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# Task 1: Update NHD in IDWR Critical Areas – Weiser Sub-basin

COOPERATIVE AGREEMENT NO. G14AC00085

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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.<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 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 creating major changes to the original hydrography. Idaho is within the Pacific Northwest Region (HU 17), and the Great Basin Region (HU 16). Most of Idaho is in the Pacific Northwest Region and the project area falls within this region.

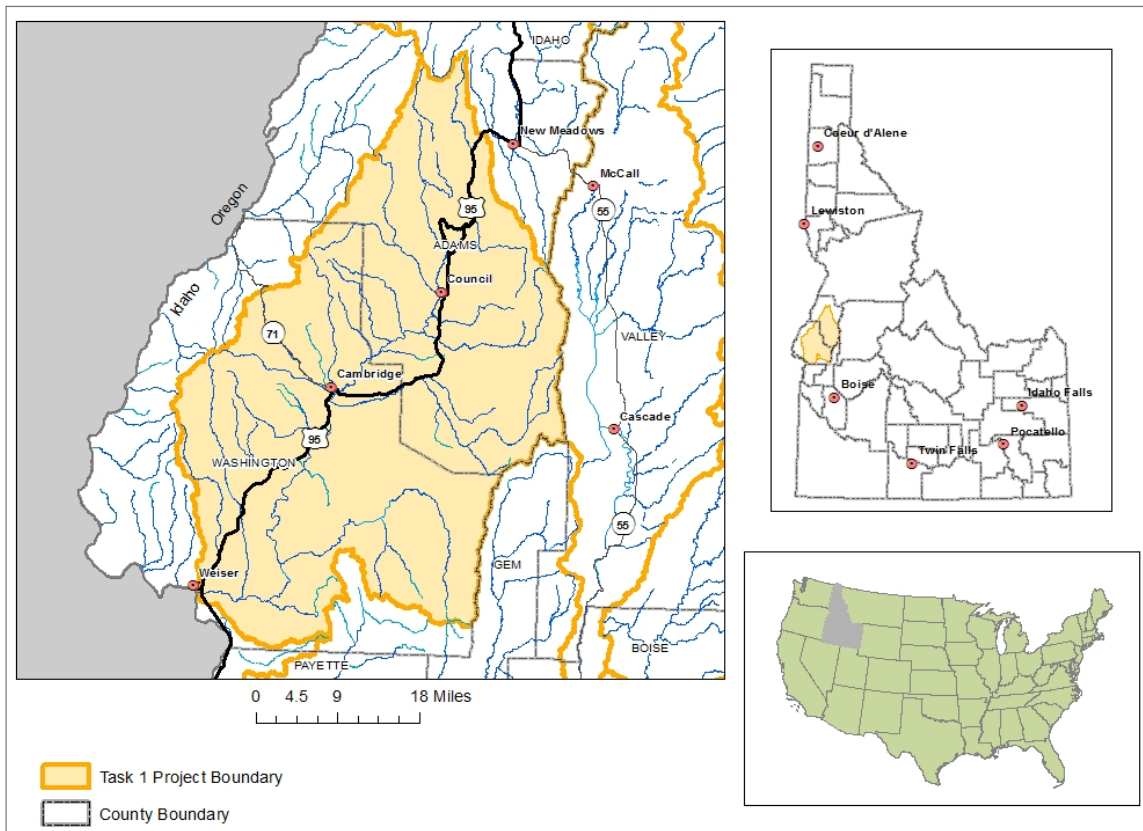
IDWR has updated hydrography within the Weiser SubBasin in Idaho, using NAIP imagery and local data. With this project, additional input has been solicited from local irrigation companies and interested stakeholders.

