
9.1 INTRODUCTION

The Cedar/Beaver Watershed Management Unit includes all streams located in the USGS Hydrological Units (HUCs) listed in Table 9-1. Few perennial streams are found in this management unit and even the most significant streams are somewhat small including: Beaver River, Coal Creek, Shoal Creek and Pinto Creek.

Biological, water chemistry and field data collected from January 1, 2004 through December 31, 2008 were used to make assessments. Water quality data were compared against standards established for each of the designated beneficial uses. Figure 9-1 shows the beneficial use classifications for this watershed management unit.

9.2 IMPAIRED WATERS

The list of streams and lakes impaired and requiring a TMDL (Category 5; Section 303d) for the Bear River are presented in Table 9-2. Pinto Creek and Newcastle Reservoir are new listings for 2010. Newcastle Reservoir has an approved TMDL for this cycle and is requested for delisting for those parameters (Table 9-3). Assessment results for all AUs for streams are presented in Table 9-4 and lakes in Table 9-5. Lake assessments are further discussed in the next section.

9.3 LAKE ASSESSMENTS

Water quality assessment for lakes includes determination of Carlson's trophic state index (TSI), water chemistry, phytoplankton species dominance, reported fish kills, and water quality trends.

Table 9-6 shows TSIs based on each sample collected from May through September by sample date. Table 9-7 contains a summary of lake trophic status by study periods. Note that some of the changes in TSIs between assessment periods is due to the variability in the lakes and reservoirs and some is due to switching methodologies between 2008 and 2010. The reported TSI for 2010 is based on Chl-a whereas prior reporting cycles averaged the TSI based on secchi disk depth (TSI-SD), Chl-a (TSI-Chla), and total phosphorus (TSI-TP). Table 9-7 includes the TSIs using both the 2008 and 2010 method using the 2010 data.

TSI values for some lakes and reservoirs differed between the 2008 and 2010 methods. Small differences are defined as a difference in TSIs of 6-10, medium differences 11-20, and large differences as greater than 20. No differences were observed between the methods suggesting little difference in trophic states estimated with the new and older methods.

For the purpose of assessing trends, the TSI's from the most recent five assessment periods were considered. Consistent trends that resulted in a net TSI change of five or changes greater than 10 between 2008 and 2010, which are not attributable to the change in TSI methodology alone, are identified. Puffer Lake exhibits an increasing trend in TSI and Newcastle Reservoir a decreasing trend.

9.4 HEALTH ADVISORIES

Upper Enterprise and Newcastle Reservoirs have fish consumption advisories for mercury.

TABLES

Table 9-1 USGS Hydrological Units in the Cedar/Beaver Watershed Management Unit

Hydrological Units in the Cedar/Beaver Watershed Management Unit	
Hydrological Unit Code	Hydrological Unit Name
16030006	Escalante Desert
16030007	Beaver Bottoms-Upper Beaver
16030008	Lower Beaver

Table 9-2 Impaired Streams and Lakes Requiring a TMDL – Cedar/Beaver Watershed

Impaired Streams and Lakes Requiring a TMDL - Cedar/Beaver Watershed				
AU ID	AU Name	Water Type	Size	Location Description
UT-160300006-002	Pinto Creek	STREAM	28.1 MILES	Pinto Creek, Middle Pinto Creek, and tributaries

Impaired Streams and Lakes Requiring a TMDL - Cedar/Beaver Watershed

Cause	Cycle First Listed	TMDL Status	Use	Source
Benthic-Macroinvertebrate Bioassessments	2010	Low Priority	Cold Water Aquatic Life	• Source Unknown
AU ID	AU Name	Water Type	Size	Location Description
UT-L-16030006-008_00	NEWCASTLE RESERVOIR	FRESHWATER LAKE	163 ACRES	LL= 373858/1133115 36S 15W 22,27 USGS MAP AND DATE: NEWCASTLE,UTAH-1972 WATERSHED: PINTO CREEK, WMU Sevier River
Cause	Cycle First Listed	TMDL Status	Use	Source
Temperature, water	2010	Low Priority	Cold Water Aquatic Life	
Mercury in Fish Tissue	2010	Low Priority	Cold Water Aquatic Life	
AU ID	AU Name	Water Type	Size	Location Description
UT16030006-004_00	Parowan Creek	Stream	35.7	Parowan Creek and tributaries from the south end of Main Street in Parowan to headwaters
Cause	Cycle First Listed	TMDL Status	Use	Source

