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Task 1: Update NHD in IDWR Critical Areas – Bear Lake Area

COOPERATIVE AGREEMENT NO. G13AC00195

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REPORT TO THE UNITED STATES GEOLOGICAL SURVEY

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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.ⁱ 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.ⁱⁱ 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. Idaho is within two hydrologic regions, the Pacific Northwest Region (HU 17), and the Great Basin Region (HU 16). Most of Idaho is in the Pacific Northwest Region, but the southeastern corner of Idaho is the Great Basin Region, specifically the Bear River Subregion. The Bear River is one of the largest streams in North America whose waters do not reach an ocean. The Bear River begins in Utah's Uinta Mountains, and flows a total of 500 miles through three states; Utah, Wyoming, and Idaho, and ends at the Great Salt Lake – with only 90 miles distance from headwaters to mouth. There are 5 subbasins within the Bear River Drainage. Four subbasins are in Idaho – 16010102 Central Bear, 16010201 Bear Lake, 16010202 Middle Bear, and 16010204 Lower Bear-Malad. The largest city in the Bear River Drainage in Idaho is Preston, Idaho (pop. 5204). A total population for all Idaho Subbasins within this project area is 17233 (2010 census). Agriculture is the largest industry and there are more than fifty Irrigation companies that encompass the Bear River Area.

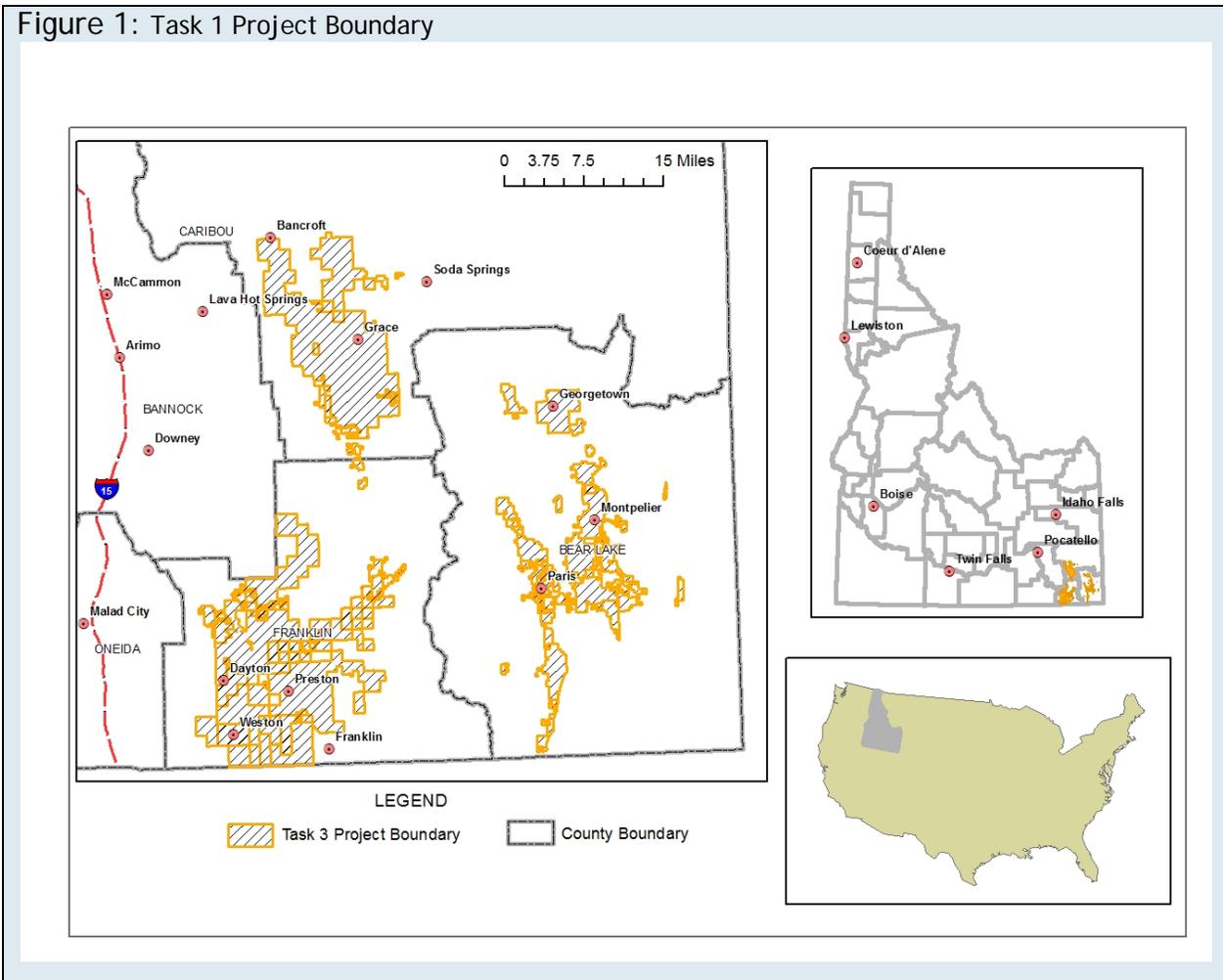
Idaho participates in the Bear River Compact (<http://www.bearrivercommission.org/>); a framework under which the waters of the Bear River are divided, and this framework regulates how the waters of the Bear River are distributed to water users in Idaho, Wyoming, and Utah. Accurate hydrologic information is needed in discussing and resolving water issues. Updated NHD allows for an easier exchange of information and a useful data set for modeling and events. The Bear Basin is also used in water right accounting (<http://www.idwr.idaho.gov/GeographicInfo/accounting.htm>) so accurate NHD assists in this effort as well.

