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# Task 2: Update NHD in IDWR Critical Areas – Mud Lake Area

COOPERATIVE AGREEMENT NO. G13AC00195

IDAHO DEPARTMENT OF WATER RESOURCES  
322 EAST FRONT ST.  
P.O. BOX 83720  
BOISE, ID 83720

Linda Davis, Idaho NHD Principal Steward  
Danielle Favreau, Idaho NHD Tech. Point of  
Contact  
Michael Verdun, GIS Analyst

REPORT TO THE UNITED STATES GEOLOGICAL SURVEY

Jeffrey Simley  
National Hydrography Dataset  
U.S. Geological Survey , NGTOC  
P.O. Box 25046, MS-510, DFC  
Denver, Colorado 80225

Tom Carlson  
Geospatial Liaison  
U.S. Geological Survey  
NW Region  
934 Broadway, Suite 98402  
Tacoma, WA 98402



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## Introduction:

In Idaho, water resources management is critical to the State's agriculturally-based economy. Idaho is the second largest water user in the U.S., only behind California, with the majority of water used in agriculture.<sup>i</sup> Idahoans are also heavily dependent on its water for power. Nearly 90% of Idaho's power is hydroelectric with 136 hydroelectric plants generating an annual average of 11 billion kilowatt hours.<sup>ii</sup> Planners and engineers have a difficult task implementing water-related projects without accurate data and need adequate tools for planning and design. In areas like southern Idaho, where agriculture is dominant, the current National Hydrography Dataset (NHD) often does not match the existing hydrography because of changes on the ground since the digital information was created. The expansion of agricultural land led to the construction of canals and the altering of waterways, sometimes with major changes to the original hydrography.

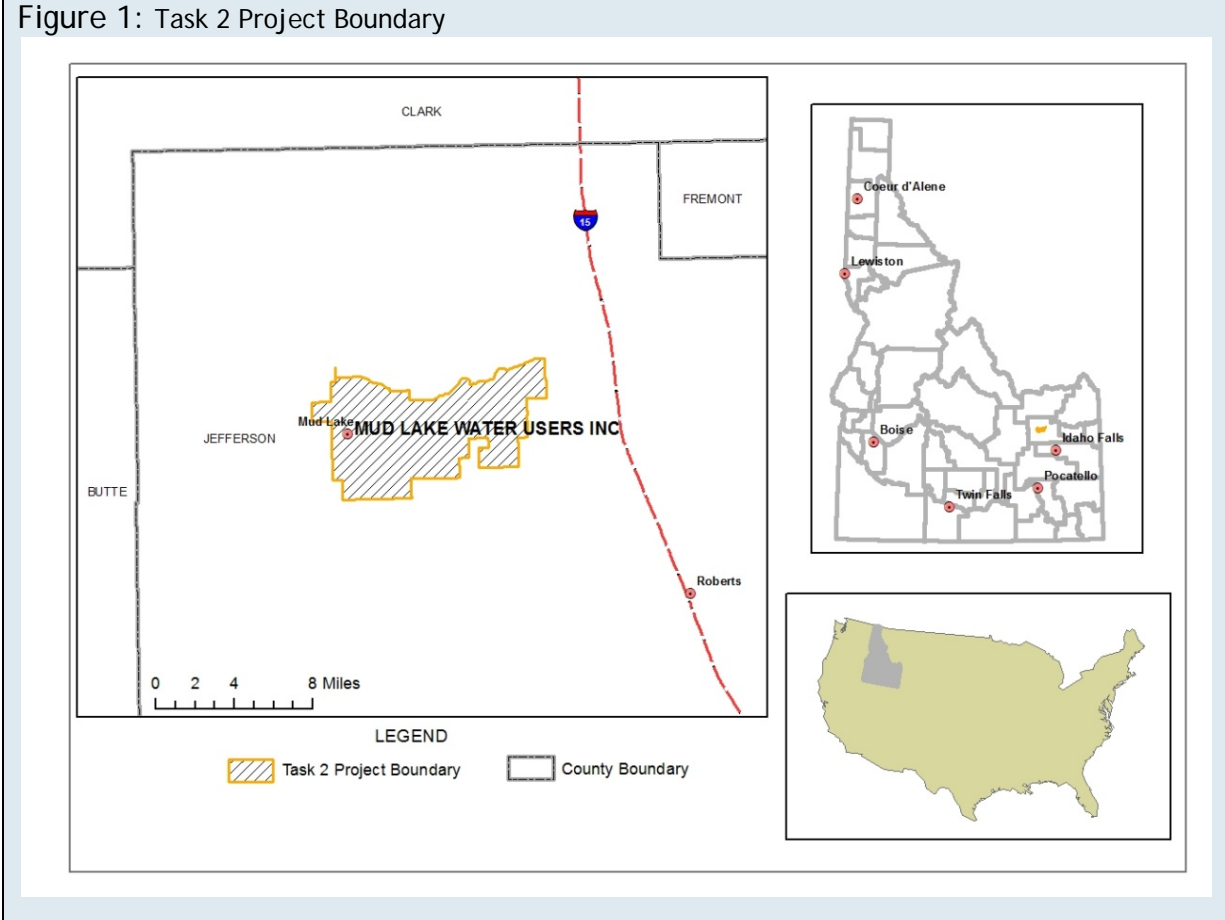
Accurate maps and digital data are the basic tools for planning and designing water projects, such as managed aquifer recharge, and are essential components of hydrologic modeling. Although groundwater comprises only 22 percent of Idaho's total water use, it accounts for nearly 95 percent of Idaho's drinking water.<sup>iii</sup> One of Idaho's important aquifers is the Eastern Snake Plain Aquifer (ESPA). The ESPA covers approximately 10,800 square miles in Southeastern Idaho. The ESPA is a vital source of water for a region that produces approximately 21 percent of all goods and services within Idaho.<sup>iv</sup> ESPA Aquifer recharge occurs primarily via irrigation percolation, canal and stream losses, and subsurface flow from surrounding areas.<sup>v</sup>