Impaired Streams and Lakes Requiring a TMDL - Cedar/Beaver Watershed

Benthic-Macroinvertebrate Bioassessments	2010	Low Priority	Cold Water Aquatic Life	• Source Unknown
AU ID	AU Name	Water Type	Size	Location Description
UT-L-16030006-017_00	Yankee Meadow Reservoir	FRESHWATER LAKE	53 ACRES	TOWNSHIP: 35S RANGE: 8W SECTION: 20 USGS MAP AND DATE: PAROWAN, UTAH-1971 WATERSHED: BOWERY CREEK,
Cause	Cycle First Listed	TMDL Status	Use	Source
Oxygen, Dissolved	2008	Low Priority	Cold Water Aquatic Life	
pH	2006	Low Priority	Cold Water Aquatic Life	
AU ID	AU Name	Water Type	Size	Location Description
UT-L-16030006-019_00	Red Creek Reservoir (Iron County)	FRESHWATER RESERVOIR	62 ACRES	TOWNSHIP: 34S RANGE: 7W SECTION: 7,18 USGS MAP AND DATE: RED CREEK RESERVOIR, UTAH-1971 WATERSHED: RED CREEK
Cause	Cycle First Listed	TMDL Status	Use	Source
Oxygen, Dissolved	2006	High Priority	Cold Water Aquatic Life	

Impaired Streams and Lakes Requiring a TMDL - Cedar/Beaver Watershed

AU ID	AU Name	Water Type	Size	Location Description
UT-L-16030007-022_00	KENTS LAKE (MIDDLE)	FRESHWATER LAKE	86 ACRES	LL= 381400/1122709 30S,29S 5W 6,31 USGS MAP AND DATE: CIRCLEVILLE MOUNTAIN, UTAH-1971 WATERSHED: BIRCH CREEK
Cause	Cycle First Listed	TMDL Status	Use	Source
Temperature, water	2006	Low Priority	Cold Water Aquatic Life	<ul style="list-style-type: none"> • Source Unknown • Managed Pasture Grazing
Phosphorus (Total)	2006	Low Priority	Cold Water Aquatic Life	<ul style="list-style-type: none"> • Other Recreational Pollution Sources • Rangeland Grazing • Site Clearance (Land Development or Redevelopment)
AU ID	AU Name	Water Type	Size	Location Description
UT-L-16030007-025_00	Three Creeks Reservoir	FRESHWATER LAKE	57 ACRES	LL= 381745/1122515 29S 5W 9 USGS MAP AND DATE: DELANO PEAK, UTAH-1943 WATERSHED: LAKE STREAM
Cause	Cycle First Listed	TMDL Status	Use	Source
pH	2006	Low Priority	Cold Water Aquatic Life	<ul style="list-style-type: none"> • Source Unknown

Table 9-3 Delisting from the 303d List – Cedar/Beaver Watershed

Delisting from the 303d List, Cedar/Beaver Watershed							
Assessment Unit	AU Name	Location Description	Water Type	Size	Cause	Reason for Removal	Delisting Comment
UT-L-16030006-008_00	NEWCASTLE RESERVOIR	LL= 373858/1133115 36S 15W 22,27 USGS MAP AND DATE: NEWCASTLE,UTAH-1972 WATERSHED: PINTO CREEK,	FRESHWATER LAKE	163 ACRES	Oxygen, Dissolved	TMDL approved or established by EPA (4A)	N/A
UT-L-16030006-008_00	NEWCASTLE RESERVOIR	LL= 373858/1133115 36S 15W 22,27 USGS MAP AND DATE: NEWCASTLE,UTAH-1972 WATERSHED: PINTO CREEK,	FRESHWATER LAKE	163 ACRES	Phosphorus (Total)	TMDL approved or established by EPA (4A)	N/A