IDWR has updated hydrography within the Bear River basin in Idaho, using NAIP imagery historical maps and local data. With this project, additional input has been solicited from local irrigation companies and interested stakeholders.

Area of Interest - Bear Lake Area:

The Task 1 Project Area consists primarily of the SubBasins 16010201 and 16010202. Watershed 1704020802 is also included in the project boundary as it intersects a portion of the Last Chance Canal Co. and the Farmers Land & Irrigation Corp. Water for the Last Chance Canal Co. and the Farmers Land & Irrigation Corp. originates from the Bear River or its tributaries and is transported across the Basin via canal. The Task 1 Project Area is located in Bannock, Franklin, and Bear Lake Counties in Eastern Idaho

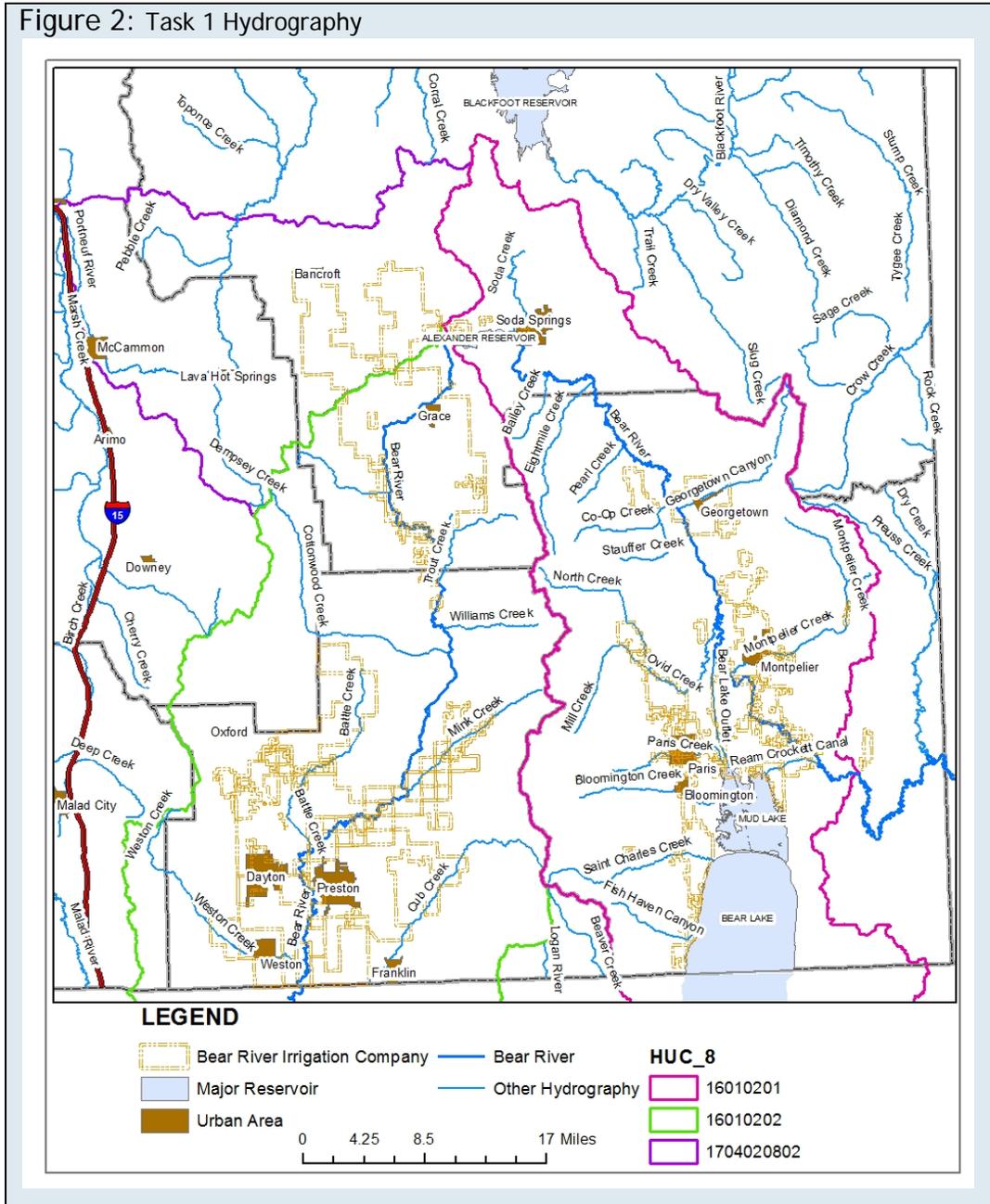
Figure 1: Task 1 Project Boundary



Most of the population within the project area is within the towns of Preston, Soda Springs, and Montpelier. From 2010 Census data; Preston has a population of 5204, Soda Springs has a population of 3058, and Montpelier has a population of 2597.ⁱⁱⁱ This HU has a mix of private and federal lands including the Bear Lake National Wildlife Refuge. About 60% of the project area is privately owned. The other significant land owner in the Project Area is the U.S. Forest Service (29% of the project area).^{iv}

The Bear River is the major river in the project area. Alexander Reservoir is on the Bear River near the town of Soda Springs. In addition, there are two major lakes in the project area; Bear Lake and its swampy northern cousin, Mud Lake or Dingle Marsh.

