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Task #3: Update the NHDFlowlines Feature with Names from the IDWR Water Rights Database

COOPERATIVE AGREEMENT NO. G12AS00003

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Introduction:

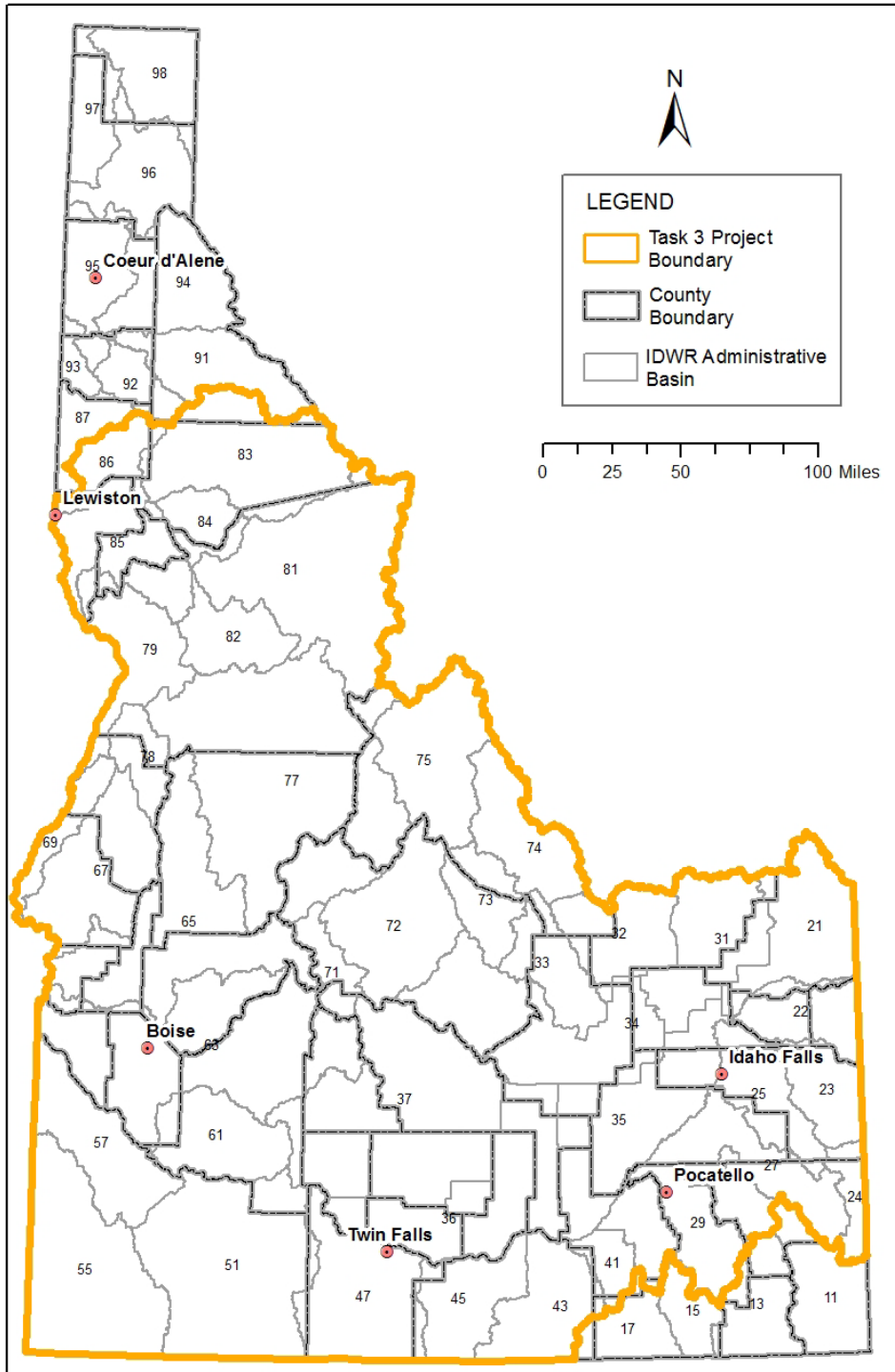
Water, a scarce resource in Idaho and through the Western U.S., is important to many competing water users including the agricultural, urban, recreational, and fisheries sectors. Although Idaho has over 95,000 miles of streams and rivers, and more than 2,000 natural lakes, precipitation is low and water demand is high.ⁱ Annual precipitation accounts of over 75 percent of Idaho's water supplyⁱⁱ but, Idaho's average annual precipitation is 22 inches per year with the Snake River Basin averaging 18 inches per yearⁱⁱⁱ.

The Idaho Department of Water Resources (IDWR) is close to completing the Snake River Basin Adjudication (SRBA) which addresses approximately two thirds of the state. During this process, points of diversion (PODs) were identified and verified. The water sources of these PODs are primarily streams, dams, and canals. During the SRBA, names of PODs water sources were also collected resulting in a large database of names of streams and other water courses. The records in this database reflect locally recognized names for many streams and tributaries, which may not currently be in the National Hydrography Database (NHD). Adding these names to the NHD will enhance the NHD, allowing for accurate analysis, querying and cartography.

