UTAH DEPARTMENT *of* ENVIRONMENTAL QUALITY
WATER QUALITY

Cold Water Aquatic Life Use Attainability Analysis for the Jordan River from confluence with Little Cottonwood Creek to Narrows Diversion, Utah and Salt Lake Counties, Utah

Jordan River Narrows Diversion (J.W. Marriott Library)

v. 1.0, March 20, 2020

Executive Summary

This Use Attainability Analysis (UAA) supports revising the designated aquatic life use for a portion of the Jordan River from a cold-water fishery to a warm-water fishery. This change would result in less stringent numeric criteria and a UAA is required (40 CFR 131.10(j)(2)).

The Jordan River flows from Utah Lake to Great Salt Lake. In addition to being located in an urban area, the Jordan River is extensively modified for water supply and flood control. Starting from the Narrows Diversion, approximately 10 miles downstream of Utah Lake to the confluence with Little Cottonwood Creek, the river is designated as Class 3A, cold water aquatic life. However, uses in the headwaters, upstream reaches, and downstream reaches, are Class 3B, warm water aquatic life. The cold water segment is listed as impaired because of noncompliance with the maximum cold water temperature criterion, 20 °C. This UAA assessed water temperatures coming into the impaired segments, models the effects of best management practices such as additional shading, and evaluates historic fish community data. The conclusion is that the cold water use is not attainable primarily because naturally occurring water temperatures upstream are too warm. Although the dams and diversions affect water temperatures, the data support that absent these effects, the cold water use would remain unattainable.

Historic evidence and current data show that the segments of the Jordan River currently classified as 3A cold water aquatic life use were misclassified. Historic fish data demonstrate that these segments have never supported a cold water fishery as intended and temperature modeling demonstrates that the highest attainable use will remain a warm-water fishery into the foreseeable future. These segments of the Jordan River that include assessment units Jordan River-5, -6, and -7 would be appropriately classified as supporting a Class 3B warm-water fishery and are recommended for reclassification.

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Introduction

The Jordan River originates at Utah Lake and flows northward for about 51 miles until discharging to Farmington Bay, Great Salt Lake. The Jordan River is located in an urban setting and has been extensively modified hydraulically for flood control and water supply. The Utah Lake & Jordan River Water Rights & Management Plan (Hooton, undated) provides a detailed summary of water rights and flood management for the Jordan River and Utah Lake that govern flow.

The headwater for the Jordan River, Utah Lake, is designated as Class 3B (R317-2-12), warm water aquatic life. From Utah Lake downstream to the Narrows Diversions (approximately 10 miles), the Jordan River is designated as Class 3B (Figure 1). This segment corresponds to assessment unit Jordan River-8 (Table 1, Figure 1). Water for secondary use is diverted via canals east and west of the Jordan River at the Narrows (Figures 1 and 2). Some of the diverted water is discharged to tributary creeks of the Jordan River to meet secondary use water rights requirements in those creeks (e.g., Big Cottonwood and Mill Creeks). An unquantified amount of this water returns to the Jordan River as return flow via surface or ground waters.

Table 1. Jordan River Assessment Units and 2016 Water Quality Impairments. The cold water aquatic life segments are shown with gray shading.

Assessment Unit	Description	Impairment
4	Jordan River from 2100 South to the confluence with Little Cottonwood Creek	Use Class 2B: E. coli; Use Class 3B: OE Bioassessment; Use Class 4: Total Dissolved Solids
5	Jordan River from the confluence with Little Cottonwood Creek to 7800 South	Use Class 2B: E. coli; Use Class 4: Total Dissolved Solids; Use Class 3A: Temperature
6	Jordan River from 7800 South to Bluffdale at 14600 South	Use Class 3A: OE Bioassessment, Selenium, Temperature; Use Class 4: Total Dissolved Solids
7	Jordan River from Bluffdale at 14600 South to Narrows	Use Class 3A: OE Bioassessment, Temperature
8	Jordan River from Narrows to Utah Lake	Use class 1C: Arsenic; Use class 4: Total Dissolved Solids

For the 21 river miles from the Narrows Diversions downstream to the confluence with Little Cottonwood Creek, the Jordan River is designated as Class 3A, cold water aquatic life. These segments correspond to the Assessment Units of Jordan River- 5, -6, and -7 (JR-5, JR-6 and JR-7; Figure 1). The water quality was determined to be impaired in 2006 because of exceedances of 20 °C, the Class 3A cold water aquatic life temperature criterion, in these segments (Table 1). The remainder of the Jordan River from Little Cottonwood Creek to Farmington Bay is designated warm water aquatic life.

Numerous reports from the Environmental Protection Agency (EPA), the Utah Division of Wildlife Resources (DWR) and Salt Lake County regarding the fishery classifications of the Jordan River are available from Salt Lake County at https://slco.org/watershed/resource-center/water-library/. The common theme in these reports is that the intent was to attain a Class 3A cold water use because:

People loved fishing;

Propagating and stocking fish was part of DWR's mission;

The upper Jordan had the required physical habitat and the least amount of pollution.