Figure 2: Task 1 Hydrography



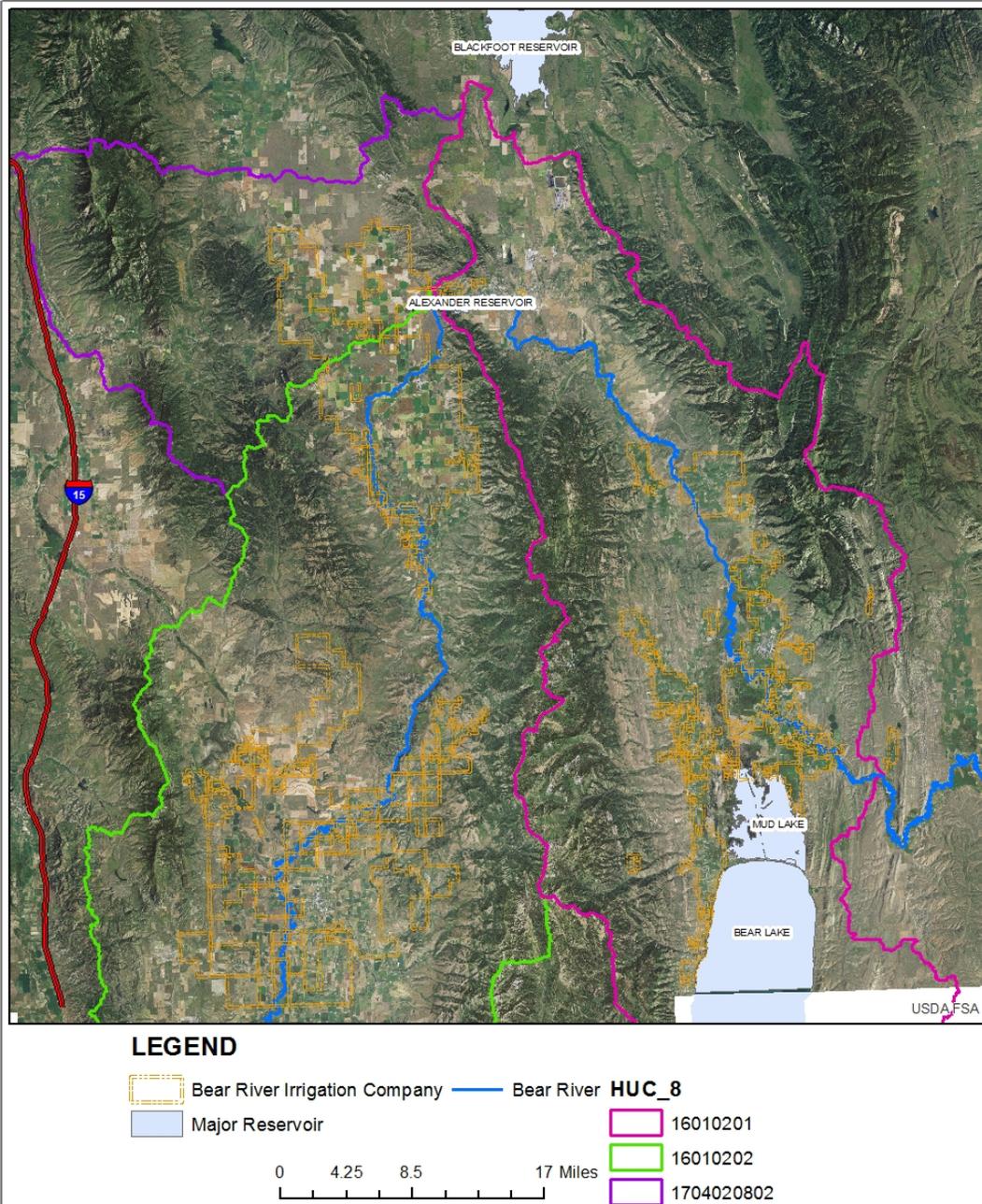
There are several water delivery organizations throughout the Area of Interest. To obtain the list of water delivery organizations, the IDWR Water Right Database was queried for active water rights for organizational owners with qualifiers like “irrigating” and “water company”. A list of the identified water delivery organizations based on water right information in the Bear Lake area is provided in Table 1. These organizations provide irrigation water for the significant agricultural activity in the project area. Agricultural activity is primarily along the Bear River and its major tributaries.

The Great Basin Region (HU 16) within Idaho has not gone through a water right adjudication since the 1920s. As a result, the organization list derived from existing Water Right information contained some organizations that are no longer in service, been renamed or reorganized, or otherwise restructured.

BATTLE CREEK IRRIGATION CO	FISH HAVEN WATER USERS CO	MAPLE CANYON CREEK WATER ASSN	REAM CROCKETT IRRIGATION CO	STRONGARM RESERVOIR IRRIGATION DISTRICT
BENNINGTON IRRIGATION CO	FIVE MILE IRRIGATION CO	MILL CANYON NORTH CANAL CO	RIVERDALE CANAL CO	TANNER BECKSTEAD DITCH CO