Water rights are divided into different business groups depending on what stage of the process they are in and if the water right is involved in water right adjudication. A Water Right is usually a Permit first or, if it is involved in water right adjudication, a Recommendation. Only PODs in the IDWR Permit, Recommendation and Water Right process stages have been verified or at least examined. The locations of PODs were described in several ways, Water Right PODs can be digitized (a point was placed on the map using aerial photography as a guide), GPS-ed (a point was placed on the map using coordinates from a GPS unit) or nominal (a point was placed in the middle of a 40 acre tract [QQ] or a 10 acre tract [QQQ]).

In this project, PODs in the IDWR Permit, Recommendation and Water Right process stages in the Snake River Basin Adjudication Boundary were analyzed in order to find names not currently included in the Geographic Names Information System (GNIS) or NHD. Springs were excluded from this effort.

Table 1: SRBA Boundary



Methods & Results:

The initial step was selecting named Points of Diversion (POD) from Recommendations and Water Rights process databases by querying POD's that did not have "Unnamed" in the POD Source field. Sources that were not actual names, such as ground water, waste water, or drain were removed from the selection. In addition, spring sources were removed from the selection as they were addressed in another project. PODs that were identified in the database as Injection or Rediversion PODs were also removed. These selections within Recommendations and Water Rights were exported into separate ArcGIS shapefiles. There were a total of 48,984 PODs selected for review.

Five fields were added to the table of each shapefile:

Name - The Name of the POD in the same format as GNIS_Name in the NHD

NM_Match - After analysis, if the POD had a name unique to the nearby reaches

Notes - stores any information pertaining to the POD, NHD, or GNIS of the location

Probable_R - Probable Reach Code associated with the POD

Confidence - a confidence level of the POD's name being verifiable.

The PODs were then broken out by IDWR Administrative Basin for analysis. The NHDflowlines of each IDWR Administrative Basin were selected. Then the selected NHDflowlines were spatially joined to the named PODs of an Administrative Basin in a one-to-many relationship with a half mile buffer. This resulted in an increase in records because a POD is often within a half mile of several stream segments. The field Match was added to the spatial join shapefile. If the GNIS Name of the joined NHDflowline was the same as Name of the POD source, Match = yes. If the GNIS Name did not equal the POD name, Match = No.

If a POD had a Name that matched the GNIS Name of any of the joined NHDFlowlines, it was removed from consideration. This was determined by using a series of count or frequency queries. A count of the number of Match = Yes and Match = No was then created. Each POD had three possible results; all Yes, all No, or some Yes and some No matches. By counting the number of responses from the first count query (all Yes = 1, all No = 1, and some Yes and some No = 2), PODs could be identified that were already associated with a named NHDflowline. 29683 PODs were identified as being associated with a similarly named NHDflowlines and were removed from further analysis. 9301 PODs were deemed suitable for further review. Table 1 is a summary of the initial POD analysis.

Basin No.	Rec. to Review	Rec. Match	Rec. Total	W.R. to Review	W.R. Matched	W.R. Total
73	0	0	0	39	609	648
75	21	146	167	254	1537	1791
74	7	85	92	262	2002	2264
71 & 72	1	18	19	284	1758	2042
77-79	15	20	35	489	1940	2429
20s	65	115	180	1989	5522	7511
31-34	2	7	9	665	4075	4740
35-37	246	1298	1544	877	3686	4563
40s	18	152	170	860	3300	4160
50s	73	200	273	598	3174	3772
80s	8	29	37	368	1782	2150
60s	27	118	145	2133	8110	10243
All Basins	483	2188	2671	8818	27495	46313

The 9301 remaining PODs were then reviewed to see if the name was unique and if the name could be verified. The probable reachcode associated with each POD and the reviewer's confidence level of the point's name being verified was added to the attribute table. The confidence level was good, limited, or bad. An example of a POD being given a good confidence level is a POD with multiple water rights with multiple owners and all rights use the same source name. Another example is a segment of NHD that is unnamed with the correct name above or below the selected reach. An example of a POD being given a bad confidence level is one where only one water right was at the POD or if all the rights at the POD had the same owner. Notes referring to the point validity and reach assignment were added to the table at this time.

After the POD review, the PODs were joined back to the NHDflowlines based on probable reach code. If the reach had a POD name with a determined confidence level of good, it was reviewed. The NHDflowline review consisted of zooming into the reach and then looking for nearby or downstream reaches with the same name, if the name should extend to other reaches with different reachcodes, and to confirm that the reach was unnamed. The result is a line shapefile of identified reaches with potential new names.

