

Bear River Watershed Management Unit Water Quality Assessment Report



**Division of Water Quality
Department of Environmental Quality**

Bear River Watershed Management Water Quality Assessment Report

**December
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**Department of Environmental Quality
Division of Water Quality
Salt Lake City, Utah**

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EXECUTIVE SUMMARY

In June 1999, the Division of Water Quality (DWQ) completed its second intensive monitoring of the Bear River Watershed Management Unit. Eighty-nine sites were monitored to assess water quality. The monitoring project was started in July 1998. Samples were collected twice a month during spring runoff and once during other months. Samples were not collected in December of 1998. At some of the sampling sites only nutrients were assessed to assist in developing the nutrient loadings in some of the streams.

Streams were assessed against State water quality standards and pollution indicators to determine if their designated beneficial uses were being met. The streams in the Bear River Watershed Management Unit are classified as one of the following or a combination of the following beneficial use classifications: protected for secondary contact recreation (2B), cold water game fish (3A), warm water game fish (3B), warm water non-game fish (3C), and waterfowl (3D), and agricultural use including irrigation and stock watering (4). Only a portion of the streams were assessed under the contact recreation classification.

There are approximately 1,445 perennial stream miles within the management unit. Of these, 1,128.7 (74.3%) stream miles were assessed under one or more of their designated beneficial uses. Eight-hundred thirty-eight miles (74.3%) were assessed as fully supporting all their beneficial uses that they were assessed for. Two-hundred eighty miles (24.8%) were assessed as partially supporting and 9.8 miles (0.9%) were assessed as not supporting at least one designated beneficial use. Table ES-1 lists individual use support by the different categories of beneficial.

Table 1. Individual Use Support Summary Bear River Watershed Management Unit (Stream Miles)							
Goals ^a	Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Not Attainable
Protect & Enhance Ecosystems	Aquatic Life	1,128.7	838.5 (74.3%)	0.0	290.2 (25.7%)	0.0	0.0
Protect & Enhance Public Health	Fish Consumption	0.0	0.0	0.0	0.0	0.0	0.0
	Swimming ^b	517.6	507.8 (98.1%)	0.0	0.0	9.8 (1.9%)	0.0
	Secondary Contact	517.6	507.8 (98.1%)	0.0	0.0	9.8 (1.9%)	0.0
	Drinking Water	0.0	0.0	0.0	0.0	0.0	0.0
Social and Economic	Agricultural	978.9	955.6 (97.6%)	0.0	23.4 (2.4%)	0.0	0.0

^a These goals are part of the national water quality goals adopted by the EPA Office of Water and the ITFM in their Environmental Goals and Indicators effort.

^b Class 2B (secondary contact) streams were evaluated as swimmable for purposes of the CWA goals, therefore the swimming and secondary contact classification categories are the same.

Upper Bear River—In the upper Bear River, all but three waterbodies were assessed as fully supporting their beneficial uses that were assessed. These were the Class 3A and 4 waters located in Summit and Rich Counties. Two segments on the main-stem of the Bear River were assessed as partially supporting their Class 3A (cold water game fish) beneficial use because of low dissolved oxygen. The source of this impairment is not known. These two segments included the Bear River from the Utah-Wyoming border to the Woodruff Creek confluence, and the Bear River from the Woodruff Creek confluence to the Utah-Wyoming border. The other waterbody assessed not supporting all of its beneficial uses was Saleratus Creek and its tributaries. The parameters of concern were dissolved oxygen, temperature, and total dissolved solids. The probable sources of the total dissolved solids are agriculture and natural. The probable sources for the temperature and low dissolved oxygen is unknown.

Lower Bear River—Beneficial use assessment remained essentially unchanged in the lower Bear River watershed. The major problem within the system is total phosphorus and the sources are agricultural activities and point sources. The waterbodies identified as having an EPA approved TMDL were not listed on the 303(d) list, but are still identified as not meeting the beneficial use support for the parameters listed in the 1996 and 1998 305(b) reports. Extensive implementation work has been done in the Little Bear watershed, and recent analyses indicate that total phosphorus loads are decreasing. . A 319 non point source project was implemented on the Cub River in 1999 to improve water quality. A total maximum daily load analysis for several pollutants will be completed in early 2001.

In the previous intensive monitoring survey, Clarkston Creek and the Malad River were not assessed. During the most recent survey they were monitored and the results indicated that they were fully supporting all of the beneficial uses that they were assessed for. The Class 2B use designation was not assessed.

Elevated Levels of Phosphorus--In addition to the waterbodies listed as being impaired by total phosphorus, there were four other waterbodies that were assessed as having elevated levels of total phosphorus. These waters need further evaluation to determine if there is a water quality problem. The four water bodies were the lower portion of Woodruff Creek, Clarkston Creek, Big Creek, and North Eden Creek. The tributaries to the latter three are included in the assessment. The estimate of miles in these waterbodies was 119.6.

The primary causes of impairment throughout the basin were total phosphorus, low dissolved oxygen, sediments, and temperature. The primary sources of impairment were agricultural practices, industrial and municipal point sources.

Bear River Watershed Management Unit Stream Water Quality Assessment

Introduction

The Bear River Basin is part of the Great Basin Hydrologic Region, and is comprised of the U.S.G.S. Hydrological Units (HUCs) listed in Table 1. The Bear River is the principal stream within this drainage area. It flows north out of Utah into Wyoming, then back into Utah, then crosses into Wyoming, then back into Utah, then into Idaho, and then turns and flows southwest into Utah and empties into the Great Salt Lake. The Bear River is the longest river (approximately 500 miles long) in the United States whose waters do not eventually empty into an ocean. Originally the Bear River did not flow into Bear Lake, but since the early 1900's, it has been diverted into Bear Lake at Stewart Dam. Water flows from Bear Lake into the Bear River via a canal. Other streams of interest include the Logan, Blacksmith Fork and Little Bear Rivers.

conductivity were measured *in situ* using a Hydrolab. Instantaneous flows were measured using a Marsh-McBurney flow meter during each survey unless the station was located at or near a U.S.G.S. gaging station. Flow data will be obtained when the U.S.G.S. publishes it. Water quality samples were collected according to standard field procedures defined and adopted by the Division of Water Quality in 1993 (DWQ, 1993). Chemical analysis in the laboratory included ammonia, total phosphorus, dissolved nitrate-nitrite, dissolved total phosphorus, total suspended solids, total dissolved solids, dissolved calcium, dissolved magnesium, dissolved potassium, dissolved sodium chloride concentration, sulfate, alkalinity and hardness. Turbidity was also determined in the laboratory. Concentrations for the following dissolved metals were determined: arsenic, barium, cadmium, chromium, copper, iron, lead, selenium, silver, zinc, and mercury.

Hydrological Unit Code	Hydrological Unit Name
16010101	Upper Bear
16010102	Central Bear
16010201	Bear Lake
16010202	Middle Bear
16010203	Little Bear - Logan
16010204	Lower Bear - Malad

At several stations only field parameters and nutrient data were collected. Nutrient data were collected at these sites to quantify nutrient loads for comparison against the TMDL load calculations. It will also be used to identify additional sources of nutrients.

Materials and Methods

Field and Laboratory -Eighty-nine sites were monitored from July 1998 through June 1999 (Table 2). Samples were collected twice a month during the spring runoff period and then monthly during the remainder of the survey. Samples were not collected during December 1998. For the majority of monitoring sites, oxygen, pH, water temperature, and

Beneficial Use Assessment--Beneficial use support assessments were made by comparing assessment data against the designated beneficial use of streams (Figure 1) based upon the methodology listed in Appendix A. Water chemistry data were compared against Utah's standards listed in '**Standards of Quality for Waters of the State**', R317-2, Utah Administrative Code (DWQ, 1999), to determine if the beneficial use designations for the different waterbodies were being supported. Waters that had elevated levels of phosphorus were identified as needing further study. Benthic macroinvertebrate data were used as supplemental data in assessing water quality in

the Little Bear River drainage. The Little Bear River is a non point source project area.

