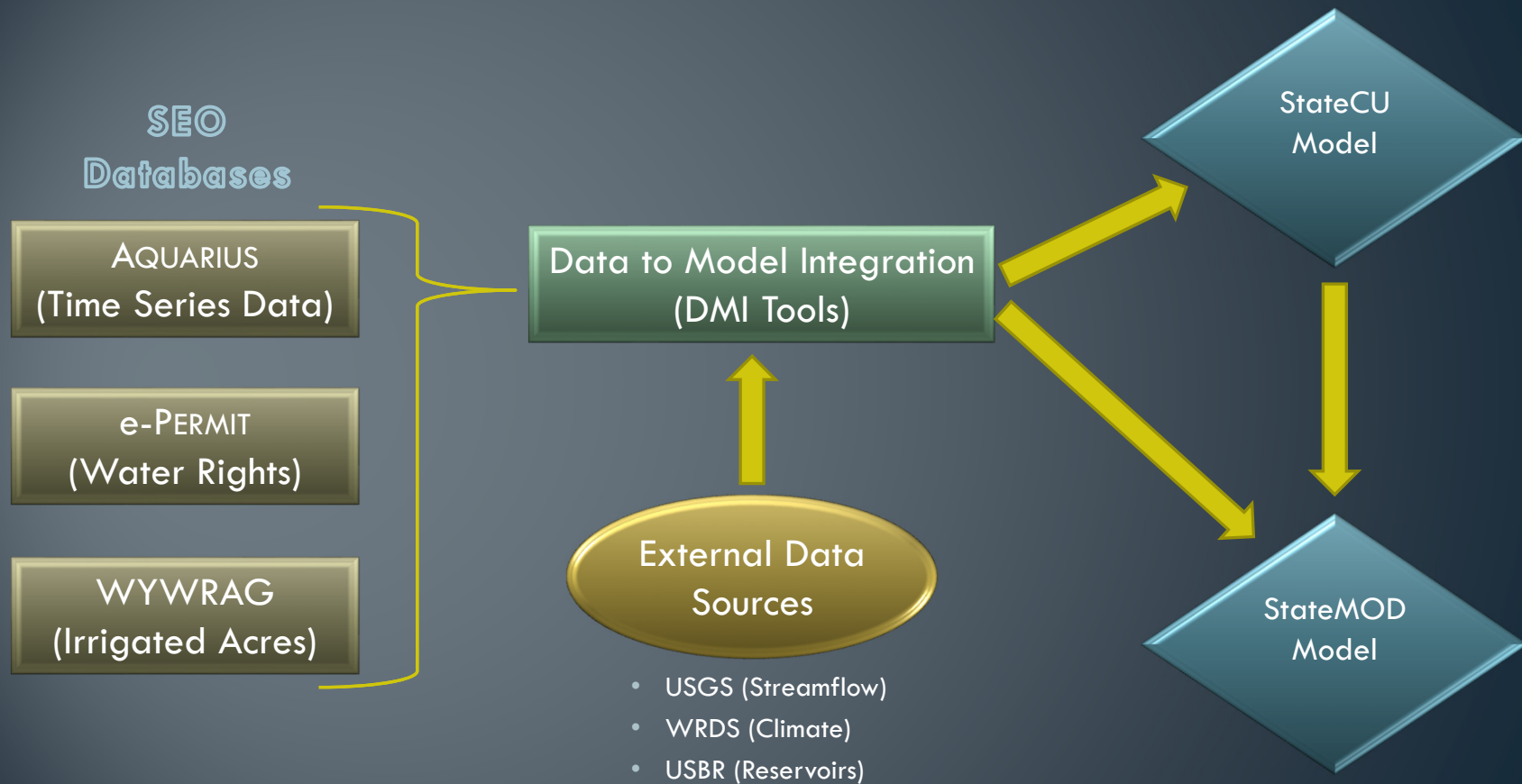
- Determine water availability for new storage projects
- Size reservoirs
- Assess risk of existing water rights under varying hydrologic conditions
- Consider impacts of various project operations and administrations
- Predict the need for additional regulation
- Assess and help to mitigate demand shortages