Discussion and Conclusions:

Issues and Challenges

- 1) False positives - Initial method returned the same value for PODs where all values had the same name or if all values had no name. For example, if the stream was unnamed and the pod source was unnamed, this would give the

same value as a properly named stream. Additional visual review was required to remove the PODs where the nearby reaches had the same name as the PODs.

- 2) Errors in the Water Right Database - For example, misspellings such as McDonald and Mc Donald were common. Nominal POD locations were often outside the methodology buffer distance causing the named stream associated with the POD to not be found with this analysis.
- 3) Errors in NHD - A common error is where the GNIS Name of a NHDflowline did not travel the entire distance of the stream or creek. Also, there were many PODs with names of lakes identified as swamp/marsh or playa in the NHD. Occasionally, NHDflowlines were identified as having an incorrect name.
- 4) PODs were often located on headwater draws that were unnamed within the NHD.
- 5) This methodology assigned only one reach code per POD. Often the stream or creek to be named extended across many reach codes.

Summary of Adjustments to Be Made To the NHD

In order to identify unique names that could be added to GNIS, the PODs that were identified to have names that are not currently in GNIS were spatially joined to the SubBasin (HUC-8) each POD was in. The number of unique names per SubBasin was then calculated. Names were sorted by SubBasin because the same name may be attached to several different reaches. For example, any one state may have many reaches named Dry Creek. As a result, 397 flowline names were identified. A summary of the number of potential new names by SubBasin(HUC-8) is provided in Appendix A. For a full list of potential new names, see Appendix B. Further research is required in order to meet GNIS submission standards for each name. Once the GNIS standards are met for a name, it will be submitted to GNIS for future inclusion into the NHD.

As a SubBasin is checked out and edited by the Idaho Data Steward or staff, the new names will be added to the NHD.

Estimate on the resources for updating attribution in the NHD with names in Basins 1701 and 1601.

Basins 1701 and 1601 are outside the SRBA. The estimated time needed for one Full Time GIS Analyst to conduct these basins outside the SRBA is two weeks preparation, two weeks review or approximately 160 hours.

There are approximately 16,000 active water right PODs currently on file in at IDWR in Basin's 1701 and 1601. For the basis of this analysis, we will assume one POD per water right. Based on numbers from the Snake River Basin Adjudication, if these

Basins were adjudicated, up to 3 times as many claims can be expected to be filed as there are water rights currently on file. Given these assumptions, there could be an additional 48,000 PODs to analyze in Basins 1701 and 1601. Based on number of water right (WR) PODs analyzed in the SRBA vs. the total number of WR PODs in the SRBA ($46313/210651= 22\%$), we are assuming that 22% of the PODs would need to be analyzed in basins 1701 and 1601. 22% of 48000 PODs is approximately 10500. We are assuming that the 2 weeks processing time in the SRBA would be the same for basins 1701 and 1601. If it took 10 weeks (2.5 months) to analyze about 48000 PODs, it would take 2 about weeks to analyze 10500 PODs.

Appendix:

A. Summary of Number of Potential New NHDFlowline Names By SubBasin

# New Names	HUC8	Name
1	17040104	Palisades
9	17040105	Salt
1	17040201	Idaho Falls
3	17040202	Upper Henrys
4	17040204	Teton
3	17040205	Willow
1	17040206	American Falls
5	17040207	Blackfoot
12	17040208	Portneuf
4	17040209	Lake Walcott
9	17040210	Raft
3	17040211	Goose
11	17040212	Upper Snake-Rock
1	17040213	Salmon Falls
4	17040214	Beaver-Camas
1	17040215	Medicine Lodge
1	17040217	Little Lost
7	17040218	Big Lost
22	17040219	Big Wood
5	17040220	Camas
9	17040221	Little Wood
1	17050101	C.J. Strike Reservoir
3	17050102	Bruneau
5	17050103	Middle Snake-Succor
7	17050108	Jordan

5	17050111	North and Middle Forks Boise
36	17050112	Boise-Mores
38	17050113	South Fork Boise
16	17050114	Lower Boise
4	17050115	Middle Snake-Payette
7	17050120	South Fork Payette
5	17050121	Middle Fork Payette
31	17050122	Payette
5	17050123	North Fork Payette
28	17050124	Weiser
14	17050201	Brownlee Reservoir
2	17060101	Hells Canyon
1	17060103	Lower Snake-Asotin
13	17060201	Upper Salmon
14	17060203	Middle Salmon-Panther
3	17060204	Lemhi
22	17060209	Lower Salmon
6	17060210	Little Salmon
3	17060305	South Fork Clearwater
11	17060306	Clearwater
1	17060307	Upper North Fork Clearwater