Stream segments (waterbodies) that were identified as having an approved TMDL in the 1998 305(b) report were assessed the same as they were in 1998. These stream waterbodies will be evaluated by determining if the criteria established in the TMDL have been met and the beneficial use is no longer impaired.

Results

Thirteen (13) survey runs were made during the intensive monitoring period, but samples from some of the stations were not collected because of inaccessibility or there was no flow at the site. The stations that were located higher in the watersheds near the Forest Service boundaries were inaccessible at times during the survey because of snow and road conditions. The six stations located in Summit County were collected by the Forest Service and were not part of the intensive survey. The samples were processed at the state laboratory.

Beneficial Use Assessment

There are an estimated 1,445 perennial stream miles within the Bear River Watershed Management Unit. An assessment of support of beneficial uses was made for 1,128.7 miles (78.1%). Of these, 838.5 miles (74.3%) were assessed as fully supporting all their beneficial uses with the exception of the 2B classification. Two-hundred eighty (280) miles (24.8%) were assessed as partially supporting, and 9.8 miles (0.9%) were assessed as not supporting at least one designated beneficial use (Figure 1). All 1,128.7 miles were assessed chemically for Class 2B, but only 517.6 were assessed using bacteriological data .

The sampling sites and beneficial use support is illustrated in Figure 3. Beneficial use for individual categories is listed in Table 3. Those stream segments that were determined not to be

supporting at least one of their designated beneficial uses are called ‘**water quality limited segments**’ and can be placed on a list called the 303(d) list. As previously mentioned, waterbodies that have an EPA approved TMDL were not included on the 303(d) list. The list of impaired waterbodies, the causes, and sources of impaired are listed in Table 4.

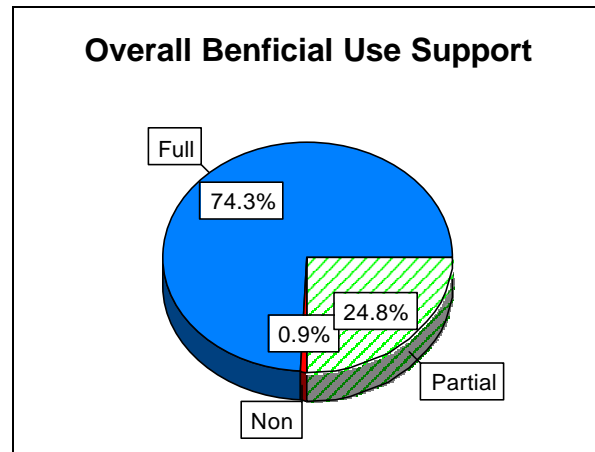


Figure 2. Overall beneficial use support excluding some Class 2B waters in Bear River Watershed Unit.

Of the 1,128.7 miles assessed for aquatic life support, 838.5 miles (74.3%) were assessed as fully supporting, 290.2 miles (25.7%) were assessed as partially supporting, and 0.0 miles were assessed as non supporting.

For Class 4 streams, agricultural use, 978.9 miles were assessed. The difference in miles assessed between Class 3 and Class 4 streams was because the Malad River (49.8 miles) does not carry a Class 4 designation. Of the miles assessed, 955.6 miles (97.6%) were found fully supporting, 23.7 miles (2.4%) were found partially supporting, and no streams were found not supporting the agricultural beneficial use designation.

Elevated Levels of Phosphorus--In addition to the waterbodies listed as being impaired by total phosphorus, there were four other waterbodies that were assessed as having elevated levels of total phosphorus. These

waters need further evaluation to determine if there is a water quality problem. The four water bodies were the lower portion of Woodruff Creek, Clarkston Creek, Big Creek, and North Eden Creek (Figure 4, Table 5). The tributaries to the latter three are included in the assessment. The estimate of miles in these waterbodies was 119.6.

Tables 6 and 7 list the miles of streams affected by the various cause and source categories identified as generally affecting water quality. The percent of stream miles affected by various causes are shown Figure 5. The relative percent impact by causes is shown in Figure 6. The primary causes of impairment were nutrients (total phosphorus), low dissolved oxygen, sediments and temperature. The percent of stream miles affected by various sources are shown in Figure 7. The relative impact of various sources is shown in Figure 8. The primary sources of impairment were agricultural activities, industrial point sources and municipal point sources. The probable sources of impairment for 97.3 miles were listed as unknown.

Upper Bear River—In the upper Bear River, all but three waterbodies were assessed as fully supporting their beneficial uses that were assessed. These were the Class 3A and 4 waters located in Summit and Rich Counties. Two segments on the main-stem of the Bear River were assessed as partially supporting their Class 3A (cold water game fish) beneficial use because of low dissolved oxygen. The source of this impairment is not known. These two segments included the Bear River from the Utah-Wyoming border to the Woodruff Creek confluence, and the Bear River from the Woodruff Creek confluence to the Utah-Wyoming border. The other waterbody assessed not supporting all of its beneficial uses was Saleratus Creek and its tributaries. The parameters of concern were dissolved oxygen, temperature, and total dissolved solids. The

probable sources of the total dissolved solids are agriculture and natural. The probable sources for the temperature and low dissolved oxygen is unknown.

Lower Bear River—Beneficial use assessment remained essentially unchanged in the lower Bear River watershed. The major problem within the system is total phosphorus and the sources are agricultural activities and point sources. The waterbodies identified as having an EPA approved TMDL were not listed on the 303(d) list, but are still identified as not meeting the beneficial use support for the parameters listed in the 1996 and 1998 305(b) reports. Extensive implementation work has been done in the Little Bear watershed, but results of the work have been inconclusive. A 319 non point source project was implemented on the Cub River in 1999 to improve water quality.

In the previous intensive monitoring survey, Clarkston Creek and the Malad River were not assessed. During the most recent survey they were monitored and the results indicated that they were fully supporting all of the beneficial uses that they were assessed for. The Class 2B use designation was not assessed.

Box Elder Creek had a sampling site located on it, but there was insufficient data collected to determine beneficial use support for this stream from the Brigham City WTP to its headwaters.

Blacks Slough was evaluated as a Class 2B, 3B, 3D, and 4 stream. However, this small stream and slough is incorrectly classified. It is not a tributary to the Bear River, thus it does not have these beneficial use designations. This stream is not classified and a recommendation will be made to properly classify it before it is assessed.

Four sampling sites were placed on Wellsville Creek to determine what it contributed to the nutrient load in the Little Bear River. This is an

intermittent stream that flows into the Little Bear River and was not assessed as to whether it was supporting or not supporting its beneficial uses.

Spring Creek continues to be a major contributor of total phosphorus to the Little Bear River and the entire lower Bear River. In addition,

it was evaluated as having low dissolved oxygen and ammonia problems. The major sources of all these parameters are point and non point sources within the watershed.

A total maximum daily load analysis for Spring Creek is being work on and will be completed in early 2001