BIRCH CREEK IRRIGATION CO	GENTILE VALLEY IRRIGATION CO LTD	MINK CREEK IRRIGATION CO	RIVERDALE IRRIGATING CO	THATCHER IRRIGATION CO
BLOOMINGTON IRRIGATION CO	GEORGETOWN IRRIGATION CO	MONTPELIER IRRIGATION CO	RIVERDALE PRESTON IRRIGATION CO	THREE MILE CREEK IRRIGATION CO
CHEAPBECK WATER CO	GLENCOE IRRIGATION CO	NATURAL MINERAL WATER CO	RUSHVILLE IRRIGATION CO	TREASURETON IRRIGATION CO
CLIFTON IRRIGATING CO	GRIMMETT BLACK OTTER IRRIGATION CO	NELSON DITCH CO	SKINNER IRRIGATION CO	TWIN LAKES CANAL CO
CONSOLIDATED IRRIGATION CO	HILLTOP WATER ASSN	OXFORD RESERVOIR & IRRIGATION CO	SOUTH LIBERTY IRRIGATION & MFG CO	VALLEYVIEW SUBDIVISION WATER ASSN
CUB RIVER IRRIGATION CO	LAST CHANCE CANAL CO LTD	PARIS RELIEF CANAL CO	SOUTHFIELD DITCH & CANAL CO	WEST CACHE IRRIGATION CO INC
DINGLE IRRIGATION CO	LIBERTY HILLSIDE CANAL CO	PEG LEG ISLAND IRRIGATION CO	SOUTHFIELD IRRIGATION CO	WEST FORK IRRIGATION CO
DRY LAKE CANAL CO	LIBERTY TOWN CANAL CO	PIONEER IRRIGATION & MFG CO	ST CHARLES IRRIGATION CO	WESTON CREEK IRRIGATION CO
FARMERS LAND & IRRIGATION CORP	LITTLE VALLEY RESERVOIR & DITCH CO	PRESTON MONTPELIER IRRIGATION CO	STRONGARM IRRIGATION DISTRICT	