The Mud Lake Water Users Inc. water right boundary overlies a portion of the north eastern part of the Eastern Snake Plain Aquifer. The Mud Lake Water Users Inc. diverts from Mud Lake for irrigation purposes. Mud Lake is an important water fowl migration and fishing destination. It is encompassed by the Mud Lake Wild Life Management area and the Camas National Wildlife Refuge.

### Area of Interest - Mud Lake Water Users Inc:

The Task 2 Project Area consists primarily of the hydrologic units intersecting the Mud Lake Water Users Inc. (MLWU) water right boundary. The MLWU is located in Jefferson County in Eastern Idaho. The MLWU boundary intersects 4 watersheds (HUC - 10), 1704021406, 1704021407, 1404021505, and 1704021506. In addition, the MLWU boundary is within the newly formed Water District 110. A Water District is created by order of the Director of IDWR for purposes of water right administration, specifically distribution of water from public or natural water sources in accordance with water right priority dates.<sup>vi</sup>

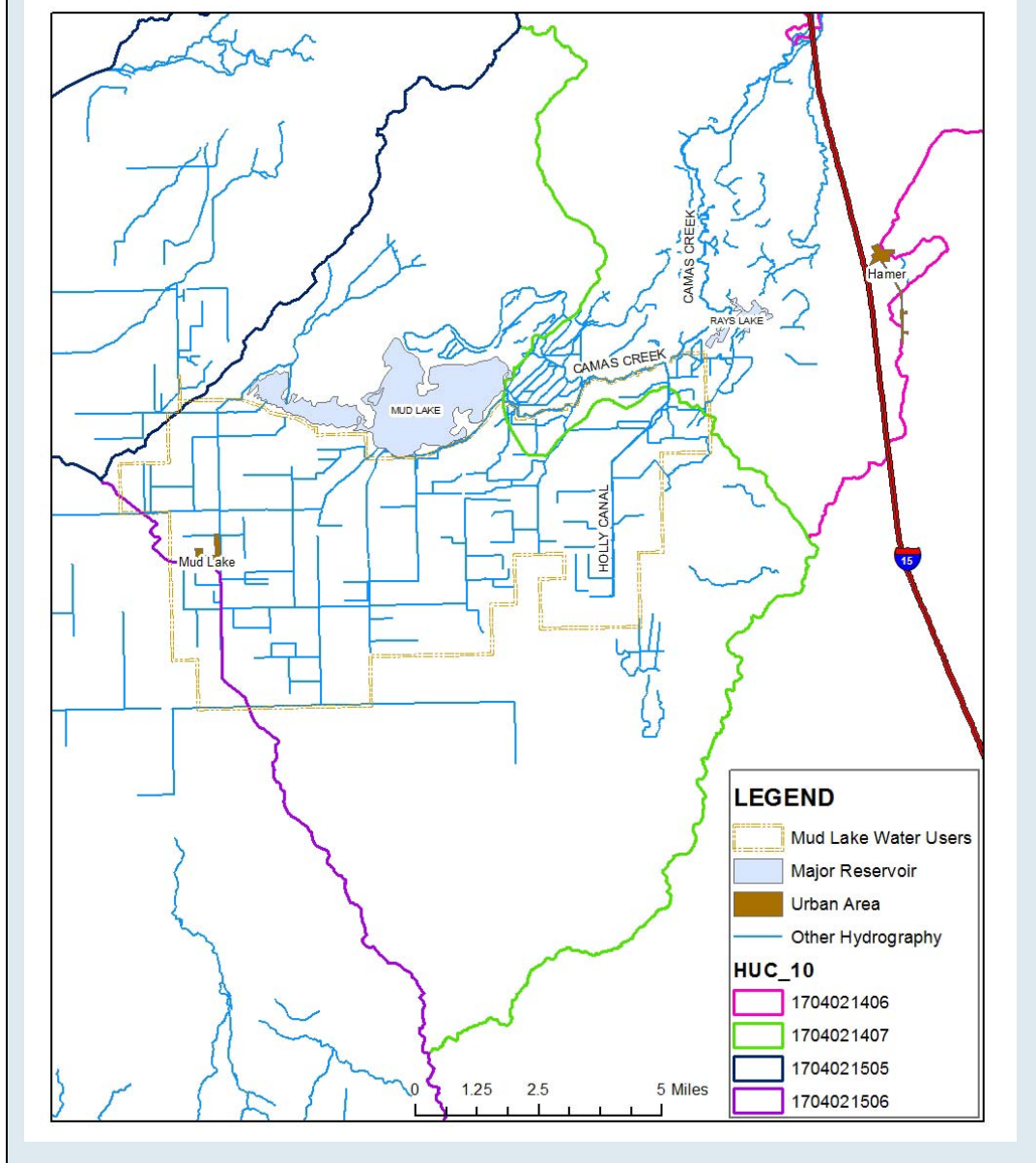
Figure 1: Task 2 Project Boundary



Most of the population within the project area is within the small town of Mud Lake. Based on the 2010 Census data, Mud Lake has a population of 358. <sup>vii</sup> This HU has a mix of private and federal lands including the Camas National Wildlife Refuge. About 35% of the project area is privately owned. Other significant land owners include the Bureau of Land Management (28% of the project area), the Department of Energy (28% of the project area), and the State of Idaho (8% of the project area). <sup>viii</sup> The 8500 acres North Lake State Wildlife Management Area is also in the project area.