Bear River Stream Beneficial Use Classifications

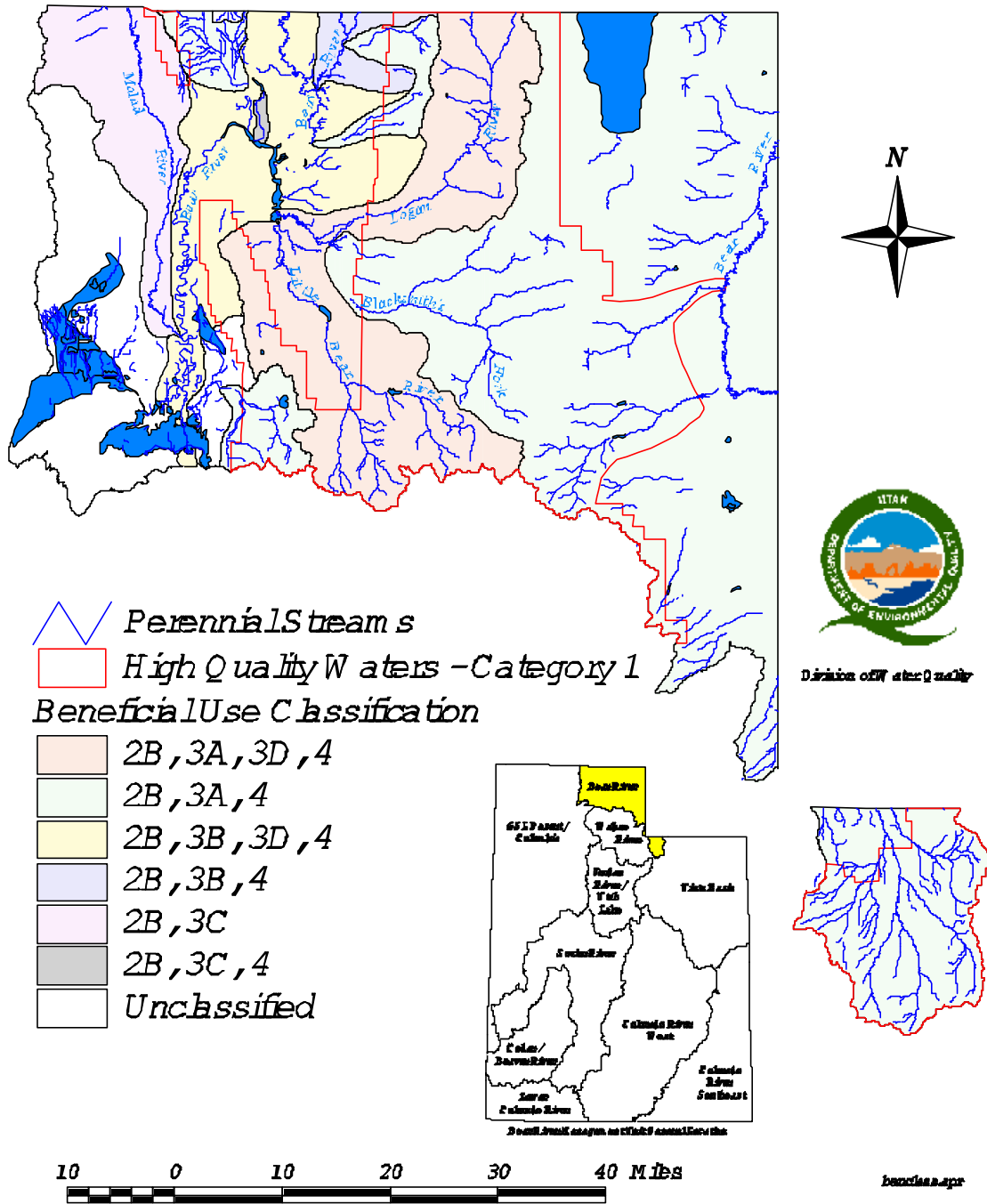


Figure 1. Bear River Water shed Management Unit beneficial use classification map.

Table 2. Bear River Watershed Management Unit Sampling Sites.

STORET	Site	STORET	Site
NO.	Description	NO.	Description
490110	BEAR R NEAR CORINNE AT U83 XING	490499	SPRING CK 1 1/3 MI N OF COLLEGE WARD @ CR XING
490117	BLACKS SLOUGH AB CNFL/ BO ELDER CK	490500	LITTLE BEAR R @ CR376 ING (MENDON RD)
490118	BOX ELDER CK BL BRIGHAM CY WWTP @ FOREST RD XING	490501	LITTLE BEAR R @ CR XING E OF ISLAND W OF PELICAN POND
490119	BOX ELDER CK AB BRIGHAM CY WWTP PLAT	490503	LITTLE BEAR R @ CR XING W OF ISLAND W OF PELICAN POND
490170	BEAR R AT I-15 XING 2 MI NE OF HONEYVILLE	490504	LOGAN R AB CNFL / LITTLE BEAR R AT CR376 49ING
490198	BEAR R BL CUTLER RES AT UP L BRIDGE	490515	LOGAN R AB CNFL / BLACKSMITH FK R N OF US89
490200	MALAD R S OF BEAR R CITY	490516	SPRING CK BL 1000 WEST DAIRY (LOGAN)
490290	MALAD R S OF PLYMOUTH AT U191 XING	490517	SPRING CK AT 1000 WEST (LOGAN)
490294	MALAD RIVER EAST OF PORTAGE	490520	LOGAN R AT MOUTH OF CANYON
490319	CLARKSTON CK AT U142 XING	490530	LOGAN R AT RED BANKS CAMPGROUND
490326	BEAR R AB CUTLER RES AT BRIDGE 1 MI W OF BENSON	490540	BLACKSMITH FK R AB CNFL / LOGAN R AT US89 XING
490350	SUMMIT CK AB CNFL / BEAR R	490544	BLACKSMITH FK R AT MOUTH OF CANYON AT U101 XING
490351	SUMMIT CK @ USFS BNDY	490545	LEFT HAND FK BLACKSMITH FK CNYN AB BLACKSMITH FK
490356	BEAR R AT AMALGA	490548	BLACKSMITH FK R BL HARDWARE RANCH
490379	CUB R W OF FRANKLIN IDAHO	490556	DITCH N OF TRI MILLER
490382	BEAR R W OF RICHMOND AT U142 XING	490557	DITCH NW OF MILLER FEEDLOT
490391	BLACKSMITH/HYRUM CANAL AB NIELSEN DAIRY	490564	WELLSVILLE CK AB CNFL/ LITTLE BEAR R
490392	BLACKSMITH/HYRUM CANAL BL NIELSEN DAIRY	490567	LITTLE BEAR R BL WHITE TROUT FARM AT CR XING
490393	BLACKSMITH/HYRUM CANAL BL PETERSON DAIRY	490570	LITTLE BEAR R W OF AVON AT CR XING
490395	HYRUM SLOUGH AT ISLAND RD XING	490574	S FORK LITTLE BEAR RIVER AB CNFL / E FORK LITTLE BEAR
490424	CUB R AT CASPER ICE CREAM RD	490575	E FK LITTLE BEAR R AB CNFL / S FK LITTLE BEAR R
490425	CUB R AT U142 XING	490593	WELLSVILLE CK S OF RAILROAD TRACKS
490430	HIGH CK @ U91 XING	490594	WELLSVILLE CK @ U101 XING
490431	SPRING CK E OF LEWISTON @ U91 XING	490595	WELLSVILLE CK BL WELLSVILLE RES
490433	HIGH CK @ USFS BNDY	490710	BIG CK AB BEAR LAKE
490437	WORM CK W OF FRANKLIN ID	490712	N EDEN CANYON CK AT CISCO RD XING
490451	HOPKINS SLOUGH OUTLET TO BEAR R .5MI N BENSON SCHOOL 20	490720	SWAN CK AB BEAR LAKE
490472	CLAY SLOUGH AB BEAR R @ CR XING	490810	BEAR R E OF SAGE CK JCT AT U30 XING AB CNFL / BRIDGER CK
490475	SPRING CK SC-4	490815	SAGE CK 2 MI W OF SAGE CK JNCT
490476	SPRING CK SC-5	490818	BIG CK @ U-16 XING
490477	SPRING CK SC-6	490820	WOODRUFF CK @ U-16 XING
490478	HYRUM SLOUGH DITCH AB EA MILLER SC-7	490822	B&Q CANAL @ STATE LINE
490479	SC-8 SPRING CK BL EA MILLER AB HYRUM SLOUGH DITCH	490824	SIX MILE CK AB JOHNSON RES
490481	SPRING CK SC-9	490828	BEAR R @ RANDOLPH/CRAWFORD MTN RD XING
490482	SPRING CK SC-10	490850	BEAR R E OF WOODRUFF
490483	SPRING CK SC-11	490860	SALAERETUS CK @ U-16 XING
490484	DITCH AB EA MILLER SC-12	490890	BEAR R BL WOODRUFF RES
490486	SC-13 DITCH W OF TRIMILLER @ RR XING	490950	BEAR R. AT UT/WY STATE LINE

Table 2. Bear River Watershed Management Unit Sampling Sites.