B. Summary of Potential New NHDFlowline Names

GNIS_Name	HUC8	HUC8Name
ABBOT GULCH CREEK	17050113	South Fork Boise
ADAMS GULCH CREEK	17040219	Big Wood
ADER GULCH CREEK	17050112	Boise-Mores
ALBERTHSEN CANYON CREEK	17040221	Little Wood
ALUM GULCH CREEK	17060210	Little Salmon
ANDERSON CREEK	17060305	South Fork Clearwater
ANDREWS CANYON CREEK	17060209	Lower Salmon
ANTELOPE CREEK	17050102	Bruneau
ARLING CREEK	17050123	North Fork Payette
ASHLOCK GULCH CREEK	17050115	Middle Snake-Payette
ASHTON GULCH CREEK	17050112	Boise-Mores
AUGLEBRIGHT GULCH CREEK	17050121	Middle Fork Payette

BADGER SPRINGS GULCH CREEK	17060203	Middle Salmon-Panther
BAILEY CORRAL CANYON CREEK	17040218	Big Lost
BAKER GULCH CREEK	17060209	Lower Salmon
BARKER GULCH CREEK	17050113	South Fork Boise
BEAR CREEK	17050120	South Fork Payette
BEAR HOLLOW CREEK	17040211	Goose
BECK CANYON CREEK	17040218	Big Lost
BERG-GREEN GULCH CREEK	17060204	Lemhi
BESSIE GULCH CREEK	17050201	Brownlee Reservoir
BIG GULCH CREEK	17050112	Boise-Mores
BIG HILL GULCH CREEK	17050112	Boise-Mores
BIG WATER GULCH CREEK	17050113	South Fork Boise
BIG WHITLEY GULCH CREEK	17050115	Middle Snake-Payette
BIRD GULCH CREEK	17050113	South Fork Boise
BLACK ROCK CANYON CREEK	17040208	Portneuf
BLACKROCK CANYON CREEK	17040210	Raft
BLIND CANYON CREEK	17050113	South Fork Boise
BLUE JAY GULCH CREEK	17050201	Brownlee Reservoir
BOARD GULCH CREEK	17050201	Brownlee Reservoir
BOONEVILLE GULCH CREEK	17050108	Jordan
BOX CANYON CREEK	17040221	Little Wood
BOX GULCH CREEK	17050201	Brownlee Reservoir
BRADY GULCH CREEK	17060306	Clearwater
BRIER CANYON CREEK	17040218	Big Lost
BRIM CANYON CREEK	17040209	Lake Walcott
BROAD HOLLOW CREEK	17040209	Lake Walcott
BROWNS GULCH CREEK	17050112	Boise-Mores
BRUSH CANYON CREEK	17040220	Camas
BUCK CANYON CREEK	17040221	Little Wood
BUFFALO GULCH CREEK	17060305	South Fork Clearwater
BULL GULCH CREEK	17050124	Weiser
BULLION GULCH CREEK	17040219	Big Wood
BUTTERFIELD GULCH CREEK	17050201	Brownlee Reservoir
CABIN GULCH CREEK	17040221	Little Wood
CALDWELL CANYON CREEK	17040207	Blackfoot
CALDWELL DRAW CREEK	17050114	Lower Boise
CALDWELL GULCH CREEK	17050113	South Fork Boise
CALIFORNIA GULCH CREEK	17050112	Boise-Mores
CAMP CREEK	17050120	South Fork Payette
CANNON GULCH CREEK	17050113	South Fork Boise
CARSON GULCH CREEK	17050124	Weiser

CARTWRIGHT CANYON CREEK	17050122	Payette
CEDAR DRAW CREEK	17040212	Upper Snake-Rock
CHARLOTTE GULCH CREEK	17050112	Boise-Mores
CHARTERS CREEK	17050120	South Fork Payette
CHING CREEK	17040214	Beaver-Camas
CLARK GULCH CREEK	17050113	South Fork Boise
CLAUDS CREEK	17040207	Blackfoot
CLEAR LAKES CREEK	17040212	Upper Snake-Rock
CLUB CANYON CREEK	17060201	Upper Salmon
COFFEE POT CREEK	17040202	Upper Henrys
COLD SPRING CANYON	17050122	Payette
COLD SPRING CREEK	17040207	Blackfoot
COLD SPRING GULCH CREEK	17050124	Weiser
CONWAY DRAIN	17050114	Lower Boise
COONROD GULCH CREEK	17050122	Payette
CORA GULCH CREEK	17060210	Little Salmon
CORRAL GULCH CREEK	17050108	Jordan
COTTONWOOD GULCH CREEK	17060209	Lower Salmon
COUGAR CANYON CREEK	17050124	Weiser
COW CREEK	17040220	Camas
CROESUS GULCH CREEK	17040219	Big Wood
CROOKED CREEK	17040202	Upper Henrys
CROY CREEK	17040219	Big Wood
CRUMLEY GULCH CREEK	17050122	Payette
CURLEW GULCH CREEK	17050114	Lower Boise
CURRIN GULCH CREEK	17050122	Payette
DARE GULCH CREEK	17050113	South Fork Boise
DAUGHERTY GULCH CREEK	17060201	Upper Salmon
DAVID CREEK	17050123	North Fork Payette
DAVIS CANYON CREEK	17060203	Middle Salmon-Panther
DEAD MAN GULCH CREEK	17050124	Weiser
DEAD SHEEP CREEK	17060204	Lemhi
DEADHORSE GULCH CREEK	17050112	Boise-Mores
DECKER CREEK	17040219	Big Wood
DEER GULCH CREEK	17060306	Clearwater
DEMOCRAT GULCH CREEK	17040219	Big Wood
DIEBENOW GULCH CREEK	17040219	Big Wood
DIXIE GULCH CREEK	17050113	South Fork Boise
DOG CREEK	17040219	Big Wood