### Area of Interest - Weiser SubBasin:

The Project Area consists of the SubBasin 17050124. The Project Area is located in Washington County and Adams County in Western Idaho. The City of Weiser, population of over 5500<sup>iii</sup>, lies where the Weiser River meets the Snake River at the outflow of HU 17050124. Although there are several dams in HU 17050124, the Weiser River is unregulated. The latest flood event, in 2011, resulted in the closure of State Highway 95.<sup>iv</sup>

Water storage on Weiser River and at the Galloway site are currently being studied. In the early 1970s Federal lands for the potential Galloway dam and reservoir site were classified and withdrawn for hydropower purposes by the Federal Power Commission (now the Federal Energy Regulatory Commission). In 2008, the Idaho Water Resources Board was directed by the Idaho Legislature to investigate water storage projects statewide, including the Weiser-Galloway Project. Potential project benefits may include flood risk reduction, hydropower, additional water storage, pump back, irrigation, regional economic development, recreation and flow augmentation requirements for anadromous fish recovery.<sup>v</sup> The Weiser-Galloway project area is located approximately at river mile 13.5 on the Weiser River.<sup>vi</sup>

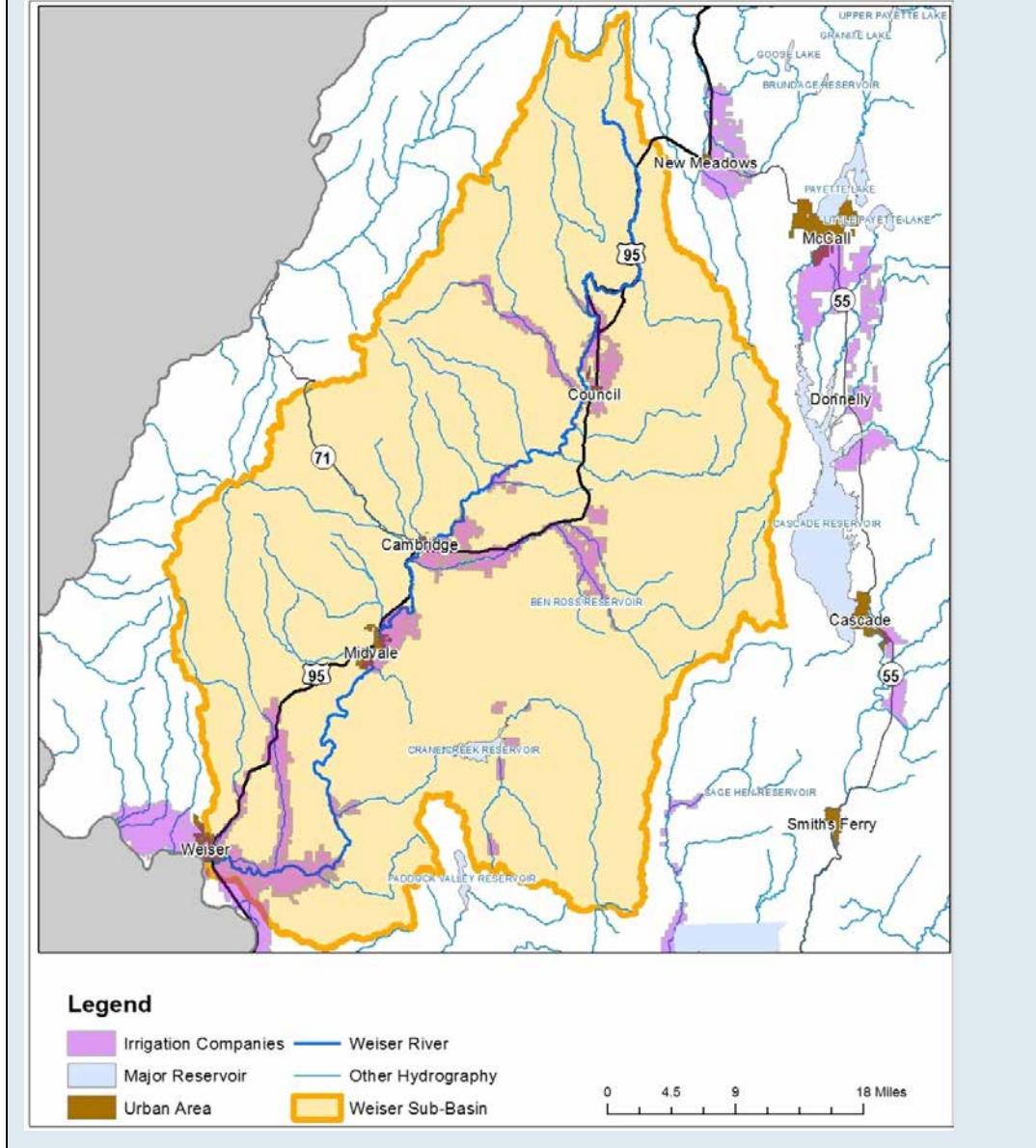
Figure 1: Project Boundary



Most of the population within the project area are from the towns of Weiser, Cambridge and Council. From 2010 Census data; Weiser has a population of 5507, Cambridge has a population of 328, and Council has a population of 839.<sup>vii</sup> This HU has a mix of private, state, and federal lands. About 50% of the project area is privately owned. The other two significant land owners in the Project Area are the U.S. Forest Service (28% of the project area) and the Bureau of Land Management (15% of the project area).<sup>viii</sup>

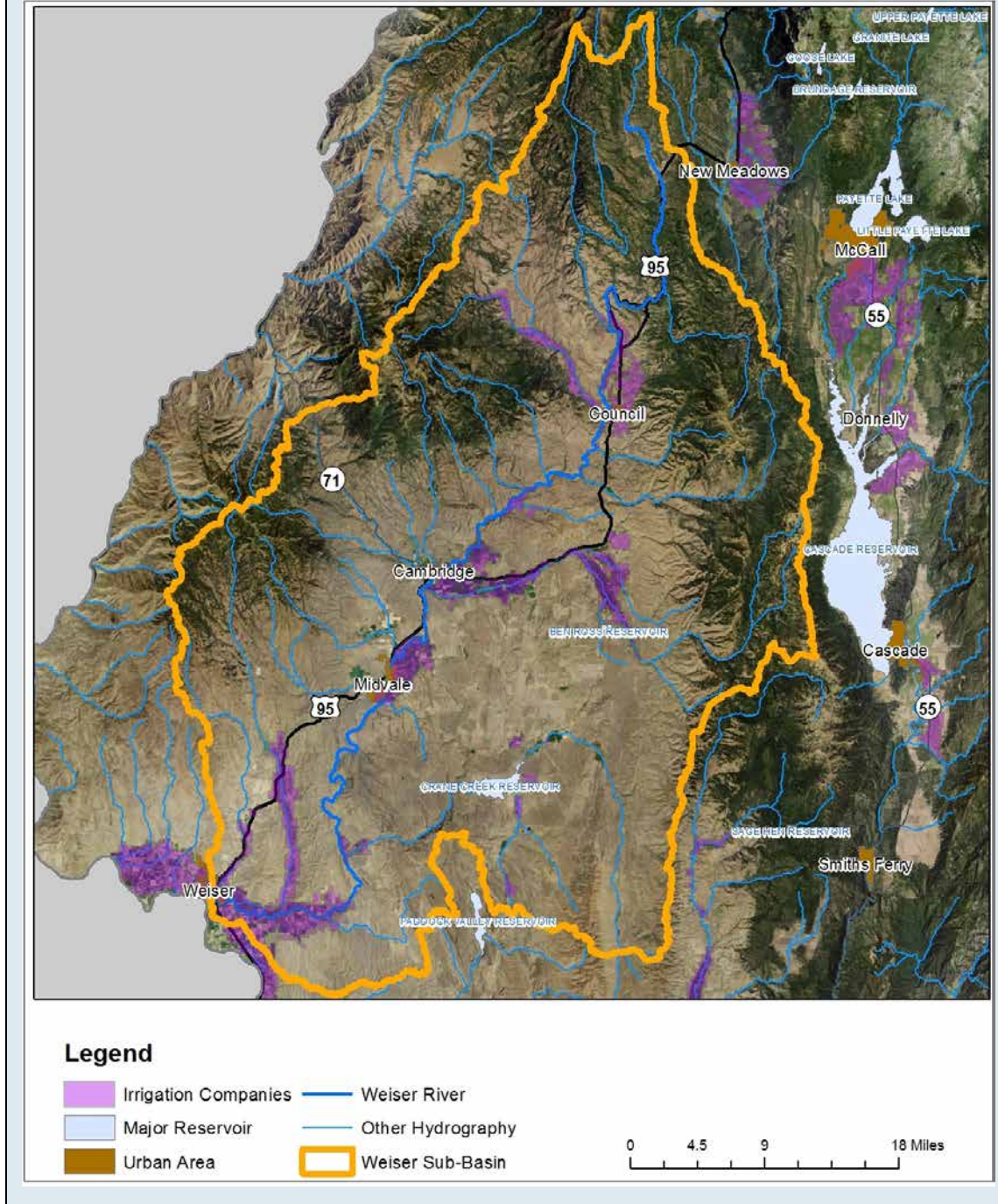
The Weiser River is the major river in the project area. Subbasin 17050124 is a basin that may be used in Water Rights Accounting, where the goal is to make the administration of water rights and the delivery of water an open and transparent process that can be examined by the public. One important data layer that is necessary for both model display and analysis is accurate hydrography.