STORET	Site	STORET	Site
NO.	Description	NO.	Description
<i>490487</i>	<i>HYRUM SLOUGH @ NIBLEY COLLEGE WARD XING</i>	490953	MILL CK @ N SLOPE RD XING
<i>490488</i>	<i>SC-14 MILLER DAIRY DITCH AB SPRING CK</i>	490954	CARTER CK AT ELIZABETH PASS RD XING
<i>490489</i>	<i>MILLER DAIRY DITCH NW OF FEEDLOT SC-15</i>	490955	W FK BEAR RIVER AB CNFL/ BEAR RIVER
<i>490490</i>	<i>SPRING CK @ CR 376 (MENDON) XING</i>	490996	STILLWATER FK OF BEAR R AB CNFL/ HAYDEN FK
<i>490492</i>	<i>S FK SPRING CK E OF PELICAN POND @ RD XING</i>	490998	HAYDEN FK B.R. AB CNFL/ STILLWATER FK
<i>490494</i>	<i>S FK SPRING CK @ US 89 XING</i>	590165	LITTLE BEAR R BL HYRUM RES

STORET Stations in italics were sampled for nutrients and field parameters only

**Table 3. Individual Use Support Summary
Bear River Watershed Management Unit
(Stream Miles)**

Goals^a	Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Not Attainable
Protect & Enhance Ecosystems	Aquatic Life	1,128.7	838.5 (74.3%)	0.0	290.2 (25.7%)	0.0	0.0
Protect & Enhance Public Health	Fish Consumption	0.0	0.0	0.0	0.0	0.0	0.0
	Swimming ^b	517.6	507.8 (98.1%)	0.0	0.0	9.8 (1.9%)	0.0
	Secondary Contact	517.6	507.8 (98.1%)	0.0	0.0	9.8 (1.9%)	0.0
	Drinking Water ^c	0.0	0.0	0.0	0.0	0.0	0.0
Social and Economic	Agricultural	978.9	955.6 (97.6%)	0.0	23.4 (2.4%)	0.0	0.0

^a These goals are part of the national water quality goals adopted by the EPA Office of Water and the ITFM in their Environmental Goals and Indicators effort.

^b Class 2B (secondary contact) streams were evaluated as swimmable for purposes of the CWA goals, therefore the swimming and secondary contact classification categories are the same.

Bear River Watershed Management Unit Stream Beneficial Use Assessment

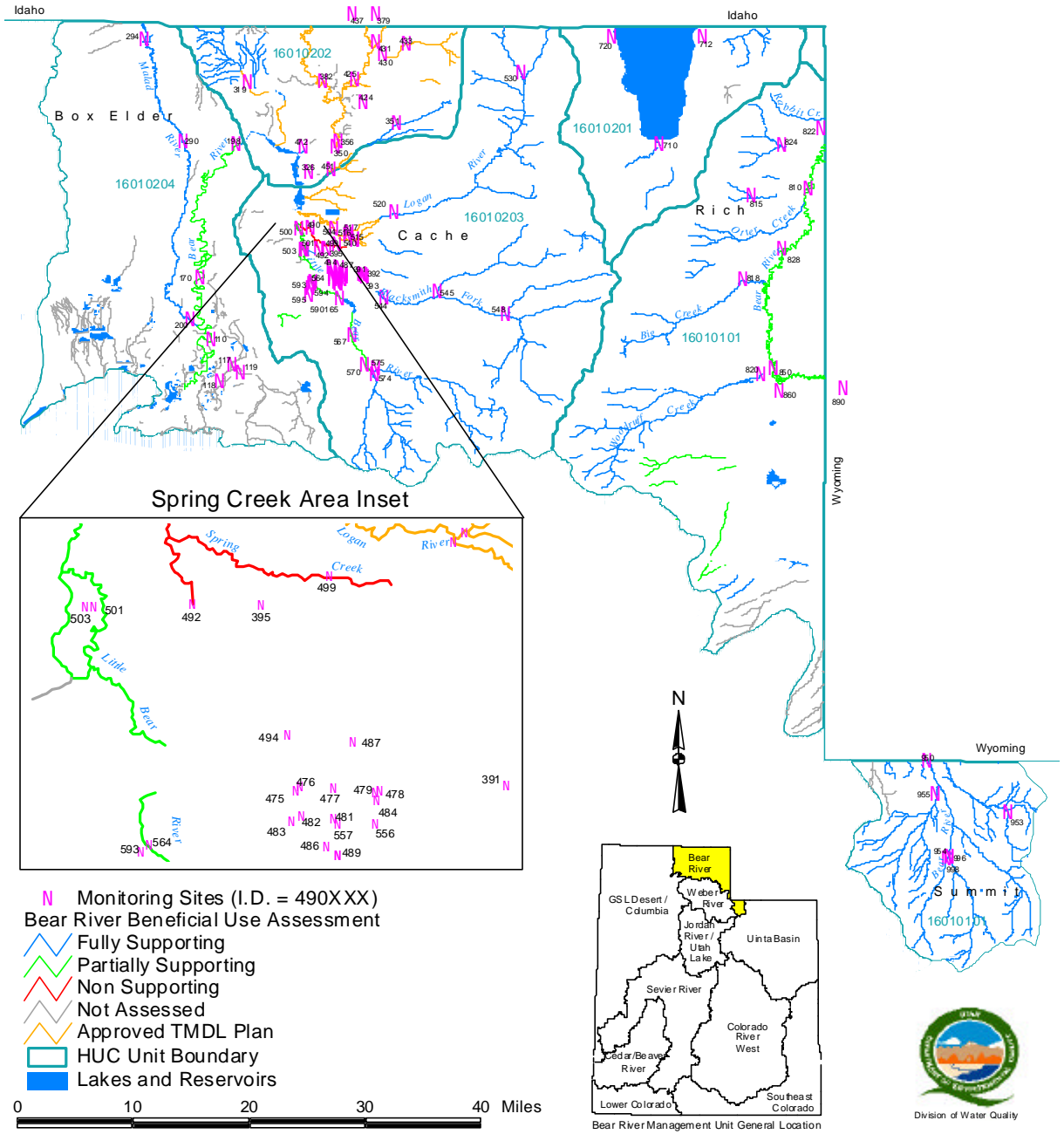


Figure 3. Bear River Watershed Management Unit Stream Beneficial Use Assessment and sampling sites.

Table 4. Impaired Waterbodies in the Bear River Watershed Management Unit

Table 4. Impaired Waterbodies in the Bear River Watershed Management Unit											
									Probable		
					Beneficial	Beneficial	Parameter or	Impact	Source	Impact	TMDL
STORET	Waterbody	Waterbody		Stream	Use	Use	of	of	of	of	Approved
No.	Name	Description	HUC	Miles	Class	Support	Concern	Stressor	Parameter or Stressor	Source	
490110	Bear River-1	Great Salt Lake to Malad River confluence	16010204	32.1	3B	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490110	Bear River-1	Great Salt Lake to Malad River confluence	16010204	32.1	3B	PS	Total Phosphorus	Moderate	Industrial Discharge	Moderate	1998
490170	Bear River-2	Malad River confluence to Cutler Reservoir	16010204	38.6	3B	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490170	Bear River-2	Malad River confluence to Cutler Reservoir	16010204	38.6	3B	PS	Total Phosphorus	Moderate	Industrial Discharge	Moderate	1998
490170	Bear River-2	Malad River confluence to Cutler Reservoir	16010204	38.6	3B	PS	Total Phosphorus	Moderate	Municipal Discharge	Moderate	1998
490326 490356 490382	Bear River-3	Cutler Reservoir to Idaho Stateline	16010202	26.8	3B	PS	Sediment	Moderate	Agriculture	Moderate	1998
490326 490356 490382	Bear River-3	Cutler Reservoir to Idaho Stateline	16010202	26.8	3B	PS	Sediment	Moderate	Hydrological Modification	Moderate	1998
490326 490356 490382	Bear River -3	Cutler Reservoir to Idaho Stateline	16010202	26.8	3B	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490326 490356 490382	Bear River-3	Cutler Reservoir to Idaho Stateline	16010202	26.8	3B	PS	Total Phosphorus	Moderate	Hydrological Modification	Moderate	1998
490500 490501 490503	Little Bear River-1	Cutler Reservoir to Hyrum Reservoir	16010203	28.1	3A	PS	Total Phosphorus	Moderate	Agriculture	Moderate	
490500 490501 490503	Little Bear River-1	Cutler Reservoir to Hyrum Reservoir	16010203	28.1	3A	PS	Total Phosphorus	Moderate	Reservoir Releases	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	2B	NS	Fecal Coliform	Moderate	Agriculture	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Total Phosphorus	Moderate	Agriculture	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Total Phosphorus	Moderate	Industrial Discharge	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Total Phosphorus	Moderate	Feedlot	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Ammonia	Moderate	Agriculture	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Ammonia	Moderate	Industrial Discharge	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Dissolved Oxygen	Moderate	Industrial Discharge	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Dissolved Oxygen	Moderate	Agriculture	Moderate	
Several Sites	Spring Creek	confluence w/ Little Bear River to headwaters-tribs	16010203	7.3	3A	PS	Temperature	Moderate	Unknown	Moderate	
49057 490570	Little Bear River-2	Hyrum Reservoir to East Fork Little Bear confluence	16010203	6.8	3A	PS	Total Phosphorus	Moderate	Agriculture	Moderate	
49057 490570	Little Bear River-2	Hyrum Reservoir to East Fork Little Bear confluence	16010203	6.8	3A	PS	Total Phosphorus	Moderate	Aquaculture	Moderate	
490424 490425	Cub River	confluence w/ Bear River to Utah-Idaho Stateline	16010202	13.8	3B	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490424 490425	Cub River	confluence w/ Bear River to Utah-Idaho Stateline	16010202	13.8	3B	PS	Total Phosphorus	Moderate	Habitat Modification	Moderate	1998

