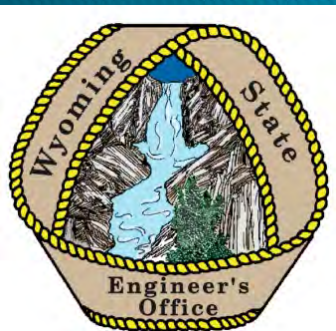


Using Remote Sensing to Support Compact Requirements in the Upper Colorado River Basin – Wyoming

Steve Wolff
Colorado River Coordinator
Wyoming State Engineer's Office



San Diego – September 2012

Why remote sensing



Colorado and Upper Colorado River Compacts in Wyoming



307-777-6160

Legend

- ◻ Cities
- ~ Major Streams
- Lakes/Reservoirs
- Major River Basins

■ Colorado River Compact, 1922
 ■ Upper Colorado River Compact, 1948

Colorado River Compact, 1922 - Divides the basin at Lee Ferry, AZ. Provides that the upper basin states may use 7.5 million acre feet annually.

Upper Colorado River, 1948 - Apportions 14% of the water allocated in the Colorado River Compact to Wyoming.

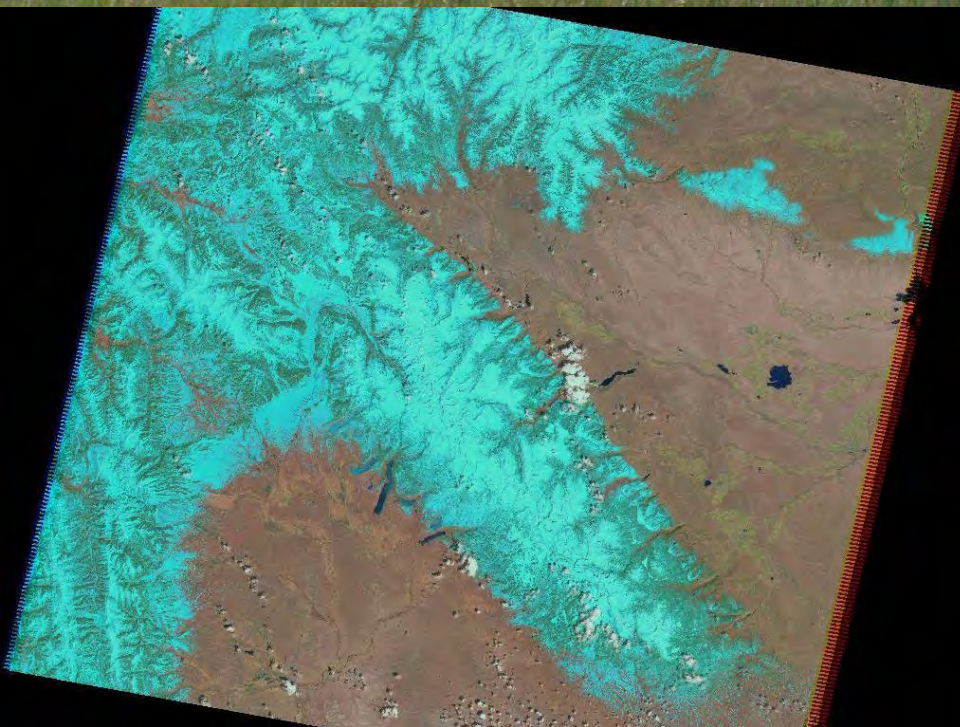


0 50 Miles

Lambert Conformal Conic Projection





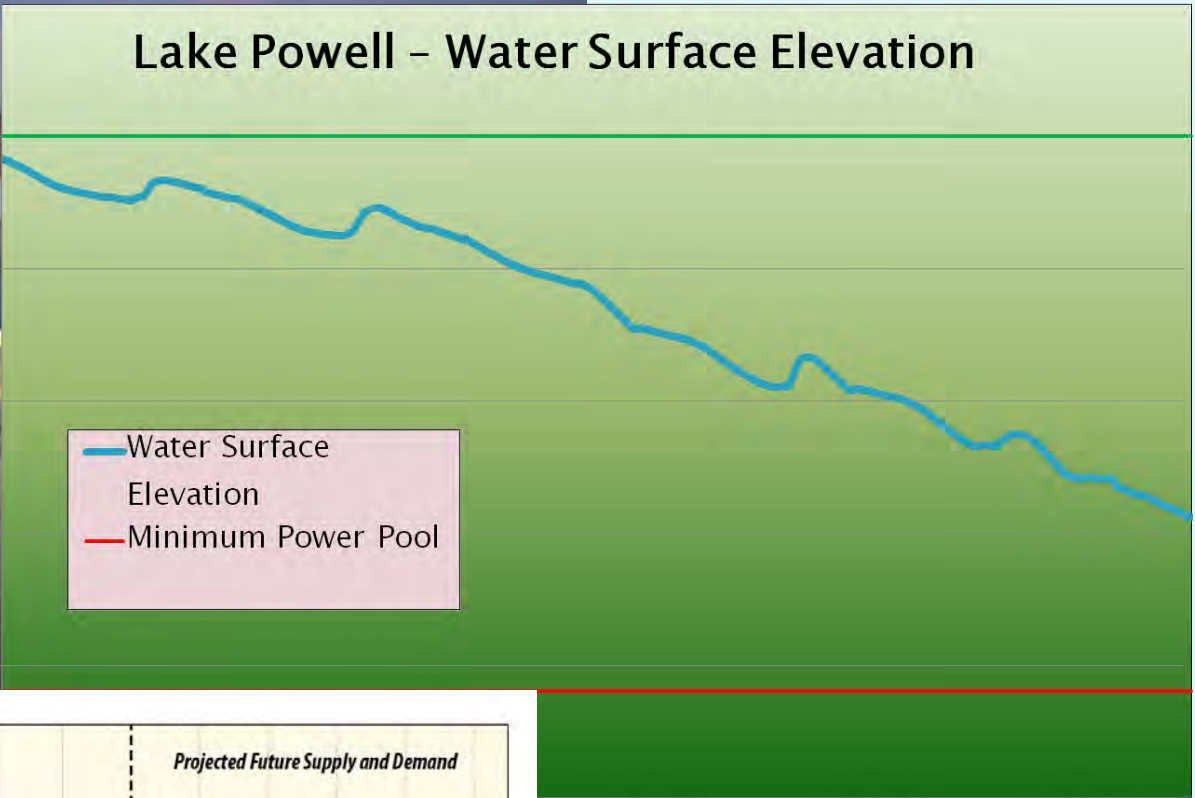


State Recognized Responsibilities

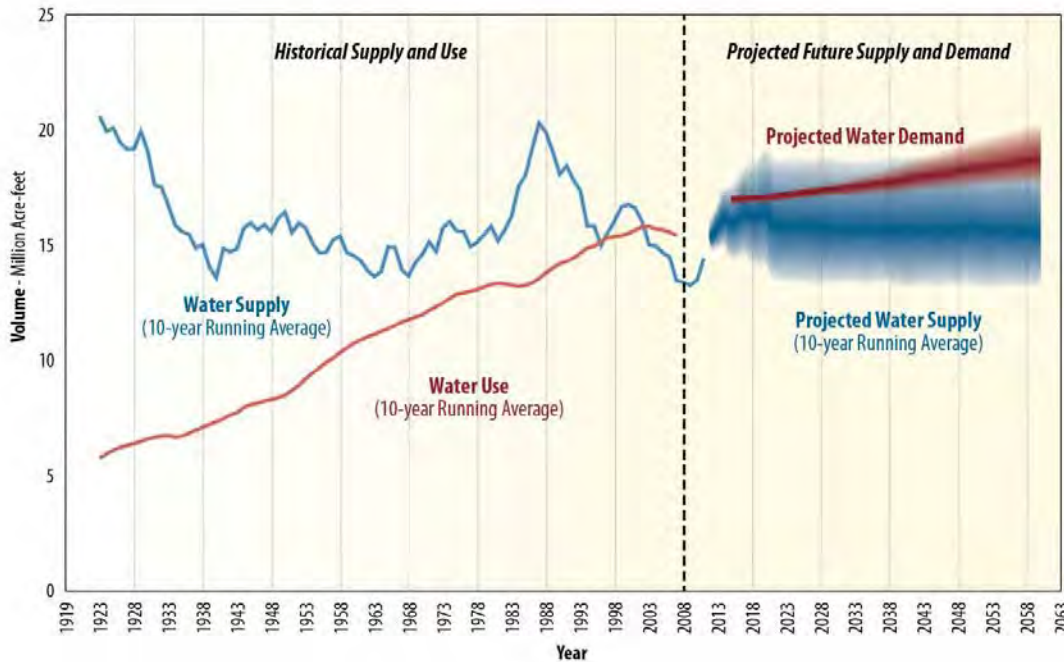
- ▶ State had responsibility under the Upper Basin Compact to annually account for its water use in the basin
- ▶ Protect Wyoming's apportionments as outlined under the compacts
- ▶ Prior to 2006, very little measurement of water use occurred in the basin



