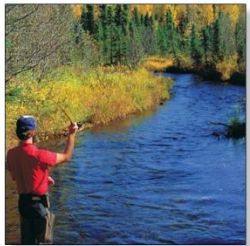


July 11th Agenda

1. Introductions
2. New Accounting Model development status and recent Conceptual changes (Jennifer)
3. Model testing approach and results (Jennifer)
4. Proposed changes to Palisades Powerhead LTF sequence (Tony)
- ~~5. Policy Discussion (Tony)~~
6. List of topics from the WRA Policy Manual and recommendations for future discussion (Tony)





New Accounting Model Development Status and Recent Conceptual Changes

Jennifer Cuhacian, IDWR Technical Hydrologist

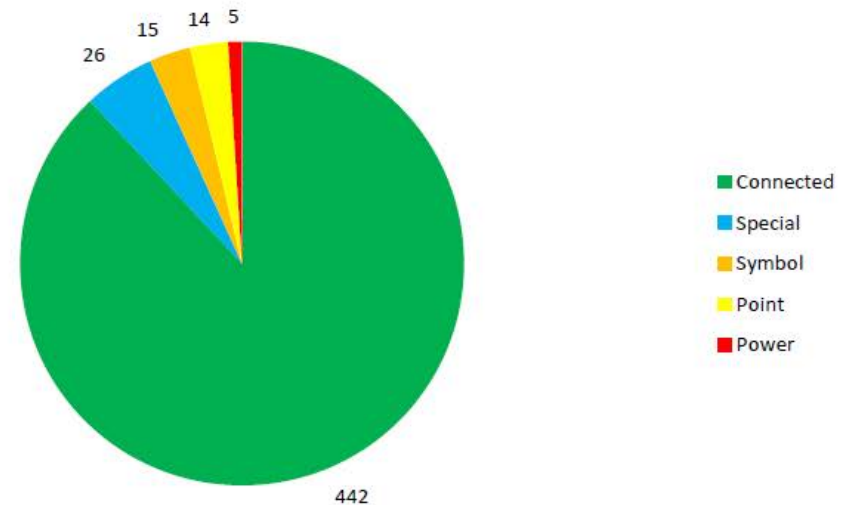
July 11th, 2013



Fall 2012 Status

- Payette model complete and beginning testing
- Snake model nearing completion, still working on:
 - Special calculations
 - Exchange wells
 - Combined diversions
 - Combined limits
- Lead developer retired from IDWR

New WD1 Water Right Accounting Progress
as of 08/02/2012



New Program Features

from Garth Newton's 5/15/2012 WRA Technical Subcommittee Presentation

- Map interface
- Single program → multiple models
- Relational database
- C# language
- Integrated storage program (runs daily)
- Choice of output reports
- Output stored in database
- Graph timeseries input and output

New Program Features

- Map interface (simplified and optimized)
- Single program → multiple models
- Relational database
- C# language (streamlined code structure)
- ~~• Integrated storage program (runs daily)~~
- Choice of output reports
- Output stored in database
- Graph timeseries input and output

Accounting Program Development Goals

- Upgrade accounting program to utilize current technology
- Reduce opportunities for human error
- Increase transparency
- Increase flexibility
- Improve integration with existing department databases

Existing Resources

- WRA web mapping tool
- WREdit
- Hydrologic Database
- Enterprise Database
- Built in ArcGIS editing tools

Key Findings

- Missing functionality
- Diminished transparency
- Mismatch of resources

Program Components

- Algorithm/Program
- Timeseries database(s)
- Map tools/model builder
- Geodatabase

Proposal Overview

- Phased approach to dismantle the new accounting model and put it back together in manageable pieces
- Focusing on transparency and maintainability

Phase 1: Rewrite Algorithm

- Thorough review of Fortran source code
- Expand documentation
- Reorganize code to separate the core algorithm (universal to all models) from the special calculations (unique)
- Baseline tests to compare new/old models
- Ready for daily use (interface and input files remain identical to the old)

Error Trapping

- Unit tests
 - All code changes are run through unit tests to ensure that there aren't undesired effects
- Source control
 - Stores previous model versions
 - Makes it easy to roll back the code if necessary

Phase 2: Reintegrate GIS tools

- Reintegrate tools for model drawing/editing:
 - Reaches
 - Diversions
 - Water Rights
- Modify code to read input data from a database rather than from flat files
- Update water right and diversion import tools (link to IDWR water rights databases)