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



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

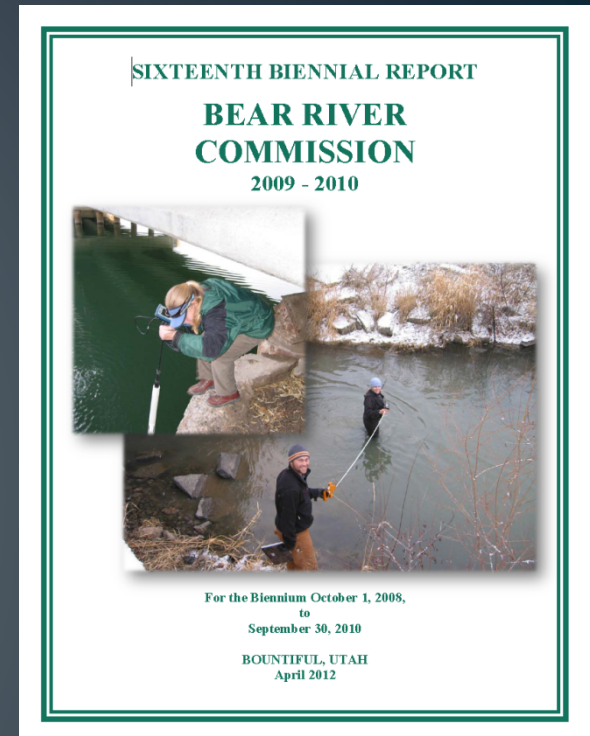


Model Extent

- 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

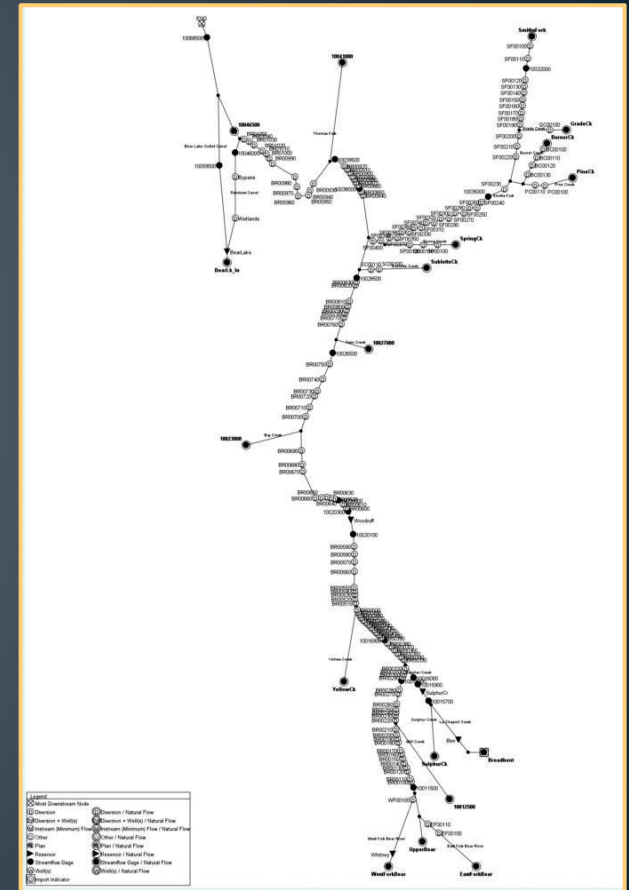
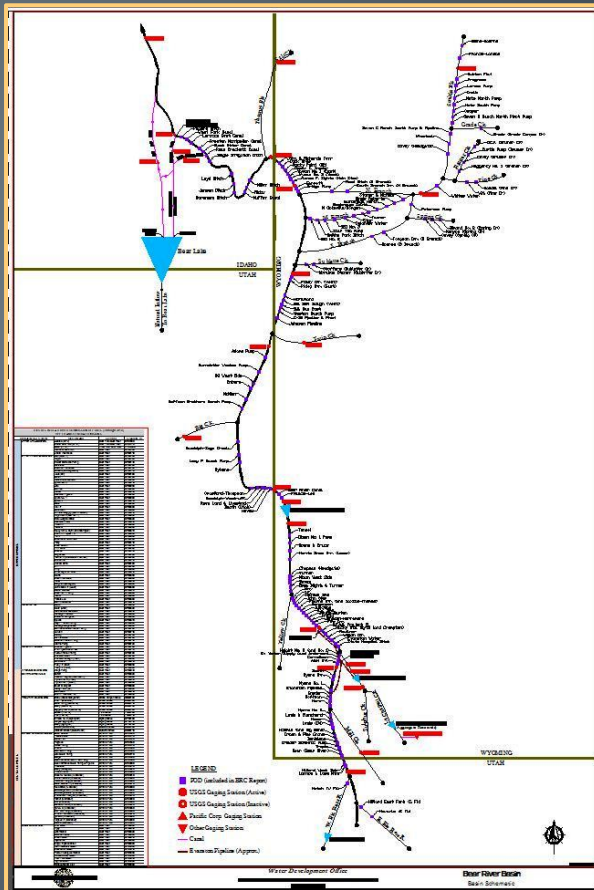
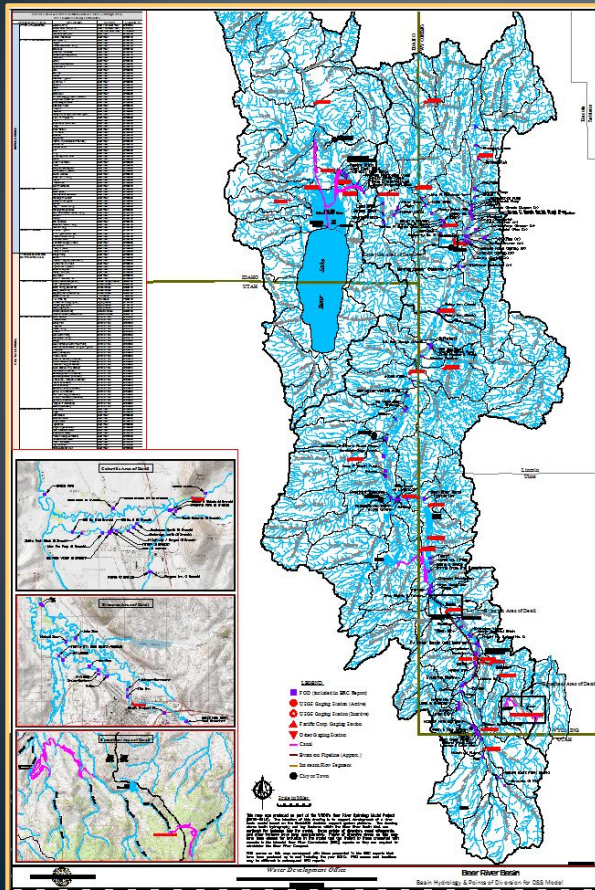
Basin Schematic