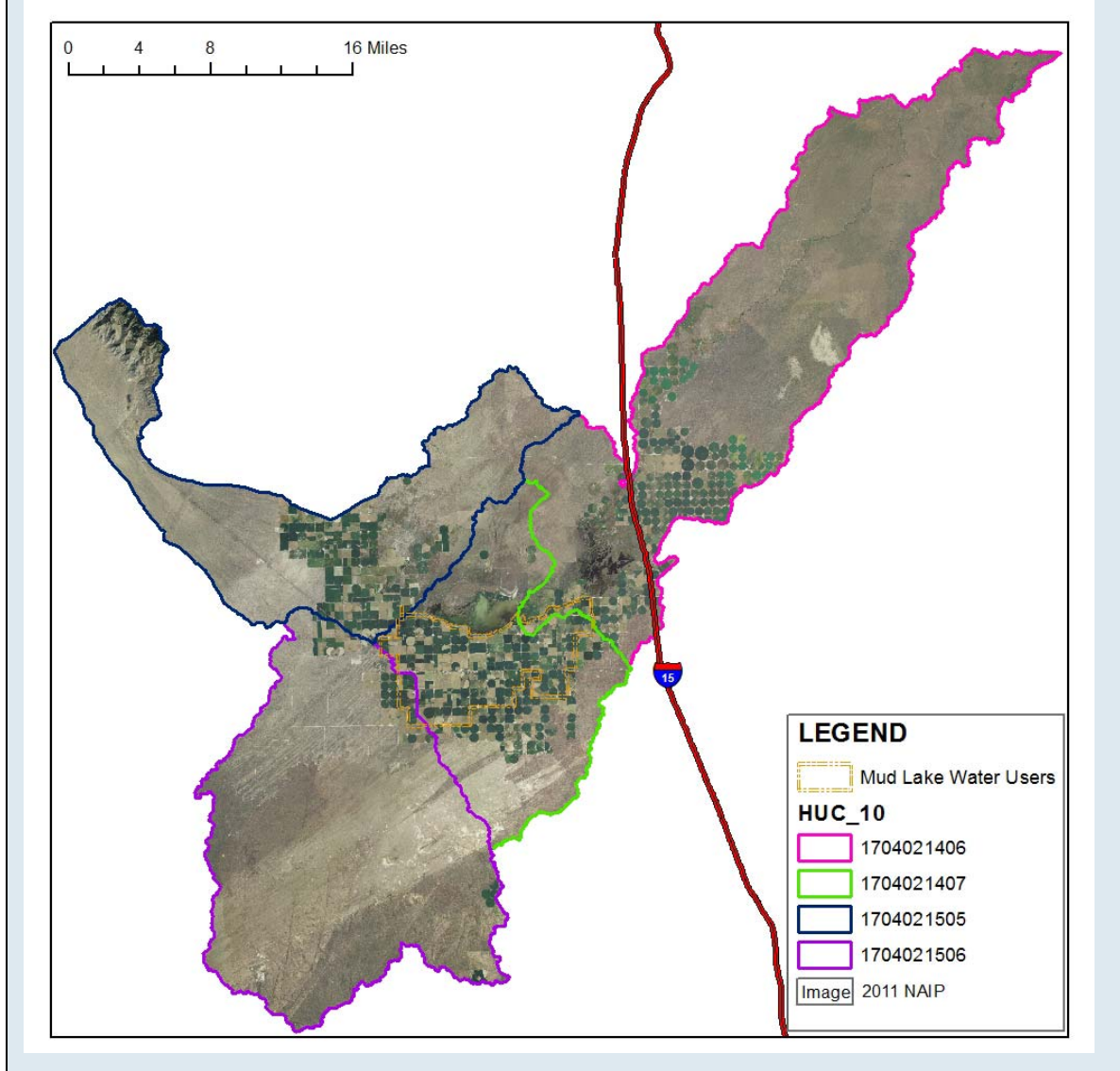
Camas Creek is the major creek in the project area. There are two major reservoirs in the project area; Mud Lake and Rays Lake. Mud Lake is approximately 3000 acres and Rays Lake is approximately 200 acres. (Figure 2)

Figure 2: Task 2 Hydrography



There is significant agricultural activity in the project area primarily along Camas Creek, the I-15 corridor, the area northwest of Mud Lake, and the service area of MLWU. Grassland and Shrubland dominate the majority of the undeveloped project area. (Figure 3)

Figure 3: Task 2 General Land Use



#### Methods:

The Idaho NHD Technical Point of Contact downloaded the appropriate SubBasins from the NHD website (<http://nhd.usgs.gov/data.html>). The project area consists of portions of Hydrologic units (HU) 17040214 and 17040215. The existing NHD Flowlines and other NHD features in Watersheds 1704021406, 1704021407, 1704021505, and 1704021506 were photo-rectified using 2011 and 2013 NAIP imagery. Areas where there were questions regarding flow direction, new features, or interactions of features were recorded in order to be sent to local water managers for input.