Table 9-4 Assessment Results for Cedar Beaver Watershed Stream Assessment Units

Assessment Results for Cedar Beaver Watershed Stream Assessment Units						
AU ID	AU Name		Water Type	Size	Location Description	
UT16030006-001_00	Coal Creek		RIVER	39.637 MILES	Coal Creek and tributaries from Main Street in Cedar City (SR130) to headwaters	
Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural	Fully Supporting	N				
Cold Water Aquatic Life	Fully Supporting	N				
Secondary Recreation	Not Assessed	N				
AU ID	AU Name		Water Type	Size	Location Description	
UT16030006-004_00	Parowan Creek		STREAM	35.7	Parowan Creek and tributaries from the south end of Main Street in Parowan to headwaters	
Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural	Not Assessed	N				• Source Unknown

Assessment Results for Cedar Beaver Watershed Stream Assessment Units

Cold Water Aquatic Life	Not Supporting	N	Benthic-Macroinvertebrate Bioassessments	2010	Low Priority	
Secondary Recreation	Not Assessed	N				
AU ID	AU Name		Water Type	Size	Location Description	
UT16030007-001_00	Beaver River-1		RIVER	7.019 MILES	Beaver River Below Minersville Reservoir	
Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural	Not Assessed	N				
Cold Water Aquatic Life	Not Assessed	N				
Secondary Recreation	Not Assessed	N				
AU ID	AU Name		Water Type	Size	Location Description	
UT16030007-002_00	Beaver River-2		RIVER	57.567 MILES	Beaver River and tributaries from Minersville Reservoir to USFS boundary	

Assessment Results for Cedar Beaver Watershed Stream Assessment Units

Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural	Not Supporting	N	pH	2006	Completed / Pollution	<ul style="list-style-type: none"> • Source Unknown • Agriculture
Cold Water Aquatic Life	Not Supporting	N	pH Phosphorus (Total) Physical substrate habitat alterations Temperature, water	2006 2006 2006	Completed Completed Pollution Completed	<ul style="list-style-type: none"> • Habitat Modification - other than Hydromodification • Hydromodification
Secondary Recreation	Not Supporting	N	pH	2006	Completed	
AU ID	AU Name		Water Type	Size	Location Description	
UT16030007-003_00	Beaver River-3		RIVER	142.767 MILES	Beaver River and tributaries from USFS boundary to headwaters	
Use	Attainment	Threatened	Cause	Cycle First Listed	TMDL Status	Source
Agricultural	Fully Supporting	N				
Cold Water Aquatic Life	Fully Supporting	N				
Secondary Recreation	Not Assessed	N				

Table 9-5 Summary of Individual Lake and Reservoir Support for Cedar/Beaver River Watershed Management Unit

Summary of Individual Lake and Reservoir Support for Cedar/Beaver River Watershed Management Unit																
Assessment Unit ID	Name	Assessment Category 2008	Assessment Category 2010	Parameters Not Supporting 2008	Parameters Not Supporting 2010				Total P > 0.025 mg/L or TSI>50	Winter DO/Fish Kills	Cyano Bacteria Present	Assessment Cycle				
					DO	pH	T	Other				2002	2004	2006	2008	2010
UT-L-16030007-024	Anderson Meadow Reservoir	2	2								Y	FS	FS	FS	FS	
UT-L-16030007-020	Kents Lake	4	4		FS	FS	FS		TP, TSI		N	NS	NS	NS	FS	FS
UT-L-16030007-027	Labaron Reservoir	4	4							DO	Y	NS	NS	NS	FS	
UT-L-16030007-011	Minersville Reservoir	4	4								N	NS	NS	NS	FS	
UT-L-16030006-008	Newcastle Reservoir	5	5, 4A, 3B	DO	NS	NS	FS	Hg	TP		N	NS	NS	NS	NS	NS

Summary of Individual Lake and Reservoir Support for Cedar/Beaver River Watershed Management Unit