Accounting Activities

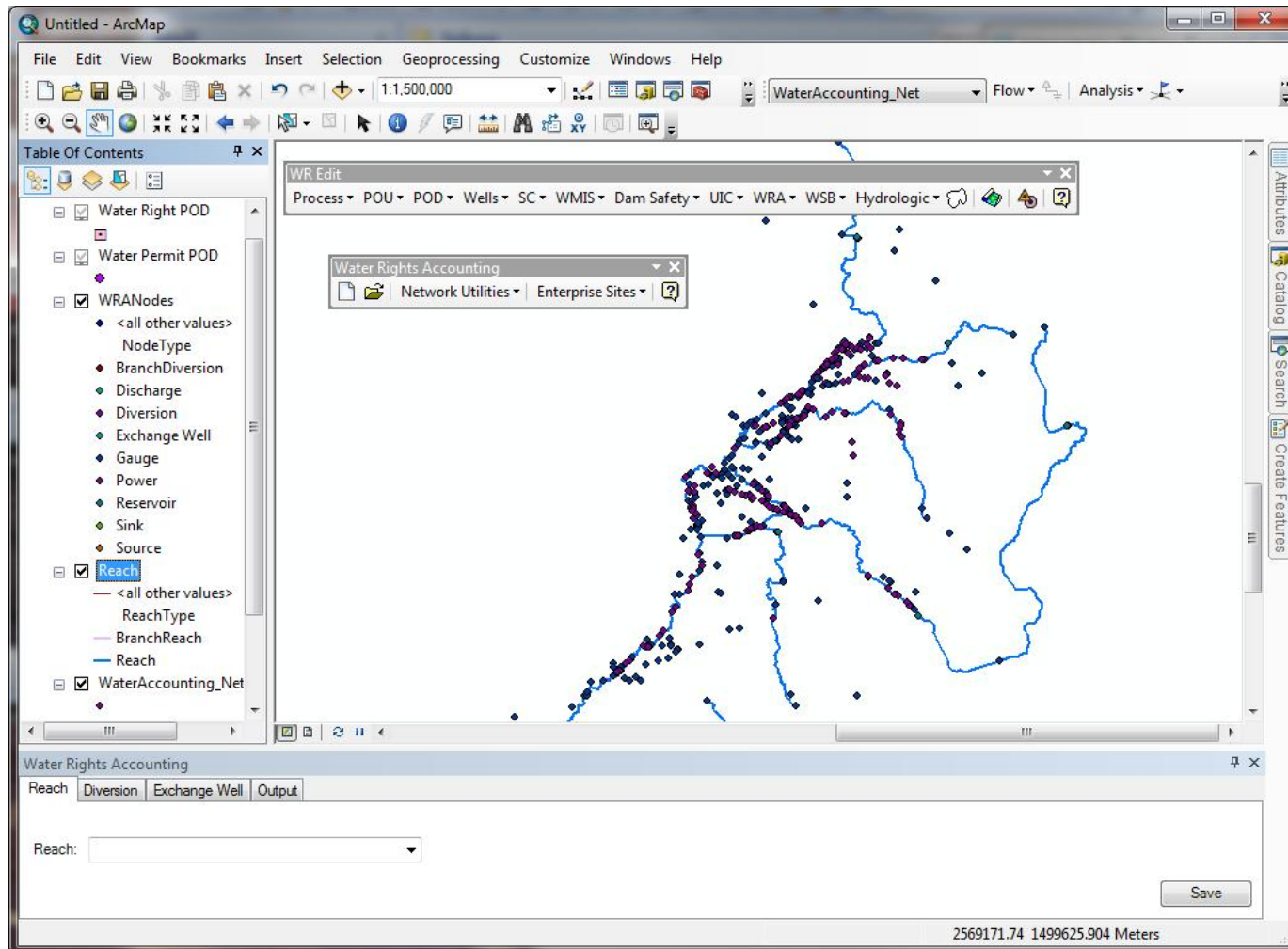
- Daily
 - Collect, review (shifts, errors, etc), and load timeseries data
 - Run accounting model
 - Review output for errors
 - Publish data
 - Send daily reports
- Occasional
 - New diversions
 - Water right transfers
 - Combine/un-combine diversions
 - New special calculations
- One-time
 - Build core model and network