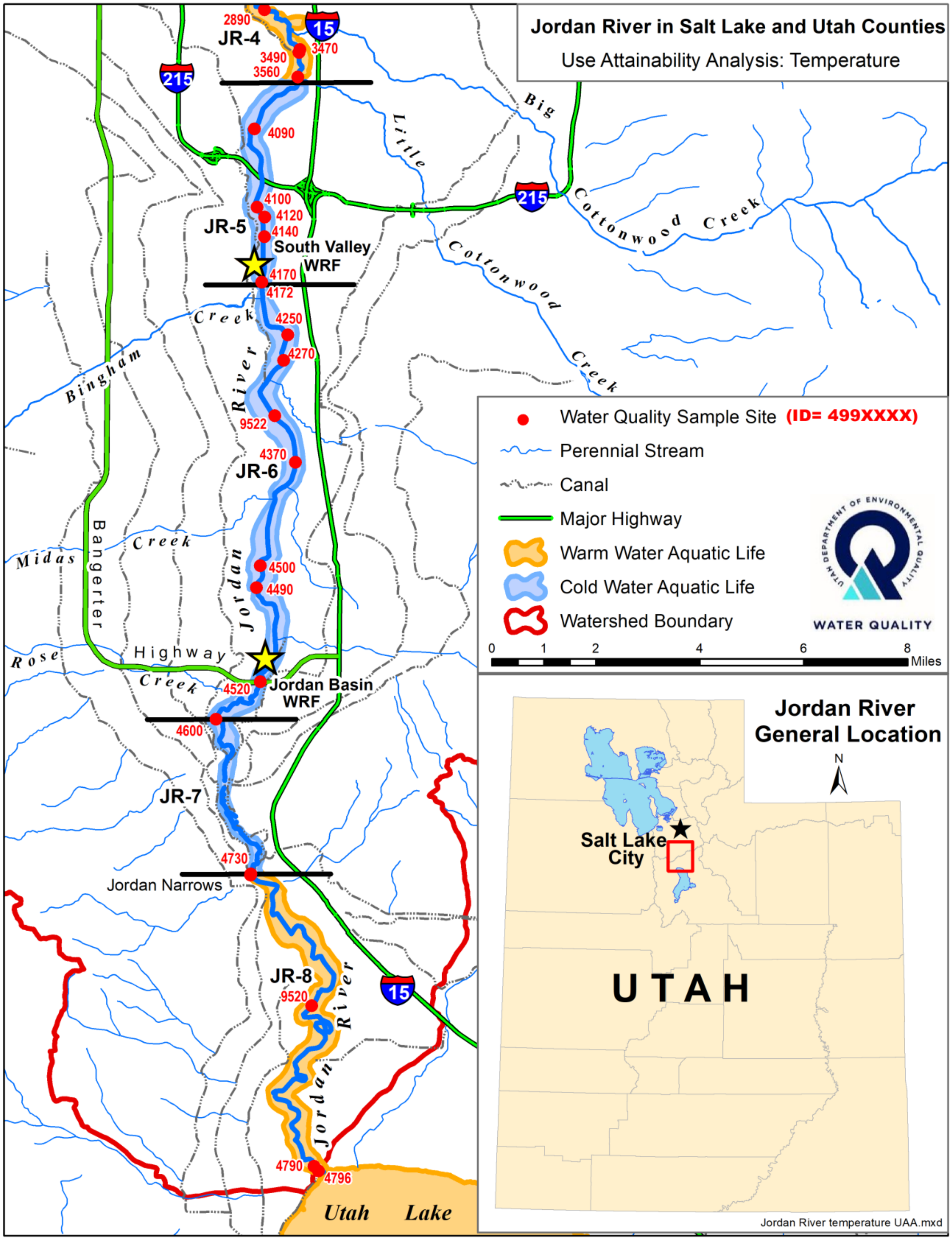

Figure 1. Jordan River major drainage features, aquatic life use classifications, sampling sites, and location of two publically-owned water reclamation facilities (WRFs).

However, there is no documentation that the temperature requirements of a cold water use were ever considered. This Use Attainability Analysis (UAA) is the first time the temperature requirements are assessed.

Figure 2. Jordan River Narrows Diversions (J. W. Marriott Library). The first dam was constructed in 1872.

Regulatory Basis

Designated uses and their associated criteria are water quality standards. Revisions to these standards must be consistent with Utah and Federal Requirements. Utah Code R317-2-7.1:

c. Site-specific standards may be adopted by rulemaking where biomonitoring data, bioassays, or other scientific analyses indicate that the statewide criterion is over or under protective of the designated uses or where natural or un-alterable conditions or other factors as defined in 40 CFR 131.10(g) prevent the attainment of the statewide criteria as prescribed in Subsections R317-2-7.2, and R317-2-7.3, and Section R317-2-14.

Under 40 CFR 131.10(g), Utah may remove a designated use which is not an existing use, as defined in § 131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is not feasible because:

- Naturally occurring pollutant concentrations prevent the attainment of the use; or
- Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
- Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or

- Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
- Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

Water Temperature in the Jordan River

To determine if the cold water use is attainable under ambient conditions, the water temperatures from upstream that are unimpacted by any permitted discharges were assessed. The ambient conditions in these reaches are the results of natural conditions affected by the human-caused conditions of dams and diversions for flood control and water supply. This approach is supplemented with a temperature model that evaluates if the cold water use is attainable by increasing shading on the river and absent any thermal loading from permitted discharges.

Two publically-owned treatment works, South Valley Water Reclamation Facility (22 MGD) and the Jordan Basin Water Reclamation Facility (15 MGD) discharge to the JR-5 and -6, respectively (Figure 1). The South Valley facility is at about 7500 South and the Jordan Basin facility is located near 138th South.