DONNELLY CREEK	17060203	Middle Salmon-Panther
DRY CANYON CREEK	17040208	Portneuf
DRY CREEK	17050124	Weiser
DRY WASH	17040210	Raft
DUGWAY CANYON CREEK	17040221	Little Wood
DUSTMAN CREEK	17050120	South Fork Payette
DUTCH OVEN GULCH CREEK	17050124	Weiser
DYES GULCH CREEK	17050122	Payette
EAST ARENA DRAIN	17050103	Middle Snake-Succor
EAST FORK COW CREEK	17040220	Camas
EAST FORK MONTEZUMA CREEK	17050111	North and Middle Forks Boise
EAST HARTLEY GULCH DRAIN	17050114	Lower Boise
EIGHTMILE CREEK	17040210	Raft
ELDORADO GULCH CREEK	17050112	Boise-Mores
ELKHORN CREEK	17040219	Big Wood
ELKHORN GULCH CREEK	17040219	Big Wood
ELLIS CREEK	17040208	Portneuf
ELLIS GULCH CREEK	17050113	South Fork Boise
FAIRCHILD GULCH CREEK	17050124	Weiser
FIR GULCH CREEK	17050122	Payette
FIR TREE GULCH CREEK	17050122	Payette
FIRST HOLLOW	17040210	Raft
FLUME GULCH CREEK	17060210	Little Salmon
FORT HALL CREEK	17050124	Weiser
FOX GULCH CREEK	17050113	South Fork Boise
GAMBRINUS CREEK	17050112	Boise-Mores
GARDEN CREEK	17060306	Clearwater
GARDNER GULCH CREEK	17050113	South Fork Boise
GEM GULCH CREEK	17050113	South Fork Boise
GEORGE WAY GULCH CREEK	17050122	Payette
GIBBONS CANYON	17060101	Hells Canyon
GILL GULCH CREEK	17060209	Lower Salmon
GILLESPIE GULCH	17060101	Hells Canyon
GLADHEART GULCH CREEK	17050201	Brownlee Reservoir
GLASS GULCH CREEK	17050108	Jordan
GLEN COULEE	17040212	Upper Snake-Rock
GOLD STAR GULCH CREEK	17060203	Middle Salmon-Panther
GOLDEN GOOSE CANYON CREEK	17050201	Brownlee Reservoir
GOLWAY GULCH CREEK	17060203	Middle Salmon-Panther
GRAEHL CREEK	17040105	Salt
GRANDJEAN CREEK	17050120	South Fork Payette

GRANITE CREEK	17040211	Goose
GREEN CANYON CREEK	17040208	Portneuf
GREGORY GULCH CREEK	17050112	Boise-Mores
GRIFFITH DRAIN	17050103	Middle Snake-Succor
GROSSEN CANYON CREEK	17050124	Weiser
GROUSE CANYON CREEK	17040215	Medicine Lodge
GUY CREEK	17040219	Big Wood
HAHN GULCH CREEK	17050112	Boise-Mores
HARDMANS HOLLOW CREEK	17040105	Salt
HELL CANYON CREEK	17060201	Upper Salmon
HERMAN CREEK	17040205	Willow
HIBBLE GULCH CREEK	17050201	Brownlee Reservoir
HOLLAND GULCH CREEK	17050122	Payette
HOO HOO GULCH CREEK	17050201	Brownlee Reservoir
HOPPER GULCH CREEK	17040213	Salmon Falls
HOWARD GULCH CREEK	17060306	Clearwater
HULLS GULCH CREEK	17050114	Lower Boise
HUNTER CREEK	17050113	South Fork Boise
HUNTLEY GULCH CREEK	17050201	Brownlee Reservoir
HURD GULCH CREEK	17050115	Middle Snake-Payette
JACKS CREEK	17050102	Bruneau
JAKES CANYON CREEK	17060204	Lemhi
JIM BOB CREEK	17050102	Bruneau
JOES GULCH CREEK	17060201	Upper Salmon
JOHNNY WOODS GULCH CREEK	17050112	Boise-Mores
JOHNSON GULCH CREEK	17060203	Middle Salmon-Panther
JOKER CREEK	17050124	Weiser
JONES GULCH CREEK	17050113	South Fork Boise
KAMIAH GULCH CREEK	17060306	Clearwater
KELLY CANYON CREEK	17040201	Idaho Falls
KELSON CREEK	17040214	Beaver-Camas
KIMBALL GULCH CREEK	17050122	Payette
KOPPES CREEK	17050121	Middle Fork Payette
LAHT DRAIN	17050103	Middle Snake-Succor
LAKE CREEK	17060203	Middle Salmon-Panther
LAMBS GULCH CREEK	17040219	Big Wood
LANDING CREEK	17040209	Lake Walcott
LANKTREE GULCH CREEK	17050114	Lower Boise
LEES GULCH	17040219	Big Wood