Database Issues

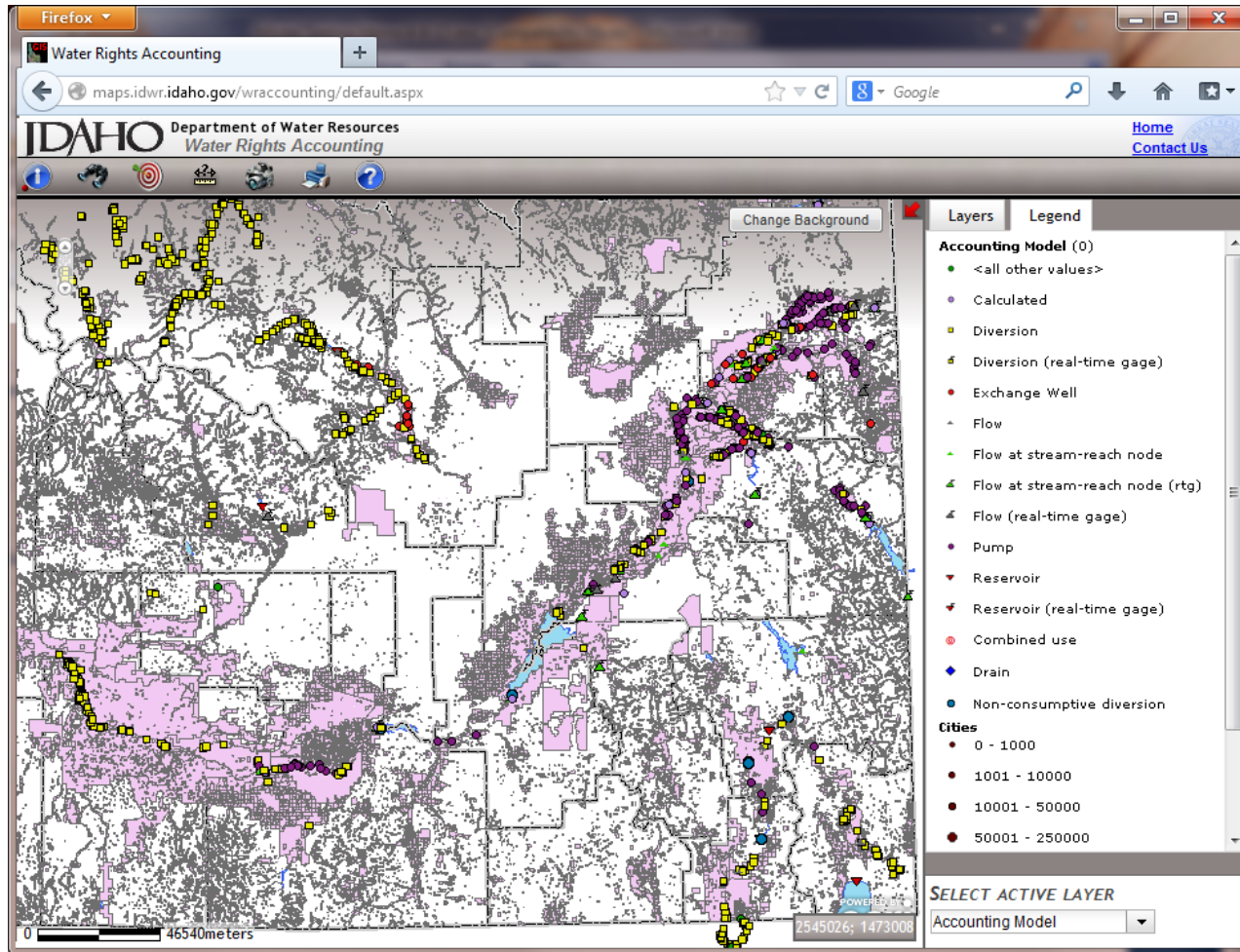
- Time to upgrade our Access databases to SQL Server
- This upgrade would have direct impacts on GIS tool design and functionality