Figure 3 illustrates boxplots of all temperature data grouped by assessment unit for JR-4 through -8 and Utah Lake. The median water temperatures between JR-8 and JR-7 are similar and then increase by 3°C as the river flows through JR-6 and JR-5. The median temperature in JR-4 is lower than any of the upstream reaches. JR-4 is the segment that includes Little Cottonwood, Big Cottonwood and Mill Creeks.

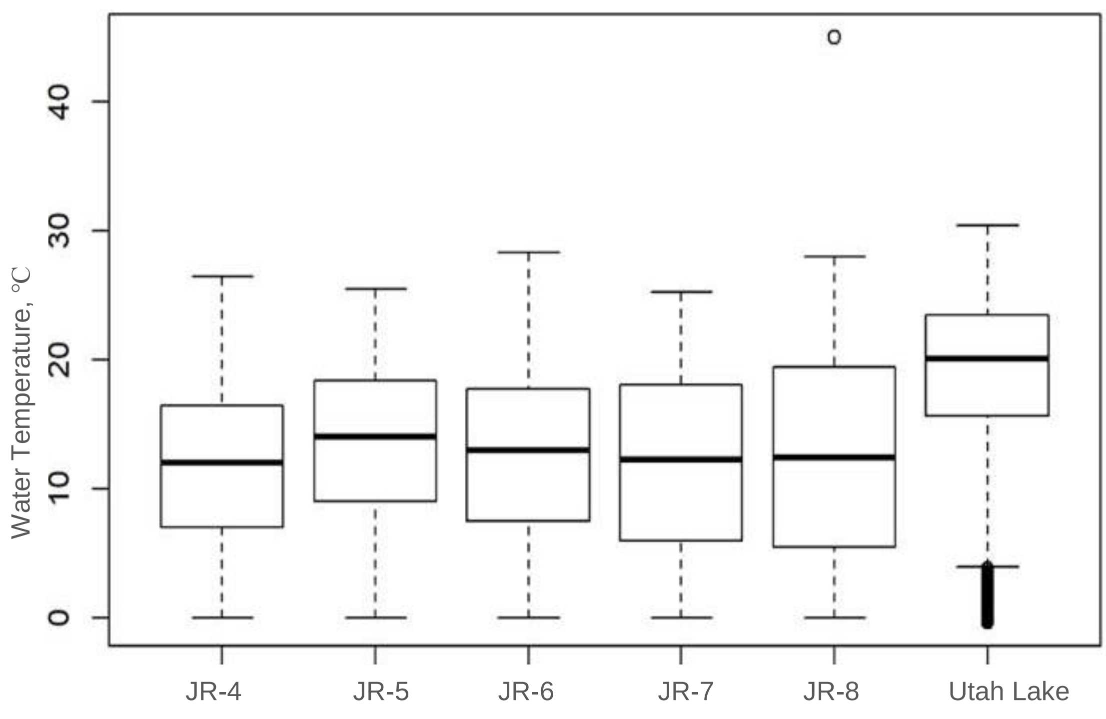

Figure 3. Boxplots of all temperature grouped by Jordan River Assessment Units

Table 2 lists the sampling locations for JR-5 through -8 from the EPA WQX database. The Monitoring Location Identifiers (MLIDs) for JR-5 through -8 are listed sequentially from downstream to upstream. The number of temperature measurements available and the locations impacted by the two POTWs are shown, i.e., the MLIDs are downstream of the discharges.

Table 2. Jordan River Monitoring Location Identifiers (MLIDs) and Number of Temperature Measurements for the Jordan River from Assessment Units 4 through 8 (JR-4 through JR-8)

Monitoring Location Identifier (MLID)	Jordan River AU (JR-)	No. of Data Points	Aquatic Life Use
UTAHDWQ_WQX-4993560	4	1	3B
UTAHDWQ_WQX-4994090	5	181	3A
UTAHDWQ_WQX-4994100	5	117	3A
UTAHDWQ_WQX-4994140	5	5	3A
UTAHDWQ_WQX-4994170	6	250	3A
UTAHDWQ_WQX-4994250	6	10	3A
UTAHDWQ_WQX-4994270	6	158	3A
UTAHDWQ_WQX-4999522	6	1	3A
UTAHDWQ_WQX-4994370	6	26	3A
UTAHDWQ_WQX-4994500	6	15	3A
UTAHDWQ_WQX-4994490	6	24	3A
UTAHDWQ_WQX-4994520	7	62	3A
UTAHDWQ_WQX-4994600	7	388	3A
UTAHDWQ_WQX-4994730	7	1	3A
UTAHDWQ_WQX-4994720	8	149	3B
UTAHDWQ_WQX-4994725	8	12	3B
UTAHDWQ_WQX-4999520	8	1	3B
UTAHDWQ_WQX-4994790	8	299	3B

AU Assessment Unit
JR Jordan River
Light gray shading indicates that MLID is downstream of the Jordan Basin facility
Dark gray shading indicates that the MLID is downstream of the Jordan Basin and South Valley facilities
These data are available as separate Appendix 3 or electronically by request

No point-sources discharge to either JR-7 (cold) or -8 (warm). The following indicator sites were selected for representing locations least impacted by anthropogenic sources and the availability of a long term temperature record:

MLID 4994790 located at the upstream boundary of JR-8 (warm water) at the Utah Lake outlet; This site is representative of the majority of source water for the Jordan River. Data are available from 1973 through 2018.