Table 4. Impaired Waterbodies in the Bear River Watershed Management Unit

Table 4. Impaired Waterbodies in the Bear River Watershed Management Unit											
									Probable		
				Beneficial	Beneficial	Parameter or Stressor	Impact	Source	Impact	TMDL	
STORET	Waterbody	Waterbody	Stream	Use	Use	of	of	of	of	Approved	
No.	Name	Description	HUC	Miles	Class	Support	Concern	Stressor	Parameter or Stressor	Source	
490437	Worm Creek	confluence w/ Cub River to Utah-Idaho Stateline	16010202	2.5	2B	NS	Fecal Coliform	Major	Agriculture	Major	1998
490437	Worm Creek	confluence w/ Cub River to Utah-Idaho Stateline	16010202	2.5	3B	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490437	Worm Creek	confluence w/ Cub River to Utah-Idaho Stateline	16010202	2.5	3B	PS	Total Phosphorus	Moderate	Municipal Discharge	Moderate	1998
490430	High Creek	confluence w/ Cub River to headwaters-tribs	16010202	20.7	3A	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490431	Spring Creek(Lewiston)	confluence w/ Cub River to Utah-Idaho Stateline	16010202	3.3	3B	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490504	Logan River	Cutler Reservoir to Mouth of Logan Canyon	16010101	14.4	3A	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
	Newton Creek	Cutler Reservoir to Newton Reservoir	16010202	5.8	3A	PS	Total Phosphorus	Moderate	Agriculture	Moderate	1998
490860	Saleratus Creek	Saleratus Creek & tribs from confluence with Woodruff Creek to headwaters	16010101	23.37	3A	PS	Dissolved Oxygen	Moderate	Unknown	Moderate	
490860	Saleratus Creek	Saleratus Creek & tribs from confluence with Woodruff Creek to headwaters	16010101	23.37	3A	PS	Temperature	Moderate	Unknown	Moderate	
490860	Saleratus Creek	Saleratus Creek & tribs from confluence with Woodruff Creek to headwaters	16010101	23.37	4	PS	Total Dissolved Solids	Moderate	Natural	Moderate	
490860	Saleratus Creek	Saleratus Creek & tribs from confluence with Woodruff Creek to headwaters	16010101	23.37	4	PS	Total Dissolved Solids	Moderate	Agricultural	Moderate	
490850	Bear River-5	Bear River from Utah-Wyoming border to Woodruff Creek confluence	16010101	11.84	3A	PS	Dissolved Oxygen	Moderate	Unknown	Moderate	
490810	Bear River-4	Bear River from Woodruff Creek to Utah-Wyoming border	16010101	54.79	3A	PS	Dissolved Oxygen	Moderate	Unknown	Moderate	

BEAR RIVER WATERSHED MANAGEMENT UNIT WATERS WITH ELEVATED LEVELS OF PHOSPHORUS

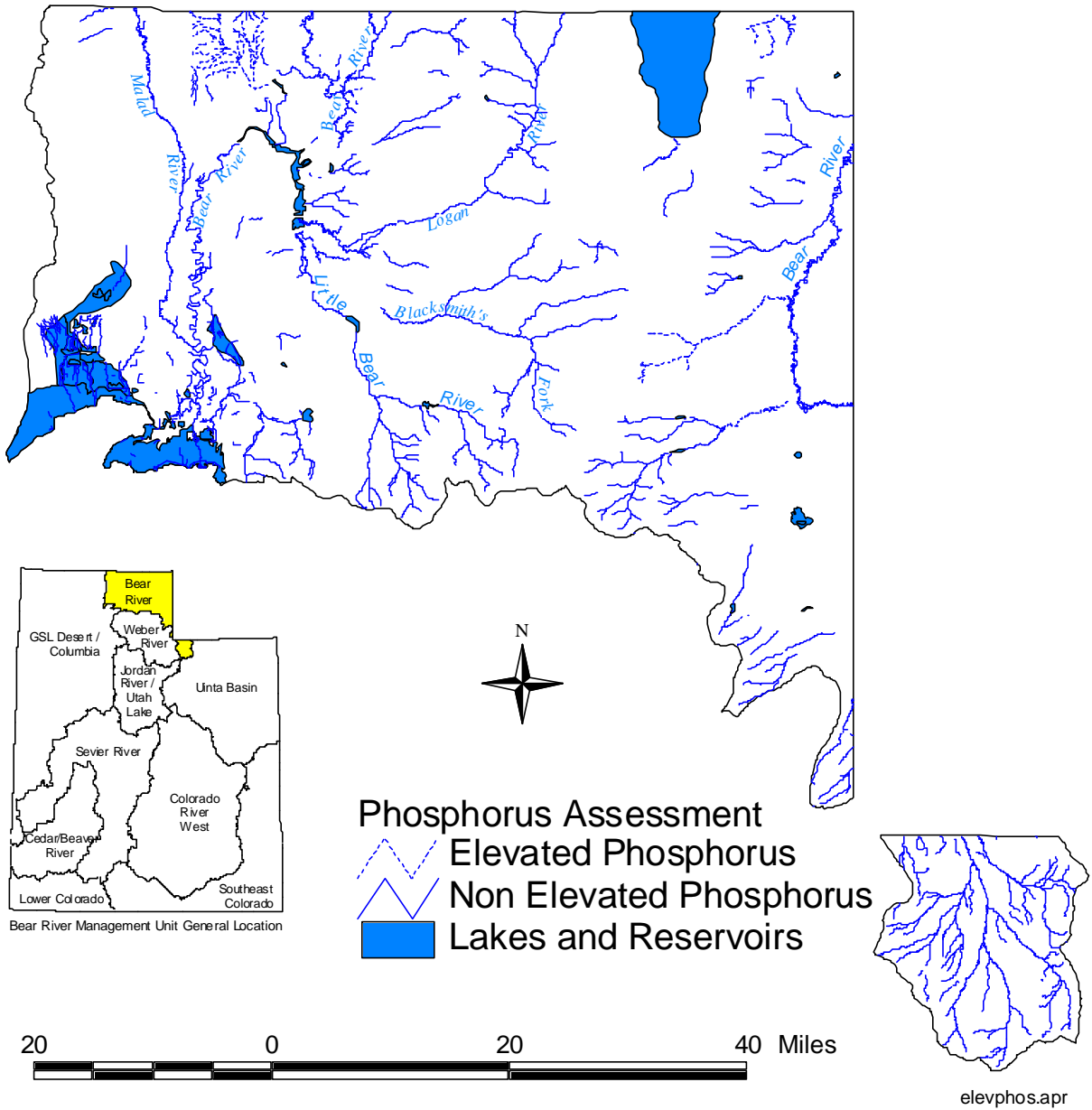


Figure 4. Stream segments with elevated total phosphorus - Bear River Watershed Management Unit.