Model Builder

- Generates network and diversion configuration

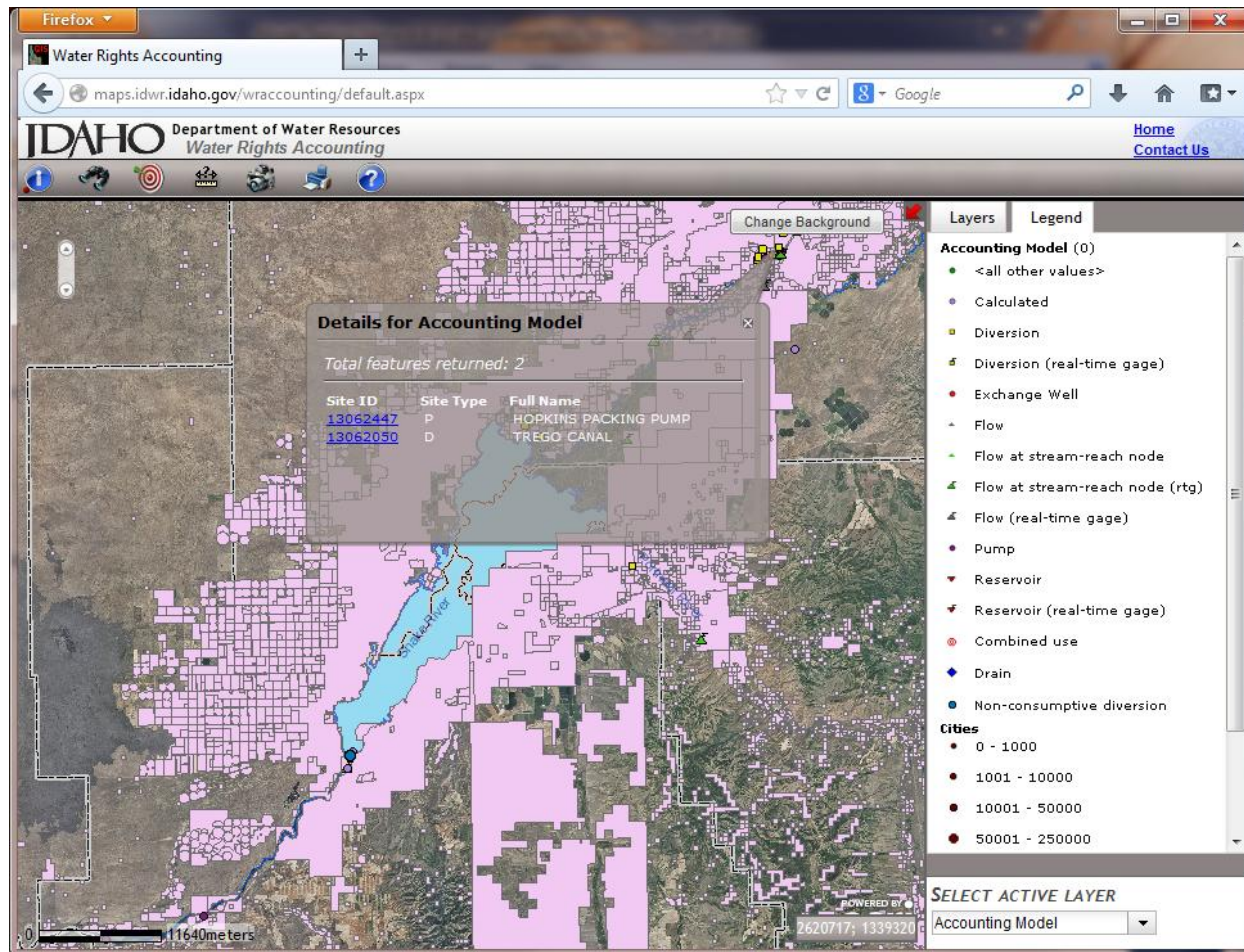


Web Mapping Tool

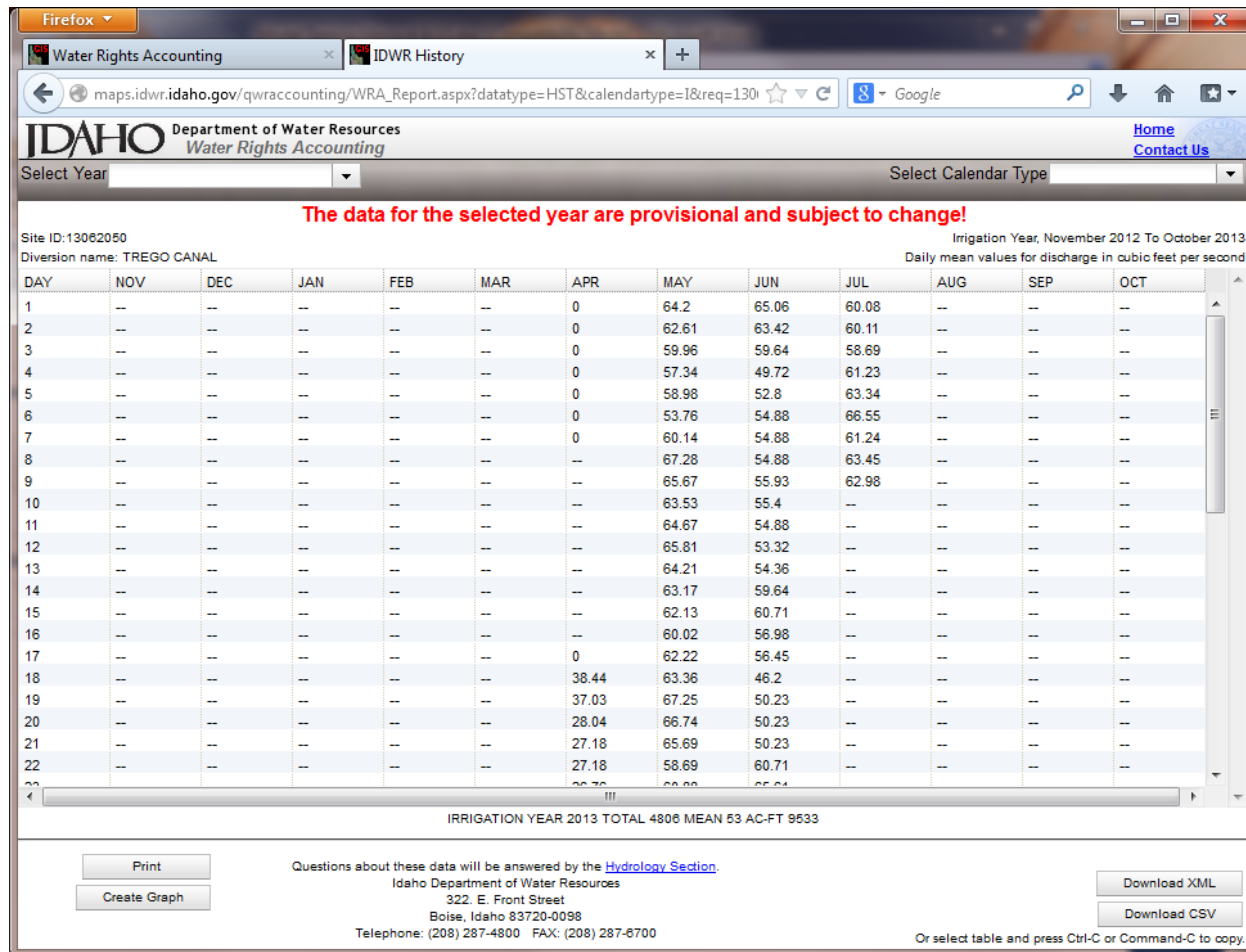


<http://www.idwr.idaho.gov/GeographicInfo/accounting.htm>

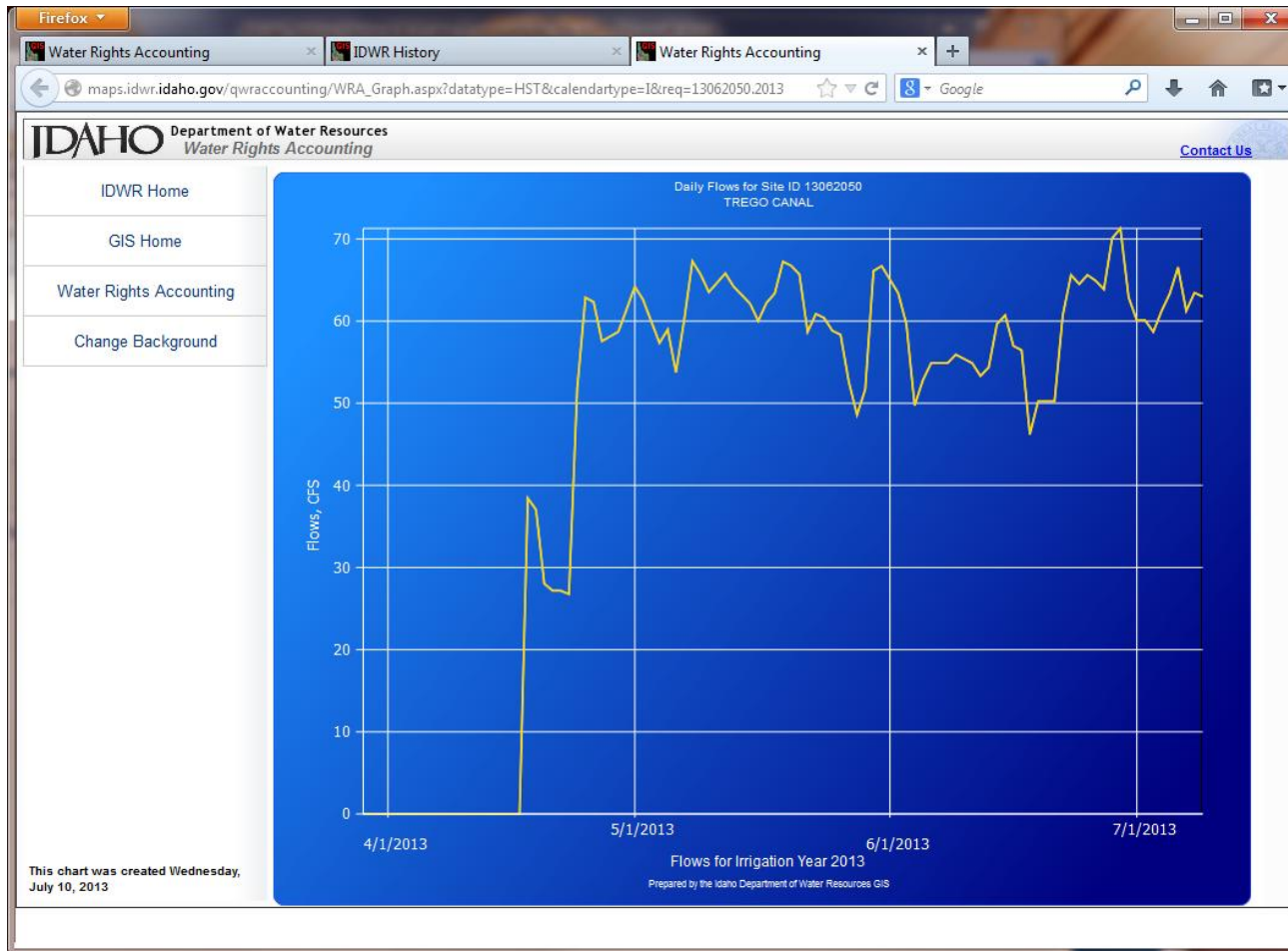
Web Mapping Tool



Web Mapping Tool



Web Mapping Tool



Web Tabular Data

Firefox

Idaho Department of Water Resources Water Rights Accounting -- Select Riv... +

maps.idwr.idaho.gov/qWRAccounting/WRA_Select.aspx

Google

Home Contact Us

Select Sites and Years to Report

Explanation

The data available from this page are **daily values for flows, diversions or reservoir contents**.