MLID 4994720 located on the downstream boundary of JR-8 (warm water) at the Narrows Diversion; This site is representative of the Jordan River water immediately upstream of JR-7 (cold water). Data are available from 1985 through 2018.

MLID 4994600 located on the JR-6 and JR-7 boundary (cold water). Data are available from 1976 through 2018.

The first two locations are unaffected by permitted discharges and have the most robust dataset to characterize the primary source of flow for the downstream JR-7. Monitoring Location 4494600 is located on the boundary of JR-6 and JR-7 but upstream of, and unaffected by the POTW discharges or other permitted discharges (Figure 1, Table 2).

All of the available water temperature data from MLID 4994790 were graphed by month (Figure 4). The pattern observed is similar to all of the other Jordan River monitoring locations where the warmest water temperatures are observed in the July and August months. The data for July and August were compiled and compared for the three indicator sites. Table 3 shows the date range for the data, the number of years with at least one sample, the number of years that 20°C was exceeded at least once and the frequency of exceedances observed.

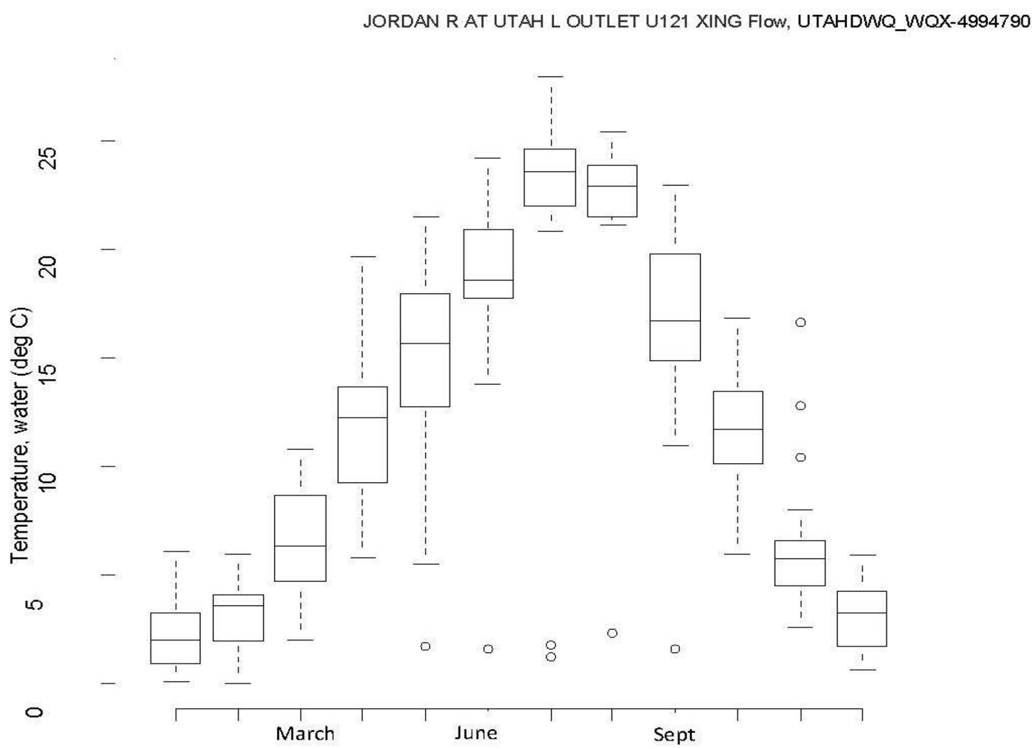

Figure 4. Monthly water temperatures in the Jordan River at MLID 4994790

Figure 5 shows boxplots for each of the indicator MLIDs for July and August separately. The two upstream MLIDs in JR-8 demonstrate that this segment is appropriately classified as warm water but significant cooling of the water would be necessary to meet the cold water use immediately downstream. As shown by the lower frequency of exceeding 20℃ in Table 3 and the lower corresponding medians in Figure 5 for MLID 4994600, some cooling of the water compared to upstream does appear to occur in these two months. This cooling of water temperature is attributed to influxes from groundwater.

Table 3. Summary of July and August Water Temperature Data for Indicator Sites on the Jordan River

Monitoring Location	Date Range	Number of Years with Data	Number of Years 20℃ exceeded	Frequency exceeding 20℃
UTAHDWQ_WQX-4994600	1973-2018	35	30	47/68
UTAHDWQ_WQX-4994720	1985-2018	13	12	20/21
UTAHDWQ_WQX-4994790	1976-2018	34	34	51/51
These data are available as separate Appendix 3 or electronically by request				