Lake Powell - Water Surface Elevation



1-Oct-02 1-Oct-03 1-Oct-04

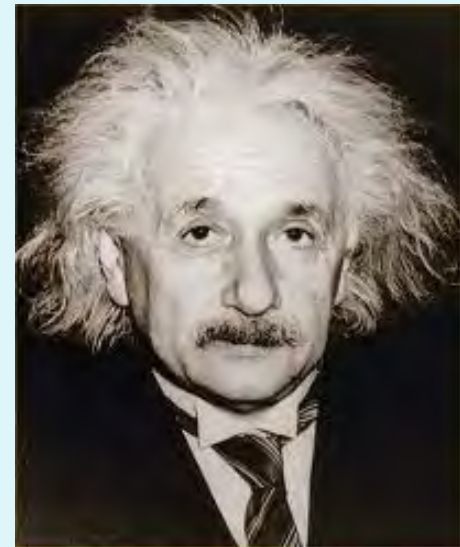


Colorado River Compact Administration Program

- ▶ In 2006, Wyoming legislature approved and funded a new program with a mandate to:
 - Develop the necessary “tools” available to accurately, reliably and “quickly” account for Wyoming’s water use in the basin
 - “... use the newest available technology in the implementation of this program so as we can minimize the need for new FTE’s.”

2007 – Cooperative Project with University of Wyoming

- ▶ Learning
- ▶ Remote sensing applications would work for our needs (METRIC™)
- ▶ Needed someone much smarter to help us



2009 – Pilot study

- ▶ Application of METRIC™ to sub-basin
 - Jan Hendrickx (New Mexico Tech) lead effort
 - Used both Landsat and MODIS imagery
 - Installed and operated two energy flux towers as well as one scintillometer
 - Wyoming presented some unique conditions and we would need to spend additional time calibrating/verifying model output



Weather Data

- ▶ Weather data to support general consumptive use estimates and remote sensing activities
 - Five fully sensed, year-round weather stations installed
 - Six fully sensed, growing season weather stations



2011 – 2015; Full Program

- ▶ METRIC™ model calibration is ongoing
- ▶ Using remote sensing to assess consumptive use across entire basin
 - Apply METRIC in two years
 - NDVI in intervening years
- ▶ Evaluating the “accuracy, reliability and timeliness” of results