LEES GULCH CREEK	17040219	Big Wood
LEWIS CREEK	17060210	Little Salmon
LIBERTY GULCH CREEK	17040219	Big Wood
LIMESTONE GULCH CREEK	17050201	Brownlee Reservoir
LITTLE BLIND CANYON CREEK	17040218	Big Lost
LITTLE CAYUSE CREEK	17050113	South Fork Boise
LITTLE CEDAR CANYON CREEK	17040212	Upper Snake-Rock
LITTLE DRY CREEK	17040204	Teton
LITTLE PIERCE CREEK	17050113	South Fork Boise
LITTLE PINE CREEK	17050124	Weiser
LITTLE WATER GULCH	17050113	South Fork Boise
LITTLE WHITLEY GULCH CREEK	17050115	Middle Snake-Payette
LOCKMAN GULCH CREEK	17050113	South Fork Boise
LOGGING GULCH CREEK	17050112	Boise-Mores
LONE PINE CREEK	17050122	Payette
LONG CANYON CREEK	17060209	Lower Salmon
LYDLE GULCH CREEK	17050114	Lower Boise
MAPLE CANYON CREEK	17060209	Lower Salmon
MARSH CANYON CREEK	17040218	Big Lost
MAXWELL GULCH	17060203	Middle Salmon-Panther
MAYNARD GULCH CREEK	17050114	Lower Boise
MC DONALD CREEK	17050111	North and Middle Forks Boise
MC INTYRE GULCH	17050112	Boise-Mores
MILK RANCH GULCH CREEK	17050112	Boise-Mores
MILL CANYON CREEK	17040105	Salt
MINNIE MOORE GULCH CREEK	17040219	Big Wood
MITCHELL CREEK	17050112	Boise-Mores
MONDAY GULCH CREEK	17050124	Weiser
MOONSHINE CANYON CREEK	17060209	Lower Salmon
MORMON CANYON CREEK	17040208	Portneuf
MULLIGAN GULCH CREEK	17040219	Big Wood
NAPOLEON CREEK	17060203	Middle Salmon-Panther
NARROW CANYON CREEK	17050113	South Fork Boise
NATE CANYON CREEK	17040105	Salt
NEIL GULCH CREEK	17050201	Brownlee Reservoir
NICHOLS CANYON CREEK	17060306	Clearwater
NICHOLS GULCH CREEK	17050113	South Fork Boise
NIECE CREEK	17060201	Upper Salmon
NINEMILE CREEK	17050114	Lower Boise
NOBLE DRAIN	17050114	Lower Boise
NORTH CANYON	17040208	Portneuf

NORTH FORK BAKER GULCH CREEK	17060209	Lower Salmon
NORTH FORK HYDE CANYON CREEK	17040105	Salt
NORTH FORK LONG GULCH CREEK	17050113	South Fork Boise
NORTH FORK RATTLESNAKE CREEK	17050112	Boise-Mores
OK GULCH CREEK	17050113	South Fork Boise
ORCHARD GULCH CREEK	17050114	Lower Boise
PARKER GULCH CREEK	17040219	Big Wood
PEARL CREEK	17040204	Teton
PETERS GULCH CREEK	17050103	Middle Snake-Succor
PETERSON CANYON CREEK	17040207	Blackfoot
PETERSON GULCH CREEK	17050122	Payette
PIERCE GULCH CREEK	17050114	Lower Boise
PINYON GULCH CREEK	17050113	South Fork Boise
PIPELINE GULCH CREEK	17050112	Boise-Mores
POISON HOLLOW	17040210	Raft
POLE CREEK	17050124	Weiser
POLE GULCH CREEK	17050114	Lower Boise
POLLARD CANYON CREEK	17060203	Middle Salmon-Panther
POOL GULCH CREEK	17060209	Lower Salmon
PORCELAIN POT CREEK	17040208	Portneuf
PORTNEUF RIVER SLOUGH	17040208	Portneuf
POSEY CREEK	17040205	Willow
POSTHOLE CREEK	17060306	Clearwater
POSTMAN GULCH CREEK	17050122	Payette
POWDERHOUSE GULCH CREEK	17050121	Middle Fork Payette
POWELL CREEK	17040220	Camas
PREACHERS COVE CREEK	17060201	Upper Salmon
PUZZLER GULCH CREEK	17060201	Upper Salmon
QUARTZ CREEK	17050111	North and Middle Forks Boise
RATTLESNAKE GULCH CREEK	17050124	Weiser
RESERVOIR CANYON CREEK	17040205	Willow
RIGHT FORK KNOX CREEK	17040206	American Falls
ROAD CANYON CREEK	17040221	Little Wood
ROAD GULCH CREEK	17050124	Weiser
ROBBER GULCH CREEK	17040212	Upper Snake-Rock
ROBERTS GULCH CREEK	17050113	South Fork Boise
ROBISON GULCH CREEK	17050124	Weiser
ROCK CREEK	17060306	Clearwater
ROCKY CANYON CREEK	17050121	Middle Fork Payette