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

Master Entry Form

Name: **Lannon & Lone Mtn** Source: **Bear River** Station ID: **BR00100**

Conveyance Type: **Open Channel Canal** Capacity (cfs): Conveyance Length (ft): **10,560.00** State: **Utah**

Irrigation Practice: **Flood** Division: **Upper**

Conveyance Efficiency: Meadow Grass Alfalfa
 Application Efficiency: Oats Grains
 Overall Efficiency: Barley Municipal

Comment:

Water Rights

Priority Date	Permit No	Permitted Use	Permitted Acres	Permitted Municipal AF	Flow (cfs)	Comment
6/25/1898	U21-26&37	Irrigation & Stock	940.00		13.43	Lannon (Utah) – overlaps WY proof 9127
6/23/1910	U21-312	Irrigation & Stock	305.16		4.36	Lone Mountain – Undefined in WY or compact

Storage Rights

Reservoir	Shareholder	Volume (AF)	Estimated Percentage Shares	Comment
Whitney	Sharon Ruffi	90.00	100%	
Whitney	Kyle Lowman	131.62	100%	
Whitney	Sam Lowman	179.00	100%	
Whitney	John Burton	111.38	100%	

Return Locations

Location 1: Return Node Location 1: **BR00180** *Lewis (D4)* Return Percentage Location 1:

Location 2: Return Node Location 2: **10012500** *Mill Creek Near Evanston Wyoming* Return Percentage Location 2:

Location 3: Return Node Location 3: Return Percentage Location 3:

Return Efficiency Pattern No (Amount of Diversion that Returns to River)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%

Return Lag Pattern No

Same Month	1 Month	2 Month	3 Month
70%	20%	10%	0%

Record: 1 of 142 No Filter Search

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?

Wyoming Water Development Office

777-7626

<http://wwdc.state.wy.us>