Green River Basin

Reservoirs Rivers Canals Weather Multimedia Diagnostics About

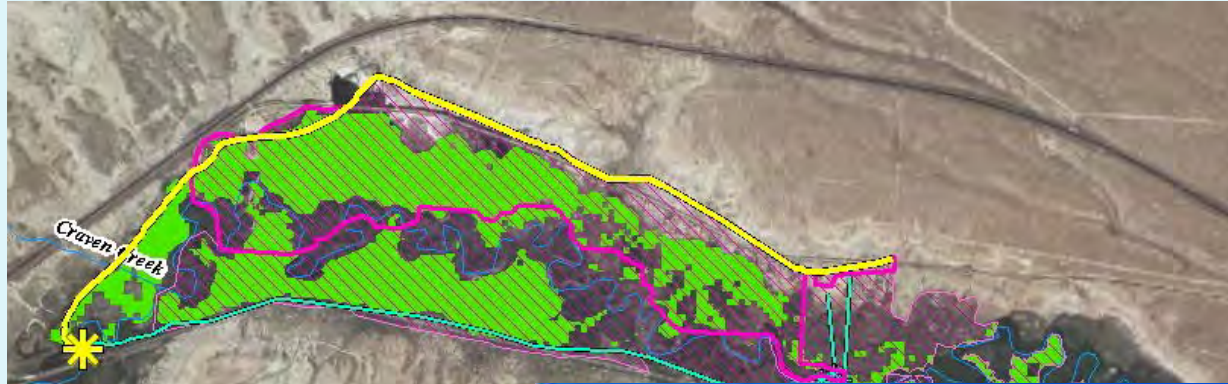
» BlacksFork River

Click a number on the map for a graph of that data



Name (Click for more information)	Last Reading	Value
Blacks Fork near Robertson	8:00 AM, Jun 5	355.0 cfs
Pate	9:00 AM, Jun 5	5.19 cfs
Shirk 1	8:00 AM, Jun 5	0.63 cfs
White, Mansfield & Robbins	8:00 AM, Jun 5	7.82 cfs
Pine Grove Canal	9:00 AM, Jun 5	67.88 cfs
Cox Henry	8:00 AM, Jun 5	3.42 cfs
Lamb Supply	8:00 AM, Jun 5	5.88 cfs
Black's Fork Canal	8:00 AM, Jun 5	159.20 cfs
Sheehan No. 2	9:00 AM, Jun 5	2.90 cfs
Bridger Butte Canal	9:00 AM, Jun 5	27.43 cfs
Taylor Kilburn	9:00 AM, Jun 5	4.77 cfs
Fort Bridger Canal	9:00 AM, Jun 5	31.53 cfs
Center	8:00 AM, Jun 5	4.31 cfs
Twin Butte	9:00 AM, Jun 5	29.86 cfs
Uinta No. 3	8:00 AM, Jun 5	4.24 cfs
Hamilton	8:00 AM, Jun 5	3.00 cfs

Mapping and Attributing Water Rights



Service Area Attributes

SERVICE AREA ATTRIBUTES

objectid: 567451

- Service Area ID: 5065

- Water Division and District: Division 4 District 9

- Data Source: 23918

- Service Area Size: SA Acreage 290.9 Irrigated 139.8

- Notes:

- Associated Water Rights:

WRID	Type	Structure	STRDiv	STRDist
<input type="radio"/> 661569	1	Mal Anderson Ditch No. 1	4	9

Type 1 - "Original", Type 2 = "Supplemental", Type 3 = "Secondary"