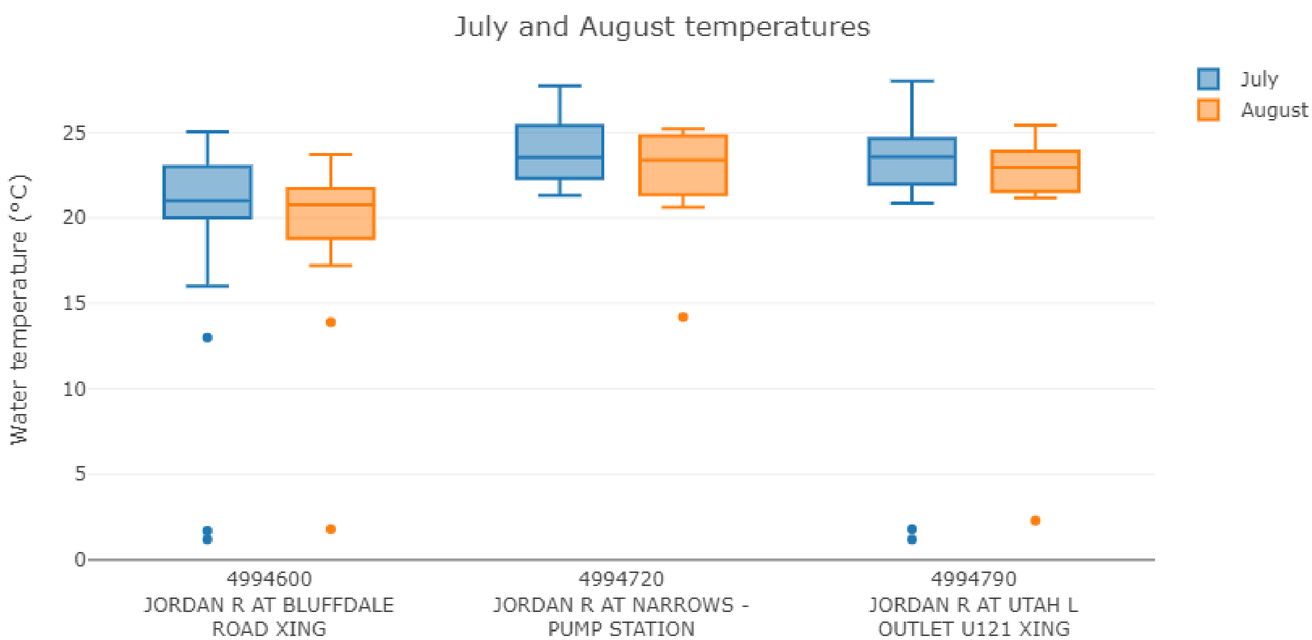

Figure 5. July and August Water Temperatures for Jordan River indicator sites. Monitoring locations move upstream from left to right. Note apparent outliers (i.e., temperatures reported below 5℃).

Follstad Shah et al. (2019) used isotopic analyses to estimate the sources of water to the Jordan River. The source of the majority of flow in JR-5 through JR-8 is Utah Lake water. As shown on Figure 6, the portion of the Jordan River's flow attributable to groundwater increases near the Narrows Diversion and the relative contribution remains relatively constant throughout JR-5 through JR-7. Figure 6 also illustrates the quantity of water diverted from the Jordan River at the Narrows. In the summer months, groundwater is usually cooler than the surface waters although some of the springs are hydrothermal (Neilson et al. 2010a; 2010b). These groundwater inputs are insufficient to cool the Jordan River to less than 20℃ from July through September.