You may create a multi-year or multi-site report.

Once the report has been generated you will have the option of downloading or graphing the results.

Step 1. Select River System

Upper Snake River

Step 2. Select data source

☐ Historical records

☒ Water Rights Accounting data

Step 3. Select one or more sites.

| Site ID | Type | Name | # HST Years | # ALC Years |
|----------|------|---------------------------------------|-------------|-------------|
| 13010500 | R | JACKSON LAKE | 37 | 26 |
| 13011000 | F | SNAKE RIVER NR MORAN WY | 37 | 26 |
| 13022500 | F | SNAKE RIVER AB RESERVOIR NR ALPINE WY | 35 | 26 |
| 13023000 | F | GREYS RIVER AB RESERVOIR NR ALPINE WY | 35 | 26 |
| 13027500 | F | SALT RIVER AB RESERVOIR NR ETNA WY | 35 | 26 |
| 13032450 | R | PALISADES RESERVOIR NEAR IRWIN | 37 | 26 |
| 13032500 | F | SNAKE RIVER NR IRWIN ID | 37 | 26 |
| 13032510 | P | P BYRD PUMP | 28 | 26 |
| 13032515 | P | BOY SCOUT CAMP PUMP | 26 | 14 |
| 13032520 | P | A ROSTAD PUMP | 26 | 16 |
| 13032920 | P | R ROSE PUMP | 22 | 21 |
| 13033010 | D | PALISADES CANAL | 25 | 24 |
| 13033643 | P | W FLEMING PUMP | 35 | 18 |
| 13033650 | P | MERT OGDEN PUMP | 27 | 21 |
| 13033660 | P | LYNN DIXON PUMP | 11 | 11 |
| 13033690 | P | T LOTT #2 PUMP | 25 | 0 |

Step 4. Select one or more years.