ROCKY GULCH CREEK	17050112	Boise-Mores
ROSS GULCH CREEK	17050124	Weiser
ROUGH CANYON CREEK	17040221	Little Wood
ROYAL GORGE CREEK	17050113	South Fork Boise
RUGGELS GULCH CREEK	17060209	Lower Salmon
SAILOR GULCH CREEK	17050112	Boise-Mores
SAND HOLLOW CREEK	17050122	Payette
SAND HOLLOW DRAIN	17050122	Payette
SAND SPRINGS GULCH CREEK	17050101	C.J. Strike Reservoir
SAVAGE HOLLOW CREEK	17040210	Raft
SAWLOG CREEK	17060203	Middle Salmon-Panther
SCALP CREEK	17040214	Beaver-Camas
SCHOOLHOUSE GULCH CREEK	17050120	South Fork Payette
SCHOONOVER CREEK	17050112	Boise-Mores
SCOTT CREEK	17060209	Lower Salmon
SECOND CREEK	17050111	North and Middle Forks Boise
SECOND HOLLOW	17040210	Raft
SEID CREEK	17050124	Weiser
SEVEN SPRINGS CANYON CREEK	17060209	Lower Salmon
SEWER CREEK	17040212	Upper Snake-Rock
SHAW HOLLOW CREEK	17040208	Portneuf
SHEEP GULCH CREEK	17060209	Lower Salmon
SHORTY CANYON CREEK	17060209	Lower Salmon
SHUT-IN CANYON CREEK	17060209	Lower Salmon
SINK CREEK	17060201	Upper Salmon
SIX MILE CANYON CREEK	17040210	Raft
SIXMILE CANYON CREEK	17060306	Clearwater
SLAUGHTERHOUSE CREEK	17050124	Weiser
SLIDE GULCH CREEK	17050120	South Fork Payette
SMITH CREEK	17040105	Salt
SMITH GULCH CREEK	17050124	Weiser
SMOKY DOME CANYON	17050113	South Fork Boise
SOARDS GULCH CREEK	17060209	Lower Salmon
SOLDIERS CANYON CREEK	17060306	Clearwater
SOUTH DEADMAN CREEK	17050122	Payette
SOUTH FORK BAKER GULCH CREEK	17060209	Lower Salmon
SOUTH FORK CLEAR CREEK	17050112	Boise-Mores
SOUTH GULCH CREEK	17060203	Middle Salmon-Panther
SOUTH HEGLAR CANYON CREEK	17040210	Raft
SPLIT ROCK CANYON CREEK	17050108	Jordan
SPRING CANYON CREEK	17040219	Big Wood

STAGECOACH CANYON CREEK	17050122	Payette
STAR GULCH CREEK	17050112	Boise-Mores
STEPHENS GULCH CREEK	17060201	Upper Salmon
STEVENS GULCH	17050113	South Fork Boise
STEWART CREEK	17050114	Lower Boise
STIERMAN GULCH CREEK	17050112	Boise-Mores
STRAIGHT CREEK	17050111	North and Middle Forks Boise
STRONG CREEK	17040202	Upper Henrys
SULPHUR GULCH CREEK	17050122	Payette
SUMMERHOUSE CANYON CREEK	17040217	Little Lost
SURDAM GULCH CREEK	17050124	Weiser
SWISHER CREEK	17050108	Jordan
TABLE ROCK CREEK	17040104	Palisades
TACKET GULCH CREEK	17050114	Lower Boise
TARTAR GULCH CREEK	17050201	Brownlee Reservoir
TARTER GULCH CREEK	17050122	Payette
TENPIN GULCH CREEK	17040214	Beaver-Camas
THOMPSON CREEK	17040212	Upper Snake-Rock
TOE JAM CANYON CREEK	17050124	Weiser
TOLLGATE CREEK	17050112	Boise-Mores
TOLMAN CANYON CREEK	17040208	Portneuf
TOMS CANYON CREEK	17040208	Portneuf
TOMS GULCH CREEK	17050112	Boise-Mores
TOWNSEND GULCH	17040219	Big Wood
TRACTION GULCH CREEK	17050124	Weiser
TRAIL CREEK	17050123	North Fork Payette
TURNER GULCH CREEK	17050112	Boise-Mores
TWIN SISTERS GULCH CREEK	17050112	Boise-Mores
TWO TREE GULCH CREEK	17050124	Weiser
VAN GULCH	17050113	South Fork Boise
VANDERBILT GULCH CREEK	17060307	Upper North Fork Clearwater
VAUGHAN GULCH CREEK	17050122	Payette
VIRGINIA GULCH CREEK	17050113	South Fork Boise
VOQUELIN GULCH CREEK	17050112	Boise-Mores
WALKER GULCH CREEK	17040212	Upper Snake-Rock
WALLA WALLA GULCH CREEK	17050112	Boise-Mores
WARM SPRING CREEK	17060201	Upper Salmon
WARM SPRINGS CREEK	17050123	North Fork Payette
WARM SPRINGS GULCH CREEK	17050112	Boise-Mores