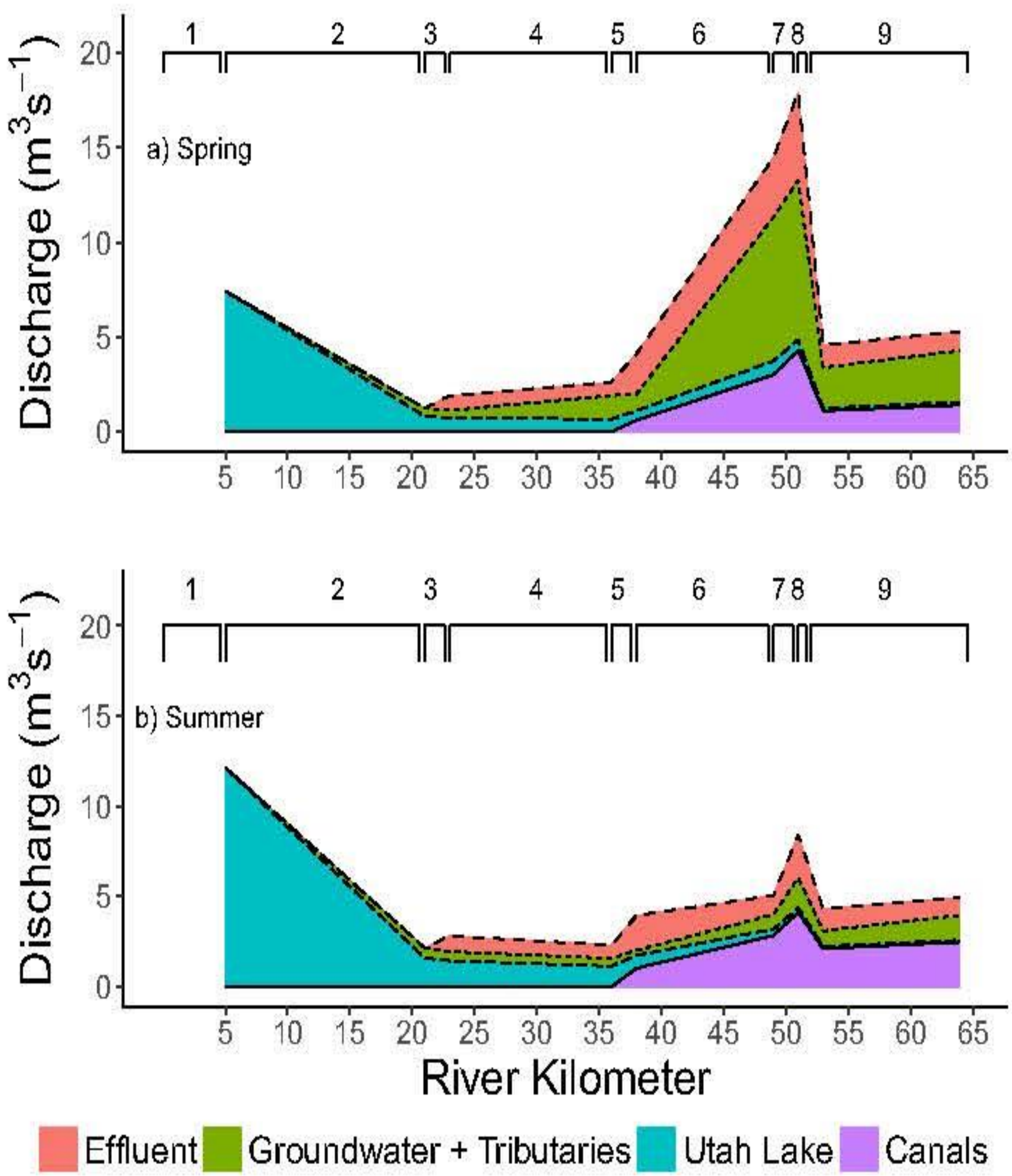

FIGURE 5. Discharge (m^3/s) attributed to different sources along the flowpath in spring (a) and summer (b). Proportional inputs were not applied to discharge in fall due to missing discharge data at some study sites. Brackets indicate river Segments 1–9, as illustrated in Figure 2.

Figure 6. Source of Jordan River Flow from Follstad-Shah et. al, 2019. The Narrows Diversion is at the end of Segment 2 and the POTWs discharge to Segments 3 and 5. Utah Lake is at zero km.

To examine if the upstream dams and diversions have measurably impacted water temperatures over time, annual water temperatures were plotted over time for the Jordan River at MLID 4994790 (Figure 7). Visually, no increasing or decreasing trends in water temperature are apparent over time. The data for only July and August were also examined and no trends were apparent over time, although this analysis is hampered by the limited data available for these two months (data not shown).

For flow, long-term measurements are available for downstream at 1700 South and the Surplus Canal back to *circa* 1950 but the first diversion dam was constructed at the Narrows in 1872. These records show that annual flows are highly variable but no obvious trends are apparent. While no trends were observed in annual water temperatures, annual minimum 7-day flows appear to have decreased since the *circa* 1980s (Figure 8).

JR-5 through -7 are designated Class 3A, cold water aquatic life. Upstream JR-8 and downstream JR-4 are designated Class 3B, warm water aquatic life. The primary source of water to the cold water segment is Utah Lake via flow through JR-8 (Figure 6). Ambient water temperatures in all of these segments exceed the maximum 20°C cold water temperature criterion in some months. These data demonstrate that the cold water use is not attainable under ambient conditions.