The next step was to collect locally available data from cooperators within the project area. Maps of hydrography over NAIP imagery of the project area were supplied to the cooperators. The cooperators were encouraged to write on the maps indicating areas where the geometry need to be adjusted and names added or corrected. The updated maps were used to verify correct placement of hydrography, flow direction, and connectivity. Also, the data provided by the local cooperators were used for submittal to GNIS in order to update names for unnamed NHDflowlines.

Maps and a request for input from the Mud Lake Water Users Inc. were requested. Two separate mailings were sent. Unfortunately, no input was received from Mud Lake Water Users Inc. within the timeline of this project.

Results:

Updates Provided to USGS for Incorporation into the NHD

During this process, 614 NHDFlowlines, 3 Waterbody, and 14 NHD Area were inserted, updated, or deleted (Table 2). Updates were submitted to USGS for incorporation into the NHD. See Figure 4 for representations of all the updated linework as a result of this project.

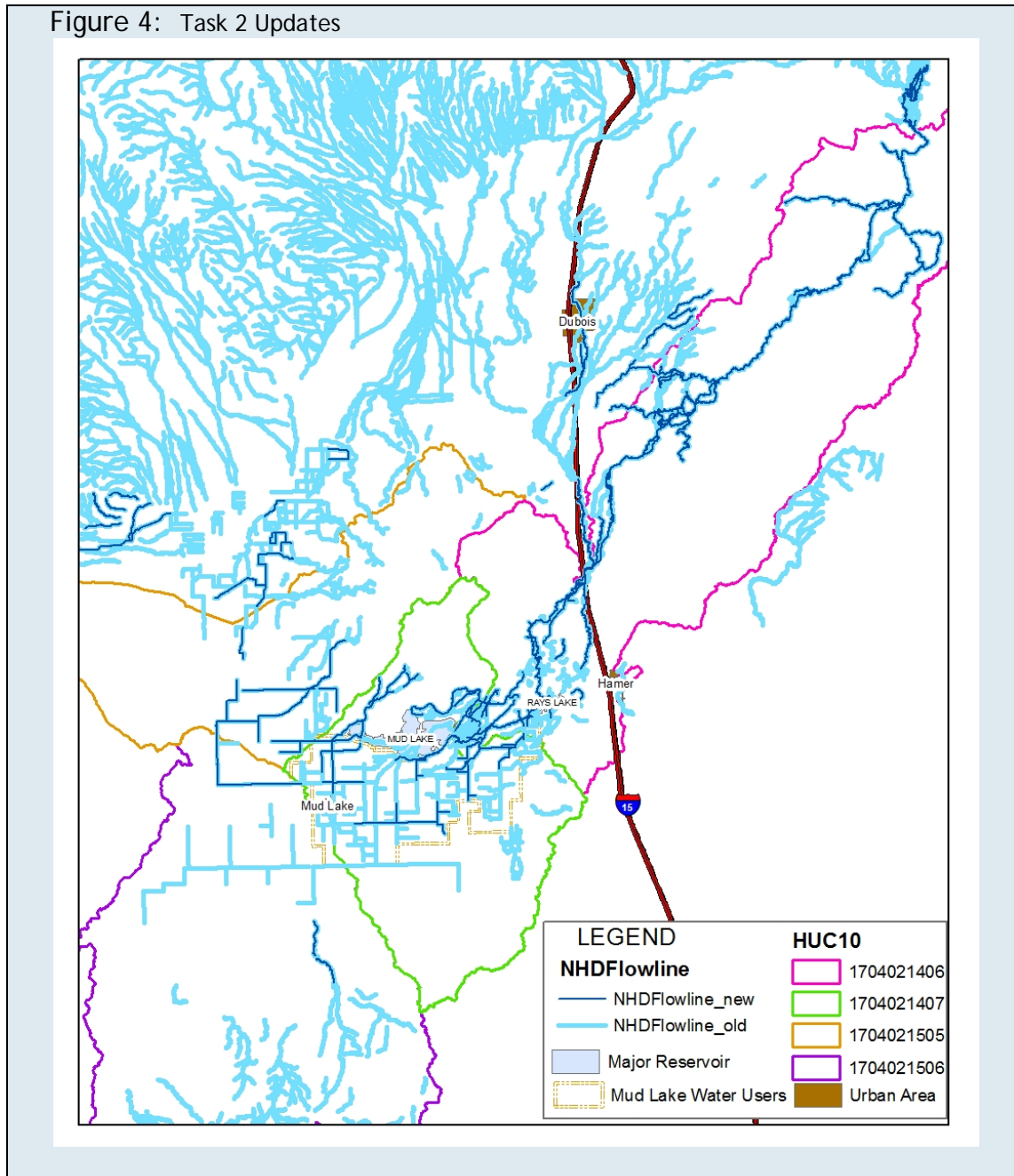
| <b>Table 2: Number of Edits per Watershed</b> |               |               |               |
|---|---------------|---------------|---------------|
| <b>NHDFlowline Edits</b>                      | <b>Delete</b> | <b>Insert</b> | <b>Update</b> |
| 17040214                                      | 18            | 28            | 512           |
| 17040215                                      | 0             | 1             | 55            |
| <b>TOTAL</b>                                  | <b>18</b>     | <b>29</b>     | <b>567</b>    |
| <b>NHDWaterbody Edits</b>                     | <b>Delete</b> | <b>Insert</b> | <b>Update</b> |
| 17040214                                      | 0             | 0             | 3             |
| 17040215                                      | 0             | 0             | 0             |
| <b>TOTAL</b>                                  | <b>0</b>      | <b>0</b>      | <b>3</b>      |
| <b>NHDArea Edits</b>                          | <b>Delete</b> | <b>Insert</b> | <b>Update</b> |
| 17040214                                      | 0             | 0             | 13            |
| 17040215                                      | 0             | 0             | 1             |
| <b>TOTAL</b>                                  | <b>0</b>      | <b>0</b>      | <b>14</b>     |
| <b>GRAND TOTAL</b>                            | <b>18</b>     | <b>29</b>     | <b>584</b>    |