WASH CANYON CREEK	17050113	South Fork Boise
WASHINGTON GULCH CREEK	17050112	Boise-Mores
WEEKS GULCH CREEK	17050113	South Fork Boise
WELLS CANYON CREEK	17040105	Salt
WHEELER CANYON CREEK	17060306	Clearwater
WHITE CANYON CREEK	17040105	Salt
WHITE PINE CANYON CREEK	17040209	Lake Walcott
WHITECAP CREEK	17050112	Boise-Mores
WHITLOCK GULCH CREEK	17050122	Payette
WILMATHE GULCH CREEK	17050122	Payette
WILSON CREEK	17040212	Upper Snake-Rock
WILSON DRAIN	17050114	Lower Boise
WIRE GULCH CREEK	17060203	Middle Salmon-Panther
WOOD GULCH CREEK	17050113	South Fork Boise
WOODRUFF GULCH CREEK	17060209	Lower Salmon
YELLOW JACKET CREEK	17060210	Little Salmon
BEAR GULCH CREEK	17050122	Payette
BEAR GULCH CREEK	17050124	Weiser
BEAR GULCH CREEK	17060209	Lower Salmon
CASTLE CREEK	17050122	Payette
CASTLE CREEK	17050121	Middle Fork Payette
CAVE GULCH CREEK	17040211	Goose
CAVE GULCH CREEK	17060103	Lower Snake-Asotin
CHERRY GULCH CREEK	17050113	South Fork Boise
CHERRY GULCH CREEK	17050122	Payette
CHERRY GULCH CREEK	17050122	Payette
CHERRY GULCH CREEK	17060201	Upper Salmon
DEEP CREEK	17040204	Teton
DEEP CREEK	17050122	Payette
DRY GULCH CREEK	17040212	Upper Snake-Rock
DRY GULCH CREEK	17060203	Middle Salmon-Panther
DRY GULCH CREEK	17060305	South Fork Clearwater
JOHNSON CREEK	17040207	Blackfoot
JOHNSON CREEK	17050112	Boise-Mores
LONG GULCH CREEK	17050108	Jordan
LONG GULCH CREEK	17040220	Camas
LONG GULCH CREEK	17040219	Big Wood
LONG GULCH CREEK	17050113	South Fork Boise
LONG GULCH CREEK	17050201	Brownlee Reservoir
LONG GULCH CREEK	17050124	Weiser
LONG GULCH CREEK	17060209	Lower Salmon

LONG GULCH CREEK	17060209	Lower Salmon
POLE CANYON CREEK	17040105	Salt
POLE CANYON CREEK	17040221	Little Wood
POLE CANYON CREEK	17040204	Teton
SAGE HEN GULCH CREEK	17050108	Jordan
SAGE HEN GULCH CREEK	17050103	Middle Snake-Succor
SPRING CREEK	17040208	Portneuf
SPRING CREEK	17050113	South Fork Boise
SPRING CREEK	17050123	North Fork Payette
SPRING CREEK	17060210	Little Salmon
SPRING GULCH CREEK	17060201	Upper Salmon
SPRING GULCH CREEK	17060201	Upper Salmon
STODDARD CREEK	17040212	Upper Snake-Rock
STODDARD CREEK	17040218	Big Lost
TIMBER GULCH CREEK	17040219	Big Wood
TIMBER GULCH CREEK	17050113	South Fork Boise
TIMBER GULCH CREEK	17040221	Little Wood
TIMBER GULCH CREEK	17050122	Payette
TIMBER GULCH CREEK	17050124	Weiser
WET GULCH CREEK	17050112	Boise-Mores
WET GULCH CREEK	17050122	Payette
WET GULCH CREEK	17060209	Lower Salmon
WOOD CANYON CREEK	17040218	Big Lost
WOOD CANYON CREEK	17050122	Payette

End Notes:

i http://www.idwr.idaho.gov/waterboard/WaterPlanning/PDFs/2010_Resource-Inventory.pdf p. 8

ii http://www.idwr.idaho.gov/waterboard/WaterPlanning/PDFs/2010_Resource-Inventory.pdf p. 8

iii http://www.idwr.idaho.gov/waterboard/WaterPlanning/PDFs/2010_Resource-Inventory.pdf p. 20