Table 5. Waterbodies in the Bear River Watershed Management Unit With Elevated Levels of Total Phosphorus.

STORET	Waterbody	Waterbody	Stream
No.	Name	Description	Miles
490820	Woodruff Creek - 1	Woodruff Creek from confl/w Bear River to Birch Creek confluence	8.66
490818	Big Creek	Big Creek & tribs from Bear River to headwaters	38.76
490712	North Eden	North Eden Creek & tribs from Bear lake to headwaters	12.04
490312	Clarkston Creek	Newton Reservoir to Utah-Idaho stateline - tribs	60.1

Table 6. Total Waters Impaired by Various Cause Categories Bear River Watershed Management Unit		
Cause Category	Contribution to Impairments	
	Major	Moderate/Minor
Cause unknown	0.0	0.0
Unknown toxicity	0.0	0.0
Pesticides	-	-
Priority organics	-	-
Nonpriority organics	-	-
Metals	0.0	0.0
Ammonia	0.0	7.3
Chlorine	0.0	0.0
Other inorganics	0.0	0.0
Nutrients	0.0	200.2
pH	0.0	0.0
Siltation/Sediments	0.0	40.6
Organic enrichment/low DO	0.0	97.3
Salinity/TDS/Chlorides	0.0	23.4
Thermal modifications	0.0	30.7
Flow alterations	0.0	0.0
Other habitat alterations	0.0	0.0
Pathogen indicators	2.5	7.3
Radiation	-	-
Oil and grease	-	-
Taste and odor	0.0	0.0
Noxious aquatic plants	-	-
Total toxics	-	-
Turbidity	-	-
Exotic species	-	-

* = Category not applicable.

- = Category applicable, no data available.

0 = Category applicable, but size of waters in the category is zero.

Note: Major category is now used only for waters found not supporting.

Table 7. Total Waters Impaired by Various Source Categories Bear River Watershed Management Unit		
Source Category	Contribution to Impairments	
	Major	Moderate/Minor
Industrial Point Sources	0.0	78.0
Municipal Point Sources	0.0	73.2
Combined Sewer Overflow	0.0	0.0
Agriculture	2.5	221.1
Silviculture	-	-
Construction	-	0.0
Urban Runoff/Storm Sewers	0.0	14.4
Resource Extraction	0.0	0.0
Land Disposal	-	0.0
Hydromodification	0.0	26.8
Habitat Modification	0.0	13.8
Marinas	*	*
Atmospheric Deposition	-	-
Contaminated Sediments	-	-
Unknown Source	0.0	97.3
Natural Sources	0.0	23.4
Reservoir Releases	0.0	28.1
Recreation	0.0	0.0
Aquaculture	0.0	6.8

* = Category not applicable.

- = Category applicable, no data available.

0 = Category applicable, but size of waters in the category is zero.

Note: Major category is now used only for waters found not supporting.

Percent of Stream Miles Affected By Causes

Bear River Watershed 2000 305(b) Assessment

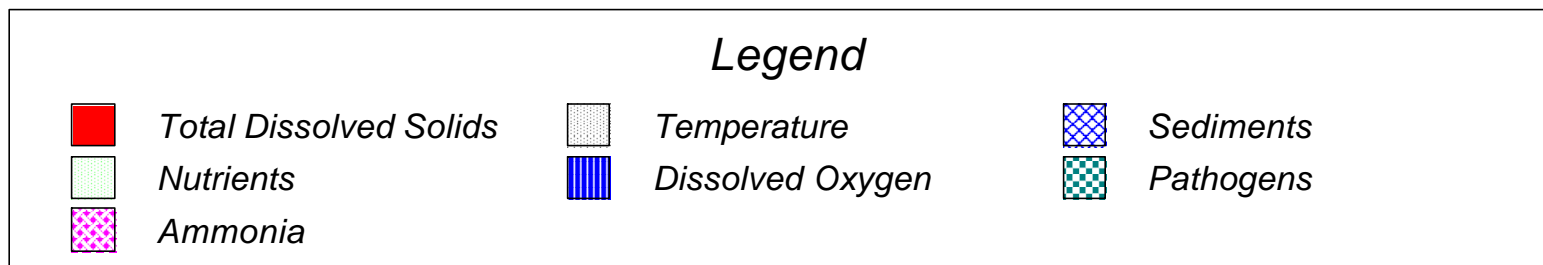
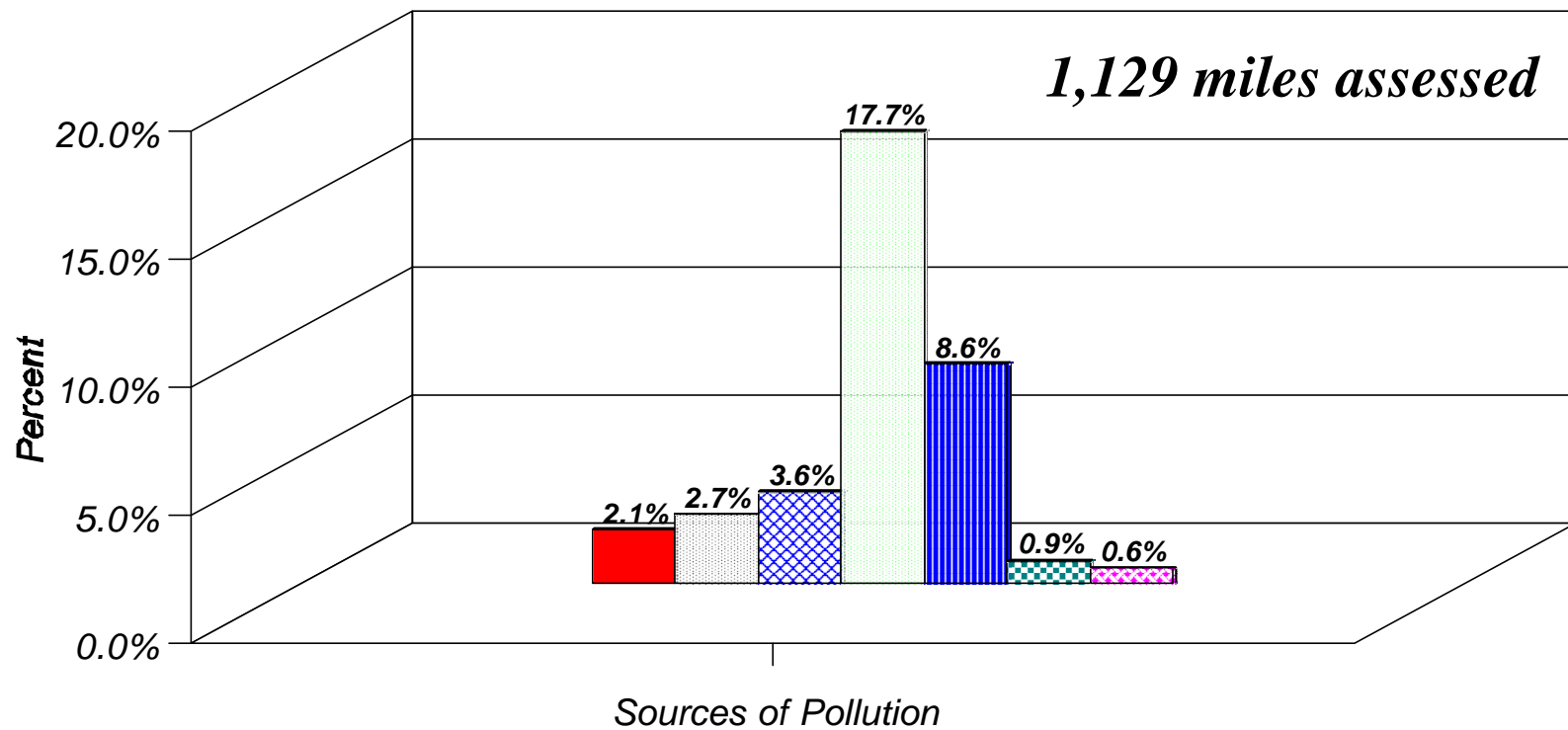