Year

2013

2012

2011

2010

2009

2008

2007

2006

Step 5. Submit your request.

You may select a single site and a single year, a single site for multiple years, or multiple sites for a single year. If you select multiple years or sites you will see only a single year/site on the next form. However, when you download data, all of the sites/years selected will be present. [View Users' Manual](#).

☒ I have read and agree to the [Conditions of Use](#).

Submit

Web Tabular Data

Firefox

Idaho Department of Water Resources | Water Rights Accounting -- Select Riv... | IDWR History

maps.idwr.idaho.gov/qWRAccounting/WRA_Report.aspx?datatype=ALC&calendartype=I&req=13033010.2013

IDAHO Department of Water Resources
Water Rights Accounting

Select Year: Select Calendar Type:

The data for the selected year are provisional and subject to change!

Site ID: 13033010
Diversion name: PALISADES CANAL

Irrigation Year, November 2012 To October 2013
Actual flow and storage for diversion

| Date | Actual-CFS DIVN | Storage-CFS STOR | Storage-AF USED | Remaining-AF RMNG | Total-AF Diverted | HSTDate |
|------------|--------------------|---------------------|--------------------|----------------------|----------------------|------------|
| 11/1/2012 | 0 | 0 | 0 | 0 | 0 | 10/28/2012 |
| 11/2/2012 | 0 | 0 | 0 | 0 | 0 | 10/29/2012 |
| 11/3/2012 | 0 | 0 | 0 | 0 | 0 | 10/30/2012 |
| 11/4/2012 | 0 | 0 | 0 | 0 | 0 | 10/31/2012 |
| 11/5/2012 | 0 | 0 | 0 | 0 | 0 | 11/1/2012 |
| 11/6/2012 | 0 | 0 | 0 | 0 | 0 | 11/2/2012 |
| 11/7/2012 | 0 | 0 | 0 | 0 | 0 | 11/3/2012 |
| 11/8/2012 | 0 | 0 | 0 | 0 | 0 | 11/4/2012 |
| 11/9/2012 | 0 | 0 | 0 | 0 | 0 | 11/5/2012 |
| 11/10/2012 | 0 | 0 | 0 | 0 | 0 | 11/6/2012 |
| 11/11/2012 | 0 | 0 | 0 | 0 | 0 | 11/7/2012 |
| 11/12/2012 | 0 | 0 | 0 | 0 | 0 | 11/8/2012 |
| 11/13/2012 | 0 | 0 | 0 | 0 | 0 | 11/9/2012 |
| 11/14/2012 | 0 | 0 | 0 | 0 | 0 | 11/10/2012 |
| 11/15/2012 | 0 | 0 | 0 | 0 | 0 | 11/11/2012 |
| 11/16/2012 | 0 | 0 | 0 | 0 | 0 | 11/12/2012 |
| 11/17/2012 | 0 | 0 | 0 | 0 | 0 | 11/13/2012 |
| 11/18/2012 | 0 | 0 | 0 | 0 | 0 | 11/14/2012 |
| 11/19/2012 | 0 | 0 | 0 | 0 | 0 | 11/15/2012 |
| 11/20/2012 | 0 | 0 | 0 | 0 | 0 | 11/16/2012 |
| 11/21/2012 | 0 | 0 | 0 | 0 | 0 | 11/17/2012 |
| 11/22/2012 | 0 | 0 | 0 | 0 | 0 | 11/18/2012 |
| 11/23/2012 | 0 | 0 | 0 | 0 | 0 | 11/19/2012 |
| 11/24/2012 | 0 | 0 | 0 | 0 | 0 | 11/20/2012 |
| 11/25/2012 | 0 | 0 | 0 | 0 | 0 | 11/21/2012 |
| 11/26/2012 | 0 | 0 | 0 | 0 | 0 | 11/22/2012 |
| 11/27/2012 | 0 | 0 | 0 | 0 | 0 | 11/23/2012 |

Print | Create Graph | Questions about these data will be answered by the [Hydrology Section](#).
Idaho Department of Water Resources
322 E. Front Street
Boise, Idaho 83720-0098
Telephone: (208) 287-4800 FAX: (208) 287-6700

Download XML | Download CSV | Or select table and press Ctrl-C or Command-C to copy

Phases 3 and 4

- Reintegrate tools that replace hardcoding?
- Implement policy toggle functionality

Next Steps

- WRA 2.0 Work Plan (hand out)
- Support subcommittee policy review with code changes and toggle functionality
- Other improvements?