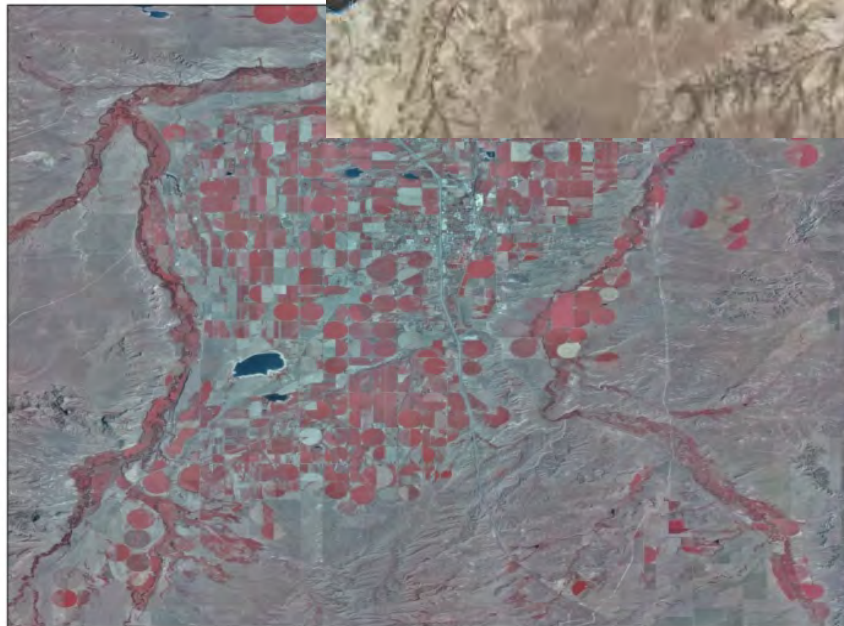
From SEO WRDB

WRID	Permit No.	Facility Name	Acreage	WDiv	WDist	WRStatus	Priority Date	Use (BU)
661569	P6458D	Mal Anderson Ditch No. 1		4	9	FADJ	4/13/1904	IRR

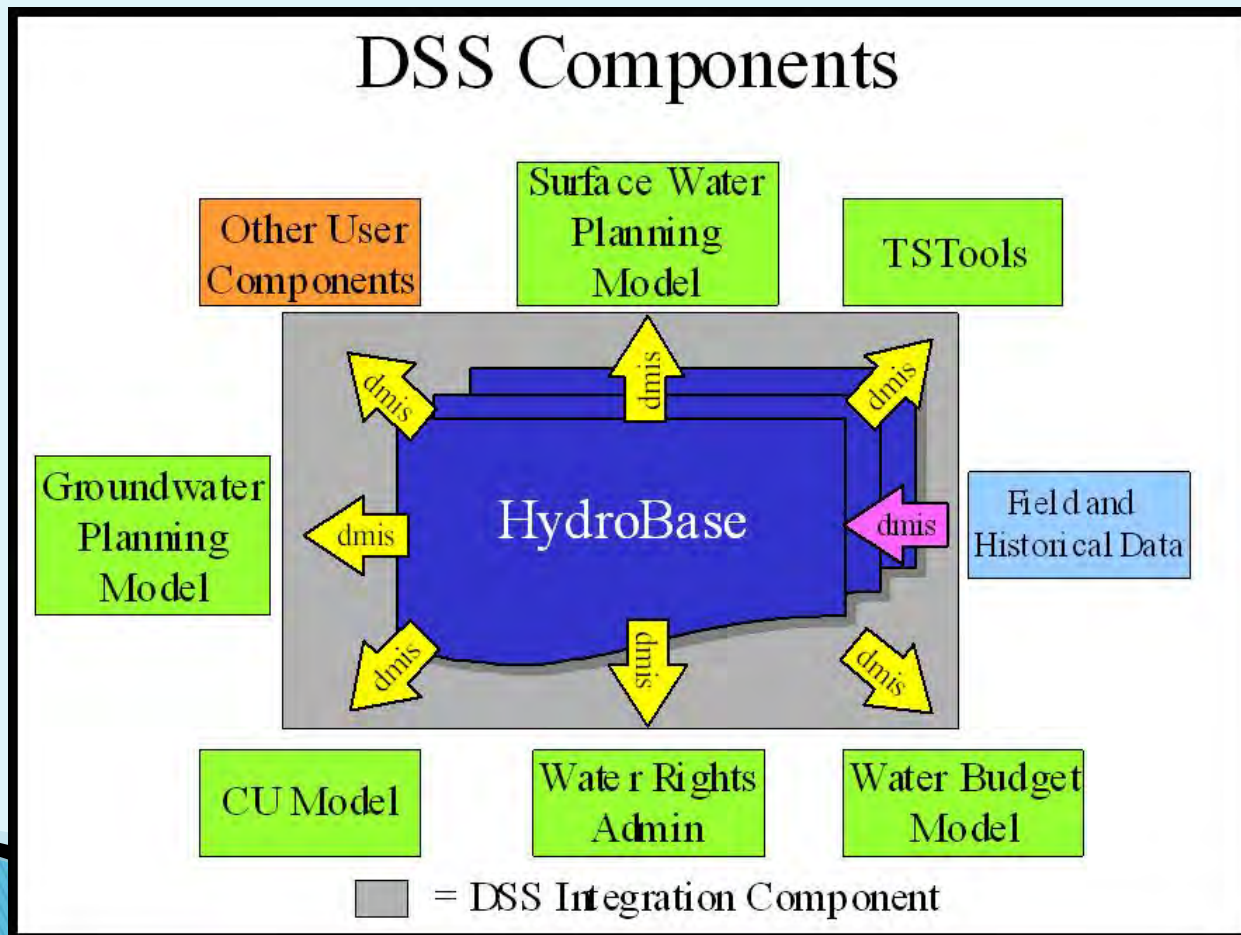
Save & Close (Changes will be saved on move to next)