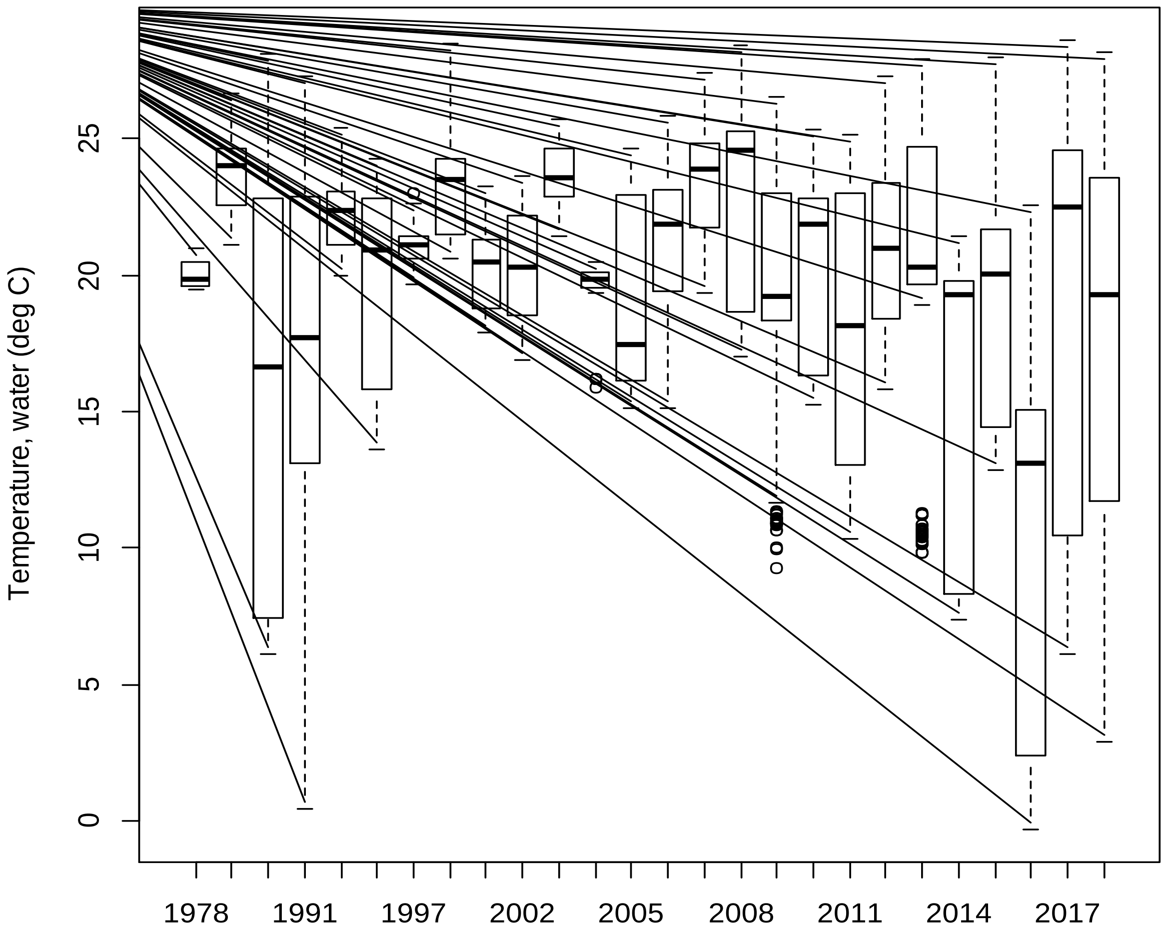

Figure 7. Annual water temperatures for Jordan River-8 at MLID 4994790 at the Utah Lake Outlet

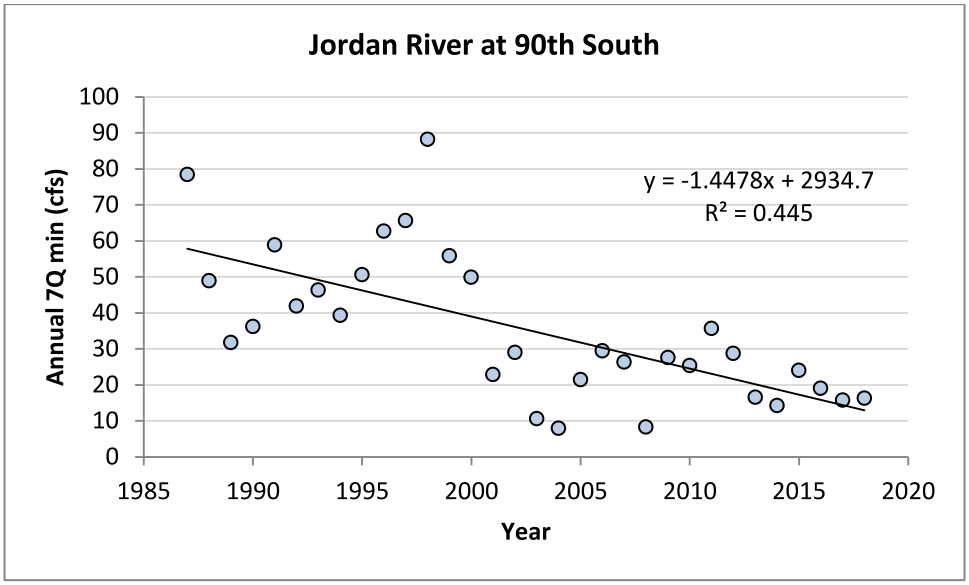

Figure 8. Jordan River Annual 7-Day Flows at 90th South

Temperature Modeling

The initial efforts to investigate the temperature impairment included construction of a temperature model. A dynamic instream temperature model was developed by Utah State University to determine if the Jordan River can meet the temperature criterion necessary for supporting cold water fisheries through tributary temperature reductions and increased shading (Appendix 1). The model excludes the thermal loading of the POTWs and evaluated how much management options, e.g., shading, could reduce temperatures. The model was applied to the Jordan River for both 2009 and 2010 summer seasons. This provides a conservative estimate of what is attainable currently and into the foreseeable planning time horizon.

A two-zone temperature/solute model from the Narrows Diversion to the confluence of Little Cottonwood Creek was developed and tested based on research by Neilson et al. (2010a, 2010b). The model includes surface fluxes (solar radiation, evaporation, conduction), bed and ground conduction, hyporheic, and dead zone fluxes (Figure 9).