Snake Accounting Model Testing

Jennifer Cuhaciyen, IDWR Technical Hydrologist

July 11th, 2013



Testing Scenarios

- 2012 (dry)

| | |
|------------------------------|---|
| 11-1-11 to 5-4-12 | Resetting the accounting for the start of the irrigation year. |
| 5-5-12 to 6-14-12 | Resetting the accounting for the day that Milner spill ceases. |
| 6-15-12 to 6-24-12 | Resetting for the Day of Allocation |
| 6-25-12 to 10-31-12 | Resetting reservoir contents due to water spilled for flood control on June 25 th . |
| 10-31-12 (no projected days) | This data set represents the conditions of a typical day-to-day accounting run that would occur throughout the irrigation season. |
| 10-31-12 (5 projected days) | Represents a typical day to day accounting run with 5 projected days. |

- 2011 (wet)
 - Final accounting run

Testing Goals

- Fix code
- Explore and explain differences
 - Rounding
 - Calculation precision

Comparison Results

- Compared every output value
 - 2,340 values per accounting day
 - Largest volume difference = 0.4 AF
 - Largest flow difference = 0.1 cfs
- Cumulative storage used by user
 - Difference no greater than 0.01%

Comparison Results

| Cumulative Storage Use (AF) | | | | | |
|-----------------------------|----------------------------|-----------|-----------|------|-----------|
| Site | Name | Old | New | Diff | % Diff |
| 13033010 | Palisades Canal | 838.7 | 838.8 | 0.1 | 0.011923% |
| 13049805 | Salem Union Canal | 16,725.3 | 16,725.4 | 0.1 | 0.000598% |
| 13061525 | Peoples (25A) | 31,118.1 | 31,118.2 | 0.1 | 0.000321% |
| 13038055 | Harrison | 40,007.3 | 40,007.4 | 0.1 | 0.000250% |
| 13087500 | Twin Falls South | 180,539.7 | 180,540.1 | 0.4 | 0.000222% |
| 13080000 | Minidoka N (27A) | 351,424.2 | 351,424.0 | 0.2 | 0.000057% |
| 13087000 | Northside Twin Falls (28A) | 606,943.9 | 606,943.8 | 0.1 | 0.000016% |

| Reservoir Accounts (AF) | | | | | |
|-------------------------|--------------------|-------------|-------------|------|-----------|
| Site | Name | Old | New | Diff | % Diff |
| 99999902 | American Falls WWS | 21,715.2 | 21,715.1 | 0.1 | 0.000461% |
| 99999905 | Total Stored | 4,111,353.5 | 4,111,353.4 | 0.1 | 0.000002% |

| Total Annual Diversion (AF) | | | | | |
|-----------------------------|-------------------------|-----------|-----------|------|----------|
| Site | Name | Old | New | Diff | % Diff |
| 13038090 | Lowder Slough | 12,332.4 | 12,332.3 | 0.1 | 0.00081% |
| 13038210 | Island (30A) | 45,215.7 | 45,215.8 | 0.1 | 0.00022% |
| 13085500 | A&B Irrigation District | 60,353.0 | 60,353.1 | 0.1 | 0.00017% |
| 13049805 | Salem Union Canal | 62,226.4 | 62,226.5 | 0.1 | 0.00016% |
| 13038305 | Parks & Lewisville | 121,896.9 | 121,896.8 | 0.1 | 0.00008% |
| 13038110 | Burgess (4A) | 266,866.6 | 266,866.4 | 0.2 | 0.00007% |
| 13058510 | Progressive Sand | 140,605.6 | 140,605.5 | 0.1 | 0.00007% |
| 13038225 | W Labelle & Lg I (7A) | 144,027.5 | 144,027.6 | 0.1 | 0.00007% |
| 13059525 | Snake R Valley (23A) | 144,267.3 | 144,267.2 | 0.1 | 0.00007% |
| 13037975 | Eagle Rock (1B) | 223,914.3 | 223,914.4 | 0.1 | 0.00004% |
| 13087500 | Twin Falls South | 990,712.8 | 990,713.1 | 0.3 | 0.00003% |
| 13087000 | Northside TF (28A) | 677,553.9 | 677,554.1 | 0.2 | 0.00003% |
| 13061610 | Aberdeen | 342,834.0 | 342,833.9 | 0.1 | 0.00003% |

2013 Parallel Runs