Figure 2: Hydrography



In the majority of the undeveloped project area, xeric shrubland dominates in the low lying areas with forests in the higher elevations.<sup>ix</sup> (Figure 3)

Figure 3: General Land Use



There are several water delivery organizations within the Weiser Basin. To obtain the list of water delivery organizations, the IDWR Water Right Database was queried for active water rights with organizational owners with qualifiers like “irrigation” and “water company”. A list of the identified water delivery organizations based on water right information in the Weiser River area is provided in Table 1. These organizations

provide irrigation water for the significant agricultural activity in the project area. Irrigation deliveries are focused primarily along the Weiser River and its major tributaries.

**Table 1: Weiser River Water Delivery Organizations**

|                                    |   |  |
|------------------------------------|---|--|
| BACON VALLEY DITCH COMPANY         | CAMBRIDGE DITCH COMPANY                     | CRANE CREEK RESERVOIR ADMINISTRATION BOARD |
| EAST FORK DITCH COMPANY, LTD       | EAST WEISER DISTRICT                        | FARMERS CANAL WATER USERS ASSOCIATION      |
| GRAY'S CREEK MEADOWS DITCH COMPANY | HORNET CREEK WATER STORAGE ASSOCIATION, LTD | LITTLE WEISER IRRIGATION DISTRICT          |
| LOST VALLEY RESERVOIR COMPANY      | MANN CREEK IRRIGATION DISTRICT              | MIDDLE VALLEY DITCH CORPORATION            |
| MONROE CREEK IRRIGATION DISTRICT   | ROBERTSON SEVEY DITCH COMPANY               | SORENSEN RINEHART DITCH COMPANY            |
| SUNNYSIDE DITCH COMPANY            | WEISER IRRIGATION DISTRICT                  |  |

**Methods:**

The Idaho NHD Technical Point of Contact downloaded the appropriate SubBasin from the NHD website (<http://nhd.usgs.gov/data.html>). The project area consists of Hydrologic unit (HU) 17050124. The existing NHDFlowlines and other NHD features were photo-rectified based 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.

Next, locally available data was collected from cooperators within the project area. Maps of hydrography with 1 meter resolution National Agriculture Imagery Program (NAIP) imagery flown in 2013 were supplied to the cooperators. The cooperators were encouraged to write on the maps indicating areas where the geometry needed to be adjusted and where names needed to be added or corrected. The updated maps were to be used to verify correct placement of hydrography, flow direction, and connectivity. The data provided by the local cooperators was used for submittal to GNIS to update names for unnamed NHDFlowlines.