Figure 5. Percent of assessed stream miles in the Bear River Watershed Management Unit impacted by causes - 2000 305(b)

Causes of Stream Water Quality Impairments

Bear River Watershed 2000 305(b) Assessment

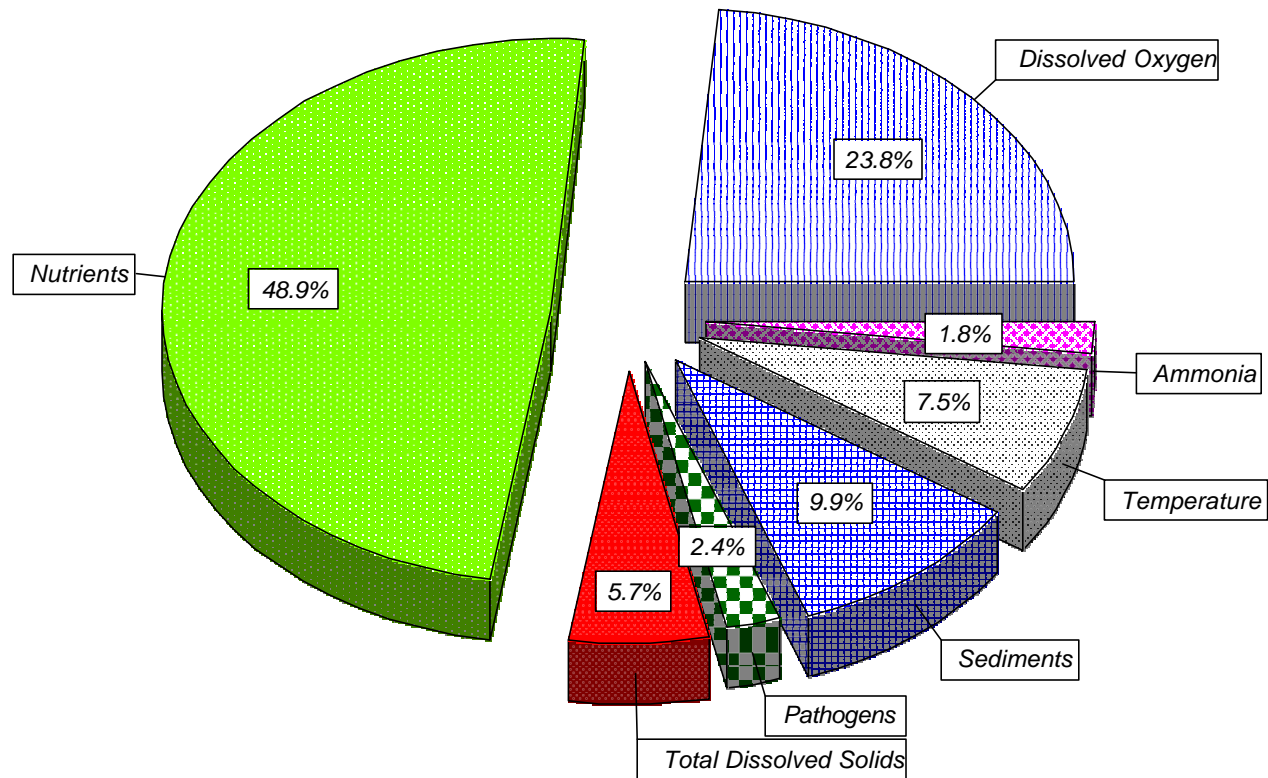


Figure 6. Relative percent impact by causes in the Bear River Watershed Management Unit - 2000 305(b)

Percent of Stream Miles Affected By Sources Bear River Watershed 2000 305(b) Assessment

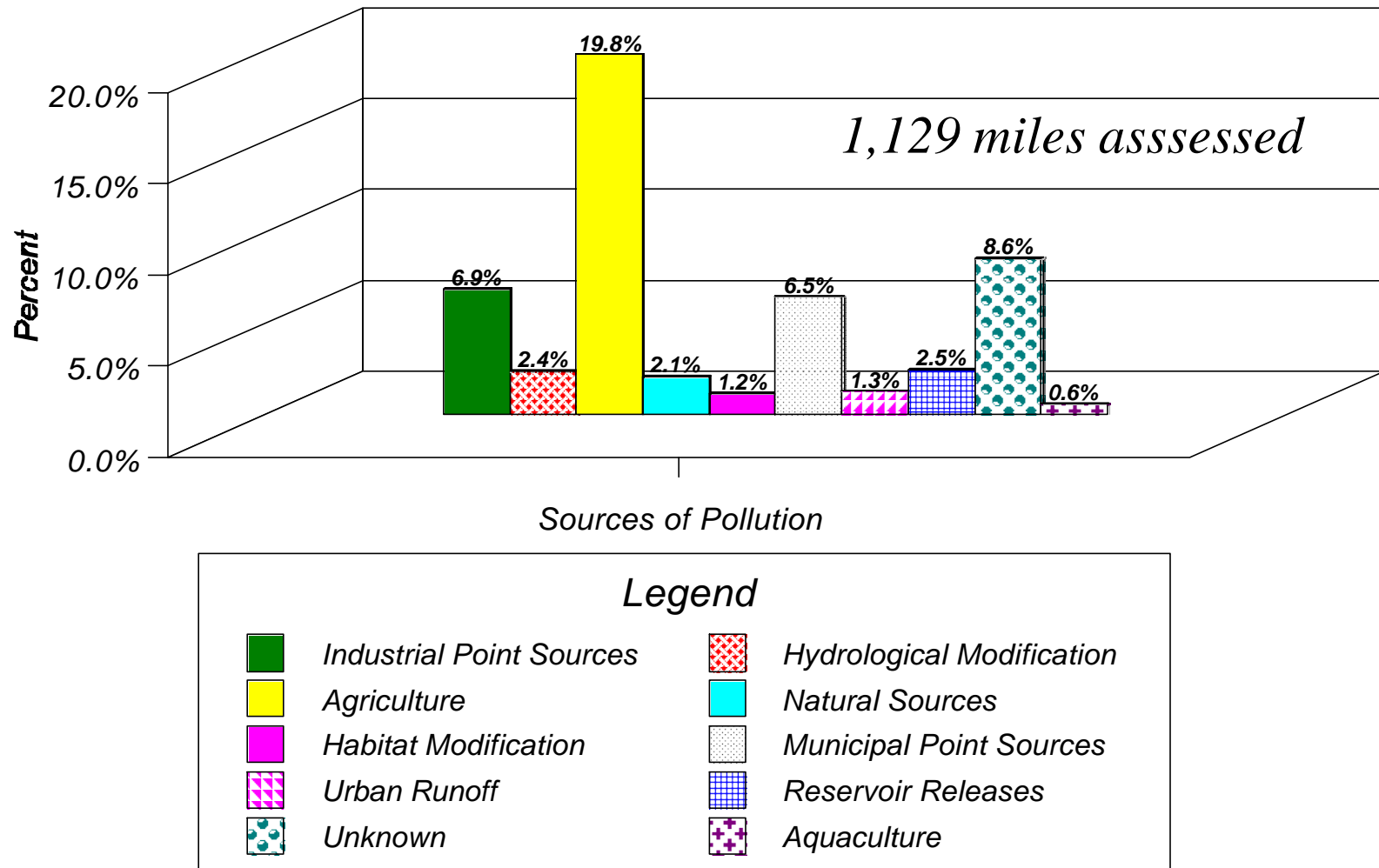


Figure 7. Percent of assessed streams miles in Bear River Watershed Management Unit impacted by sources - 2000 305(b).