In the majority of the undeveloped project area, xeric shrubland dominates in the low lying areas, and forests are in the higher elevations. (Figure 3)

Figure 3: Task 1 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) 16010201 and 16010202. The existing NHDFlowlines and other NHD features were photo-rectified based on 2011 and 2013 NAIP imagery using the USGS NHD GeoEdit Tools. 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.

The majority of NHDFlowlines updates were in HU 16010202. Twenty seven of the project area organizations had boundaries that intersected HU 16010202. Of the 27 identified organizations, only 11 were active when searched on the Idaho Secretary of State Search for Business Entities website, <http://www.accessidaho.org/public/sos/corp/search.html>.

Maps were sent to 11 confirmed active water delivery organizations (Table 2). The staff at some of these water delivery organizations reviewed the updated maps and returned the edited information to IDWR for incorporation into the NHD (Table 3). The USGS NHD GeoEdit Tools were used to incorporate changes for submittal to the USGS for inclusion into the NHD.

BATTLE CREEK IRRIGATION CO, LTD.	CHEAPBECK WATER Co.	CONSOLIDATED IRRIGATION CO.	CUB RIVER IRRIGATION CO.	NELSON DITCH CO.
RIVERDALE CANAL Co.	RIVERDALE IRRIGATING Co.	RIVERDALE PRESTON IRRIGATION CO.	MINK CREEK IRRIGATION CO.	LAST CHANCE CANAL Co., LTD.
FARMERS LAND & IRRIGATION Co.				

RIVERDALE PRESTON IRRIGATION CO.	RIVERDALE IRRIGATING Co.	NELSON DITCH Co.	CHEAPBECK WATER Co.	FARMERS LAND & IRRIGATION Co.
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Results:

Updates Provided to USGS for Incorporation into the NHD

During this process, 1964 NHDFlowlines, 121 Waterbody, and 20 NHD Area edits were inserted, updated, or deleted (Table 4). In addition, four names were identified for submittal to GNIS. 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.

Table 4: Number of Edits per Subbasin			
NHDFlowline Edits	Delete	Insert	Update
16010102	0	0	5
16010201	7	2	18
16010202	65	171	1523
16010203	0	0	2
16010204	0	0	4
17040208	55	39	73
TOTAL	127	212	1625
NHDWaterbody Edits	Delete	Insert	Update
16010102	0	0	0
16010201	0	0	1
16010202	25	35	54
16010203	0	0	0
16010204	0	0	0
17040208	0	4	2
TOTAL	25	39	57
NHDArea Edits	Delete	Insert	Update
16010102	0	0	0
16010201	0	0	0
16010202	3	1	16
16010203	0	0	0
16010204	0	0	0
17040208	0	0	0
TOTAL	3	1	16
GRAND TOTAL	155	252	1698

Maps provided to Cooperators

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

- 2) *Obtaining input from the local managers in a timely manner.* Providing corrections to IDWR provided maps was one of many priorities. Not all water delivery organizations have full-time staff and therefore may not have been available to review maps within the timeline of this project.

Conclusion

Although photorevision 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 was achieved by providing maps and data products that they found 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.

Acknowledgements:

Thank you to staffs of Cheapbeek Water Co., Farmers Land & Irrigation Co., Nelson Ditch Co., Riverdale Irrigating Co. and Riverdale Preston Irrigation Co.

End Notes:

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

ⁱⁱ http://www.legislature.idaho.gov/sessioninfo/2006/interim/energy0810s_INL.pdf

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

^{iv} GIS analysis of Idaho Land Management layer.

<http://www.idwr.idaho.gov/ftp/gisdata/GISScripts/downloadform.asp?path=Spatial/AdministrativeBoundaries/IdahoOwnership&package=idown.pkg>