Assessment Unit ID	Name	Assessment Category 2008	Assessment Category 2010	Parameters Not Supporting 2008	Parameters Not Supporting 2010				Total P > 0.025 mg/L or TSI>50	Winter DO/Fish Kills	Cyano Bacteria Present	Assessment Cycle				
					DO	pH	T	Other				2002	2004	2006	2008	2010
UT-L-16030007-028	Puffer Lake	4	3B	FS	FS	FS	NS		TP, TSI	Y	NS	NS	NS	FS	NS	
UT-L-16030006-019	Red Creek Reservoir (Iron)	5	5	DO	NS	FS	FS			DO	N	NS	NS	NS	NS	
UT-L-16030007-025	Three Creeks Reservoir	2	2	FS							Y	FS	FS	NS	FS	
UT-L-16030006-002	Upper Enterprise Reservoir	2	2	FS							Y	NS	NS	NS	FS	
UT-L-16030006-017	Yankee Meadow Reservoir	5	5	NS-pH,DO	FS	FS	FS			FK	N	NS	NS	NS	NS	

Summary of Individual Lake and Reservoir Support for Cedar/Beaver River Watershed Management Unit

Assessment Unit ID	Name	Assessment Category 2008	Assessment Category 2010	Parameters Not Supporting 2008	Parameters Not Supporting 2010				Total P > 0.025 mg/L or TSI>50	Winter DO/Fish Kills	Cyano Bacteria Present	Assessment Cycle				
					DO	pH	T	Other				2002	2004	2006	2008	2010

Notes:

FS Fully Supporting

NS Not Supporting

Y Yes

N No

DO Dissolved Oxygen

FK Fish Kill

T Temperature

Total P Total Phosphorus

NA Not Analyzed

TDS Total Dissolved Solids

Hg Mercury

Table 9-6 Individual Lake and Reservoir 2010 Trophic State Index (TSI) – Cedar/Beaver Watershed Management Unit

Individual Lake and Reservoir 2010 Trophic State Index (TSI)						
Cedar/Beaver Watershed Management Unit						
Watershed Management Unit	Assessment Unit	Name	Date	TSI-SD	TSI-Chla	TSI-TP
Cedar / Beaver River	UT-L-16030007-020	Kents Lake	9/12/2007	78	67	62
Cedar / Beaver River	UT-L-16030006-008	Newcastle Reservoir	9/5/2007	55	31	53
Cedar / Beaver River	UT-L-16030007-028	Puffer Lake	8/9/2007	60	77	65
<p>Notes:</p> <p>TSI-SD = Trophic State Index from secchi disk</p> <p>TSI-Chla = Trophic State Index from chlorophyll-a</p> <p>TSI-TP = Trophic State Index from total phosphorus</p>						

Table 9-7 Summary of Individual Lake and Reservoir Trophic State Index (TSI) – Cedar/Beaver Watershed Management Unit

Summary of Individual Lake and Reservoir Trophic State Index (TSI)														
Cedar/Beaver Watershed Management Unit														
Watershed Management Unit	Assessment Unit	Lake / Reservoir	Assessment Cycle Trophic State Index										Trophic State	
			1992	1994	1996	1998	2000	2002	2004	2008	2010 Old Method	2010 Current Method	2010 Old Method	2010 Current Method
Cedar / Beaver River	UT-L-16030007-020	Kents Lake		69	67	64	58	78	63	59	69	67	E	E
Cedar / Beaver River	UT-L-16030006-008	Newcastle Reservoir	48	54	42	48	54	47	59	62	46	31	M	O
Cedar / Beaver River	UT-L-16030007-028	Puffer Lake	49	36	38	39	50	50	40	46	67	77	E	H

Notes:

2010 Old Method TSI calculated using the 2008 Integrated Report Methodology

2010 Current Method TSI calculated using the 2010 Integrated Report Methodology of only chlorophyll-a

O = Oligotrophic

M = Mesotrophic

E = Eutrophic

H = Hypereutrophic

Figures

Cedar / Beaver Unit

Beneficial Use Classes

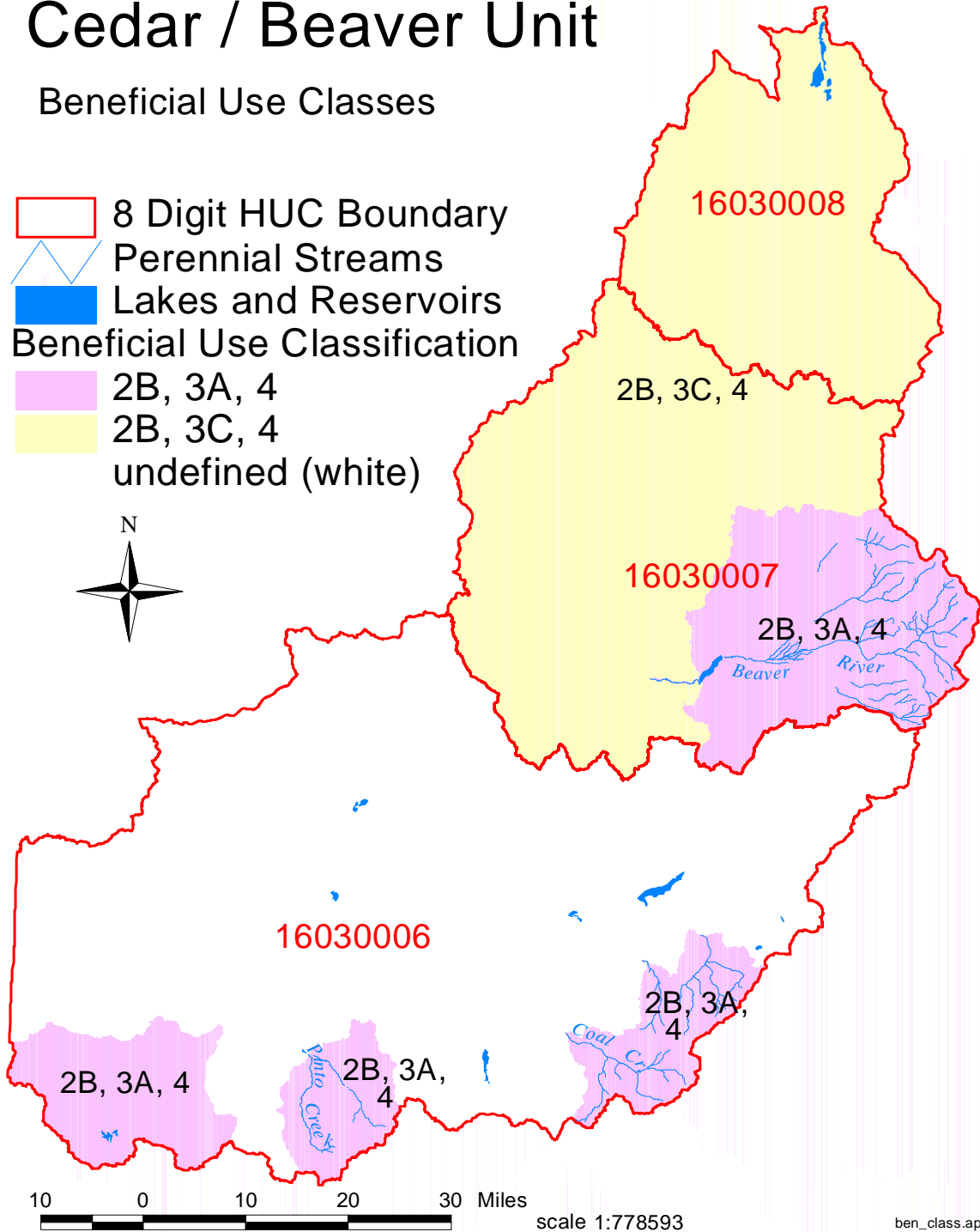
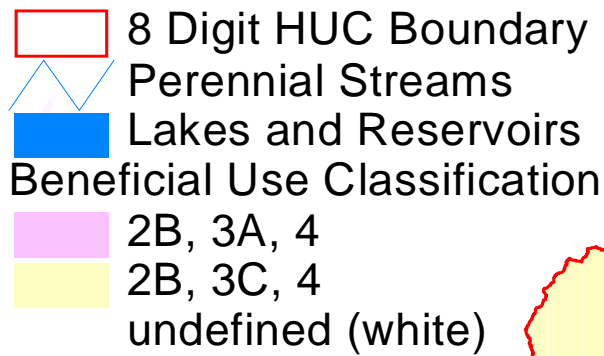


Figure 9-1 Beneficial Use Classes for Cedar/Beaver Watershed Management Unit