Maps were sent to 17 confirmed active water delivery organizations (Table 1). 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 2). The USGS NHD GeoEdit Tools were used to incorporate changes for submittal to the USGS for inclusion into the NHD.

**Table 2: Water Delivery Organizations Who Returned Corrected Maps to IDWR**

|   |                                   |                                 |
|---|-----------------------------------|---------------------------------|
| BACON VALLEY DITCH COMPANY                  | EAST FORK DITCH COMPANY, LTD      | EAST WEISER DISTRICT            |
| HORNET CREEK WATER STORAGE ASSOCIATION, LTD | LITTLE WEISER IRRIGATION DISTRICT | SORENSEN RINEHART DITCH COMPANY |
| WEISER IRRIGATION DISTRICT                  |                                   |                                 |

**Results:**

Updates Provided to USGS for Incorporation into the NHD

During this review of the Weiser Subbasin, 894 NHDFlowlines, 137 Waterbody, and 2 NHD Area edits were inserted, updated, or deleted (Table 4). Updates were submitted to USGS for incorporation into the NHD. See Figure 4 for an example of the updated linework as a result of this project.

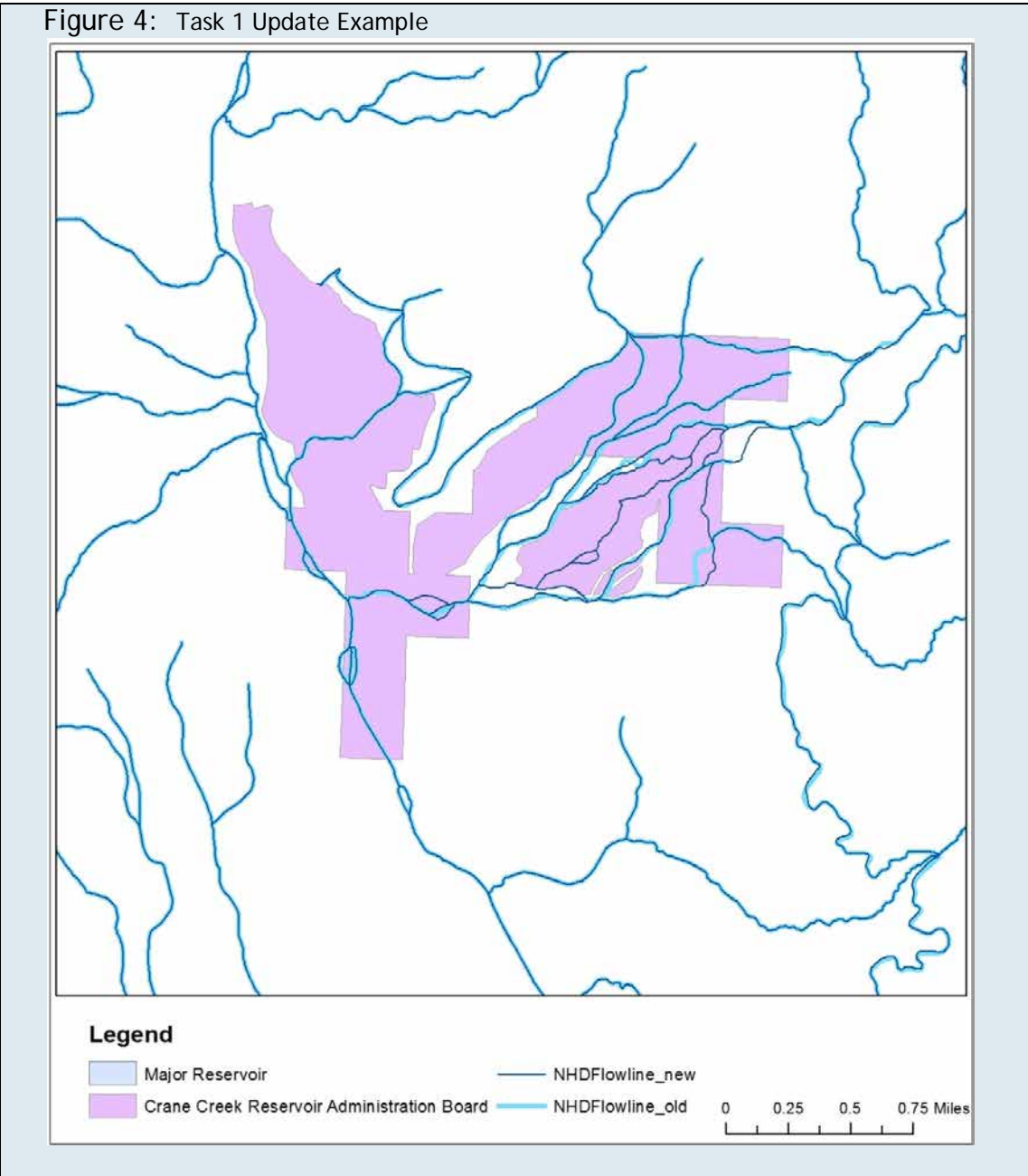
| <b>Table 4: Number of Edits</b> |               |               |               |
|---------------------------------|---------------|---------------|---------------|
| <b>NHDFlowline Edits</b>        | <b>Delete</b> | <b>Insert</b> | <b>Update</b> |
| 16010102                        | 31            | 223           | 640           |
| <b>NHDWaterbody Edits</b>       | <b>Delete</b> | <b>Insert</b> | <b>Update</b> |
| 16010102                        | 3             | 96            | 38            |
| <b>NHDArea Edits</b>            | <b>Delete</b> | <b>Insert</b> | <b>Update</b> |
| 16010102                        | 0             | 0             | 2             |
| <b>TOTAL</b>                    | <b>34</b>     | <b>319</b>    | <b>680</b>    |