Maps provided to Cooperators

IDWR provided maps of the updated NHD to cooperators illustrating the submitted updates in their service area.



Figure 4: Task 2 Updates



## Discussion and Conclusions:

### Issues and Challenges

- 1) *Extensive photorevision was necessary.* Because of the large amount of agricultural activity in the project area, the existing NHDFlowlines did not reflect current ground conditions.



- 2) *Obtaining input from the local managers in a timely manner.* Although the Mud Lake Water Users Inc. was contacted for input, none was received within the timeline of this project.

## Conclusion

Although photo-revision is an effective way to update hydrography, input from local sources is critical in accurately depicting connectivity, vertical relationships, and flow direction. Cooperation from local managers is achieved by providing maps and data products that they find useful in their business processes.

IDWR was able to provide better data for development and monitoring of managed recharge projects and other water management projects. In working together, all the cooperators have a product that is better than what any one organization could have produced.

## End Notes:

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<sup>i</sup> <http://www.uiweb.uidaho.edu/wq/wqpubs/cis887.html>

<sup>ii</sup> [http://www.legislature.idaho.gov/sessioninfo/2006/interim/energy0810s\\_INL.pdf](http://www.legislature.idaho.gov/sessioninfo/2006/interim/energy0810s_INL.pdf)

<sup>iii</sup> Mahler, R.L. & Van Steeter, M. M., *Idaho's Water Resource, Current Information Series No. 887.* University of Idaho. Retrieved January 15, 2013 from <http://www.uiweb.uidaho.edu/wq/wqpubs/cis887.html>

<sup>iv</sup> <http://www.idwr.idaho.gov/waterboard/WaterPlanning/CAMP/ESPA/>

<sup>v</sup> [http://www.idwr.idaho.gov/waterboard/WaterPlanning/PDFs/2010\\_Resource-Inventory.pdf](http://www.idwr.idaho.gov/waterboard/WaterPlanning/PDFs/2010_Resource-Inventory.pdf) p. 34

<sup>vi</sup> <http://www.idwr.idaho.gov/WaterManagement/WaterRelatedDistricts/default.htm>

<sup>vii</sup> <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>

<sup>viii</sup> GIS analysis of Idaho Land Management layer. <http://www.idwr.idaho.gov/ftp/gisdata/GISScripts/downloadform.asp?path=Spatial/AdministrativeBoundaries/IdahoOwnership&package=idown.pkg>