Service 1 of 1 No Objects Selected

(Changes made with these buttons will be saved even when leaving form by Cancel button)



Ultimately ... a Decision Support System (DSS) to help us make better decisions



Program Comparison

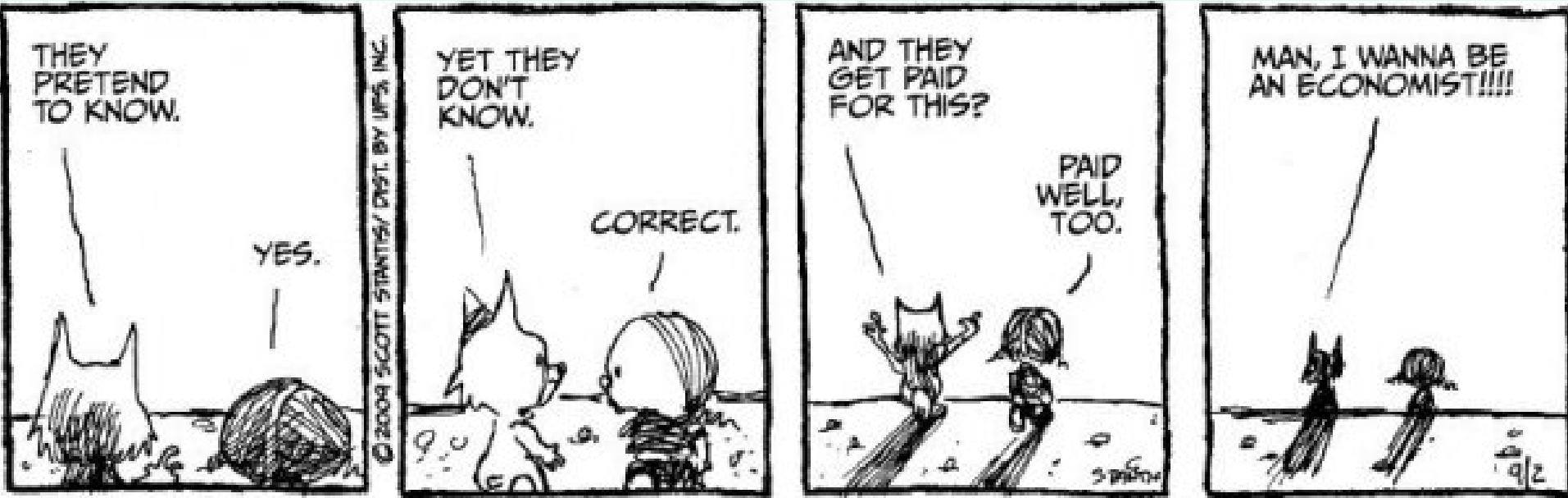
▶ North Platte Program

- Initiated in 2001
- 8 FTE
 - Program Coordinator, Acreage Inspectors, Hydrographers
- ~ \$750,000 annual operating costs

▶ Colorado River Program

- Initiated in 2006
- 1 FTE
 - Program Coordinator
 - Using remote sensing
- ~ \$250,000 annual operating costs





Contact:

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