Maps provided to Cooperators

IDWR provided maps of the updated NHD to cooperators illustrating the submitted updates in their service area. Many new canals were added, had watercourse location corrected or flow direction changed, so it was imperative to get local knowledge to ground check these updates.



Figure 4: Task 1 Update Example



## 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.* Providing corrections to the IDWR provided maps was one of many priorities for the local water managers. 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. We will incorporate any changes submitted, even after the close of the contract.
- 3) *Errors in the NHD tool Quality Checks.* The NHD tool had issues with deleting fixed errors from previous Quality Checks (QC). The QC database and associated data had to be deleted from the folders before running a new QC every time. This took extra time when checking the updated NHD features.

### 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 water storage projects, flood risk reduction 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 Cheapbeck Water Co., Farmers Land & Irrigation Co., Nelson Ditch Co., Riverdale Irrigating Co. and Riverdale Preston Irrigation Co. Thanks also to the USGS for providing matching funds for this effort.

### **End Notes:**

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

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

iii Based on 2010 US Census information.

iv Idaho Flood and Seismic Risk Portfolio, Effective 2012-2017 Produced by RISKMAP in cooperation with IDWR & FEMA Cooperating Technical Partners.

v [http://www.idwr.idaho.gov/waterboard/Meetings\\_Minutes/agenda/pdf/2013/03mar/5-13/Weiser-GallowayExecutiveBriefingPaperIWRBWorkSession03072013%20-%20V2.pdf](http://www.idwr.idaho.gov/waterboard/Meetings_Minutes/agenda/pdf/2013/03mar/5-13/Weiser-GallowayExecutiveBriefingPaperIWRBWorkSession03072013%20-%20V2.pdf)

vi [https://www.blm.gov/epl-front-office/projects/nepa/30458/39415/41316/Weiser-Galloway\\_EA\\_Final\\_508.pdf](https://www.blm.gov/epl-front-office/projects/nepa/30458/39415/41316/Weiser-Galloway_EA_Final_508.pdf) p. 2-3

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

viii GIS analysis of Idaho Land Management layer.

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

ix GIS Analysis of National Land Cover Database 2011.

<http://www.mrlc.gov/>