Sources of Stream Water Quality Impairment

Bear River Watershed 2000 305(b) Assessment

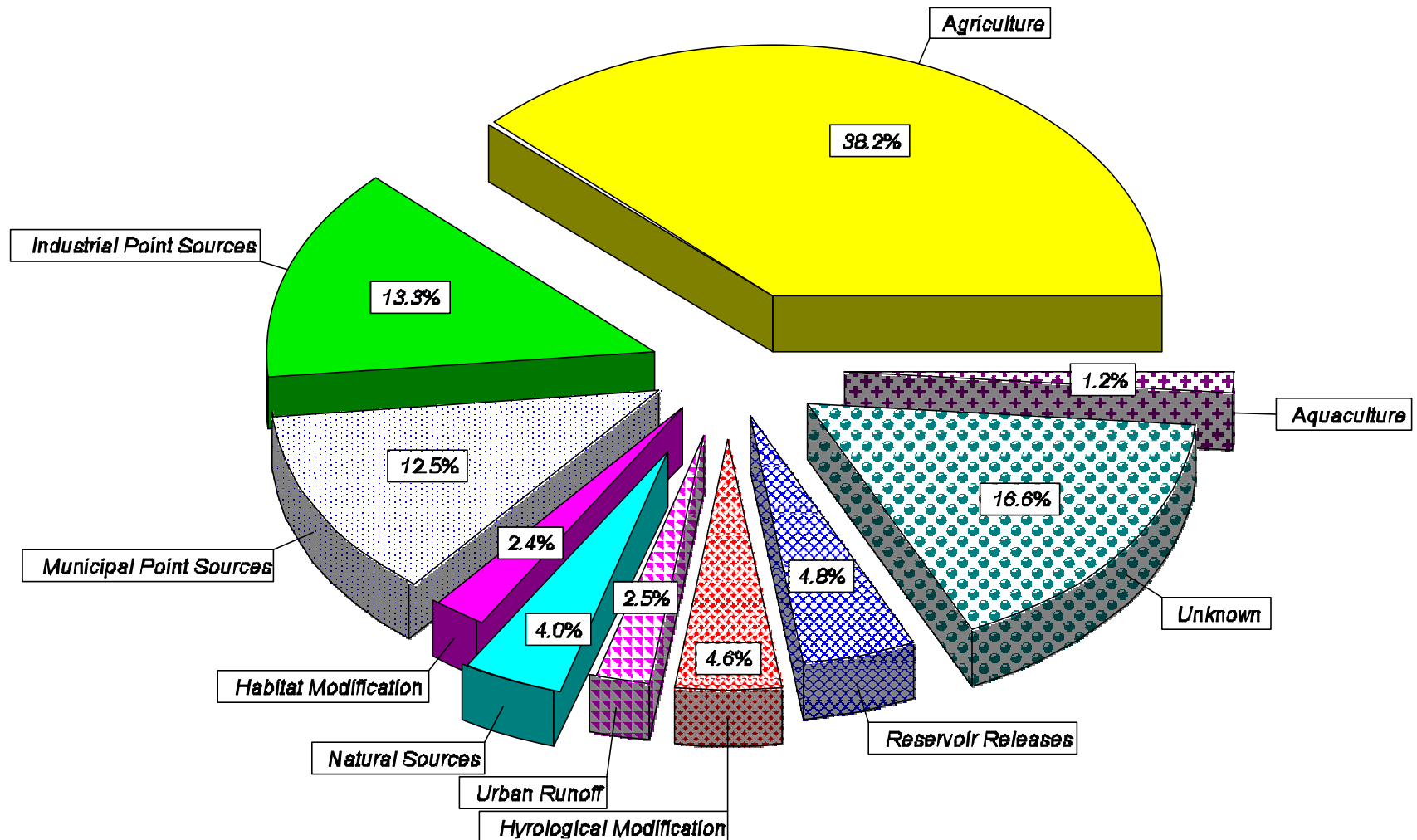


Figure 8. Relative percent impact in the Bear River Watershed Management Unit by sources on stream water quality - 2000 305(b).

REFERENCES

Division of Water Quality. 1999. Standards of quality for waters of the State, R317-2, Utah Administrative Code, Utah Division of Water Quality, Utah Department of Environmental quality, Salt Lake City, UT.

Division of Water Quality. 1993. Quality assurance and standard operating procedures manual. Utah Division of Water Quality, Utah Department of Environmental quality, Salt Lake City, UT.

APPENDIX

Methods for Determining Beneficial Use Support

Tables 1 through 4 are the criteria used to compare data against standards and pollution indicators found in *Standards of Quality for Waters of the State, R317-2, Utah Administrative Code* to determine beneficial use support of waterbodies. The State of Utah exercises discretion in using data on that goes beyond the criteria listed in the following tables and/or narrative for determining beneficial use support and can include other types of information and best professional judgement.

Table A-1. Criteria for Assessing Water as a Source of Drinking Water-Class 1C		
Degree of Use Support	Field Monitoring (Toxicants)	Restrictions
Full	For any one pollutant, no more than one violation of criterion.	No source water closures or advisories
Partial	For any one pollutant, two or more violations of the criterion, but violations occurred in #10% of the samples.	One or more drinking water source advisories lasting less than 30 days per year.
Non	For any one pollutant, two or more violations of the criterion, and violations occurred in more than 10% of the samples.	One or more drinking water source advisories lasting greater than 30 days.

Table A-2. Criteria for Assessing Primary and Secondary Contact Beneficial Use - Class 2A and 2B		
Degree of Use Support	Restrictions	Fecal Coliform Bacteria
Full	No bathing area closures or restrictions in effect during reporting period.	Criterion 1 and Criterion 2 met.
Partial	On average, one bathing area closure per year of less than one week's duration.	Geometric mean met; not more than 25 percent of samples exceed 400 per 100 ml.
Non	On average, one bathing area closure per year of greater than one week's duration, or more than one bathing area closure per year.	Neither geometric mean nor maximum criteria limits achieved.

Bacterial Criterion

Criterion 1 = The geometric mean of the fecal coliform bacteria level should not exceed 200 per 100 mL for any 30-day period.

Criterion 2 = Not more than 10 percent of the total samples taken during any 30 day period should have a density that exceeds 400 per 100 mL.

Table A-3. Criteria for Assessing Aquatic Life Beneficial Support-Classes 3A, 3B, 3C, 3D

Degree of Use Support	Conventional Parameters (pH, DO, Temperature)	Toxic Parameters (priority pollutants, chlorine, and ammonia)
Full	For any one pollutant, no more than one exceedance of criterion or criterion was not exceeded in < 10% of the samples if there were two or more exceedances.	For any one pollutant, no more than one violation of acute criteria.
Partial	For any one pollutant, criterion was exceeded two times, and criterion was exceeded in more than 10% but not more than 25% of the samples.	For any one pollutant, two or more violations of the acute criterion, but violations occurred in #10% of the samples.
Non	For any one pollutant, criterion was exceeded two times, and criterion was exceeded in more than 25% of the samples.	For any one pollutant, two or more violations of the acute criterion, and violations occurred in more than 10% of the samples.

Total Phosphorus Assessment

For **total phosphorus** , the following criteria were used to identify waters as '**needing further evaluation**'.

If the **pollution indicator value** for total phosphorus (**0.05 mg/L**) was exceeded in more than 10% of the samples, and the mean of all samples was > **0.06 mg/L** the waterbody was identified as 'needing further evaluation or study' before a decision to list a stream waterbody on the 303(d) list. Additional evaluations could include benthic macroinvertebrate data, diurnal dissolved oxygen data, habitat quality evaluations, and fisheries data. Reports published or information collected by other entities can be used to determine beneficial use support.

Table A-4. Criteria for Assessing Agricultural Beneficial Use Support - Class 4

Degree of Use Support	Conventional Parameter (Total Dissolved Solids)	Toxic Parameters
Full	Criterion exceeded in less than two samples and in < 10% of the samples if there were two or more exceedances.	For any one pollutant, no more than one violation of criterion.
Partial	Criterion was exceeded two times, and criterion was exceeded in more than 10% but not more than 25% of the samples.	For any one pollutant, two or more violations of the criterion, but violations occurred in #10% of the samples.
Non	Criterion was exceeded two times, and criterion was exceeded in more than 25% of the samples.	For any one pollutant, two or more violations of the criterion, and violations occurred in more than 10% of the samples.