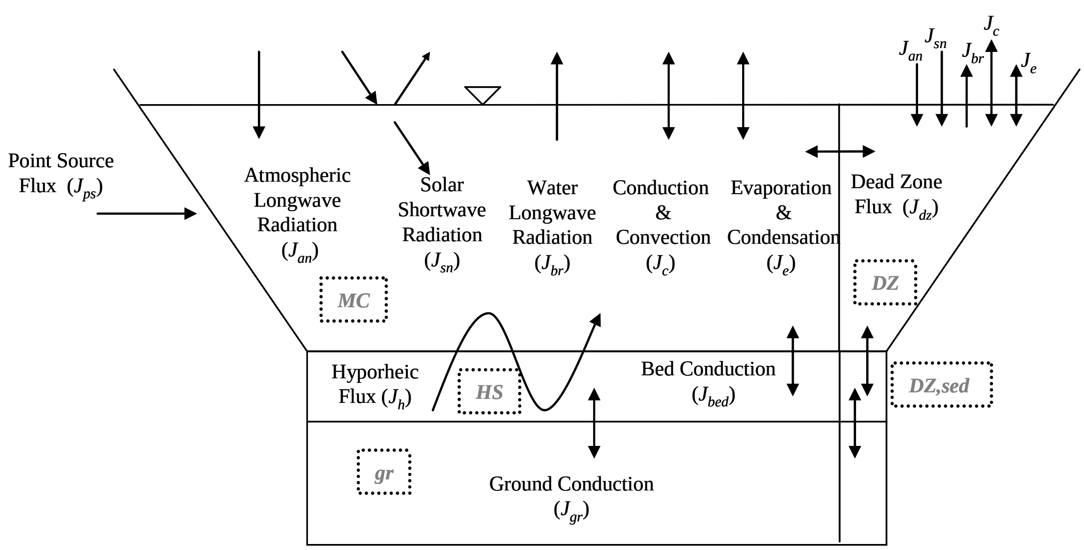

Figure 9. Energy balance components of two-zone temperature and solute model (Neilson et al. 2010(a)).

Simulations were run for both 2009 and 2010. In 2009, the water temperature would have to be decreased by approximately 2° C on average between Utah Lake and 7800 S to meet the 20° C maximum temperature criterion (Table 5). The water temperatures at the outlet of Utah Lake suggest that 2009 was a year with overall cooler water temperatures. The modeling further supports that this goal is not attainable with the current water management and the addition of practical shading (80%). The observed maximum temperatures at Jordan River Below S. Jordan Canal on August 1, 2009 was 26 °C and would need to cool to the 20°C standard. Hence, attaining 20°C without the thermal loading influence of the POTWs is not achievable in the Jordan River, and a cold-water fishery cannot be fully supported.

Table 4. August 2009 average water temperatures along Jordan River for model calibration. Data were collected using continuous monitors in August 2009

Site Number	Jordan River Location	Average Temperature (°C)
1	Below S. Jordan Canal	21.9
2	Above Rose Creek	21.2
3	Upstream Midas Creek	20.1
4	Downstream Midas Creek	20.1
5	Above North Jordan Canal	20.0
6	Below Dry Creek	18.0
7	9000 South	20.8
8	Below 9000 S Storm Drain	19.9
9	Above Bingham Creek	19.7
10	Above South Valley	19.6
11	7800 South	20.1
12	Above Little Cottonwood	20.3
13	Below Little Cottonwood	20.3
14	Below Big Cottonwood	20.2
15	2100 South	20.8
16	1700 South	20.8
17	500 North	20.8
18	Cudahy Lane	21.1
19	Burnham Dam	21.5

Aquatic Life in the Jordan River

As previously discussed, under 40 CFR 131.10(g), a UAA may not be used to remove an existing use. "Existing Uses" means those uses actually attained in a water body on or after November 28, 1975, whether or not they are included in the water quality standards (UAC R317-1-1). To assess if cold water aquatic life is an existing use, historical records were examined and the Utah Division of Wildlife Resources (DWR) was consulted.

Early observations by local residents of the Salt Lake Valley indicate that cold water fish occurred in the Jordan River from Utah Lake as far downstream as 1700 South, including several species of trout (Lockerbie 1949). The earliest fish survey on the Jordan River was completed by David Jordan at a location upstream of the Mill Creek confluence when six species of varying abundance were observed, including game and non-game aquatic species (Holden and Crist 1989). Carp were stocked throughout Utah as a food source beginning in 1881 (Heckmann et al., 1981) and were quick to establish a population throughout the Jordan River.

Near the end of the 1800s, sport fishing became popular and stocking practices began to focus on supporting populations of game species. During the first half of the 20th century, impacts of urban growth apparently extirpated most of the cold water fish species (Table 5). Reliable measurements of Jordan River fish populations prior to these anthropogenic stream alterations do not exist (Wilson 1987).

Unpublished surveys completed by the DWR from 1963 through 1986 indicate that warm water game species were common at locations near Utah Lake (Table 5). For all stations surveyed, non-game species, including carp and sucker, were generally the most common (Wilson 1987). Cold water game species were uncommon, rare, or unobserved in all reaches and all surveys.

Table 5. Number of fish captured during surveys completed on the Jordan River by the Utah Division of Wildlife Resources from 1963 – 1986 (Wilson 1987).

	1963			1976			1985-86		
Location	**# Non-Game**	**# Warm water**	**# Coldwater**	**# Non-Game**	**# Warm water**	**# Coldwate**	**# Non-Game**	**# Warm water**	**# Coldwate**
Cudahy Lane	Rare	0	0	NA	NA	NA	NA	NA	NA
17th South	Many	Rare	0	13	0	0	138	10	0
41st South	Many	0	Rare	11	0	1	35	5	0
123rd South	Common	Many	Rare	70	0	3	34	3	1
146th South	Common	0	Uncommon	25	124	0	37	7	0
Narrows	Uncommon	Many	Rare	NA	NA	NA	11	28	0
Gray shading shows reaches that correspond to Jordan River-5, -6, or 7 Assessment Units and are classified cold water aquatic life									

Fish stocking records from the Utah Division of Wildlife Resources (Appendix 2) and discussions with agency personnel indicate that typical stocking practices for the Jordan River only involve sport fish species, namely channel catfish and rainbow trout (Slater, 2016). Peak stocking numbers occurred in 1993 when nearly 90,000 fish were placed in the Jordan River with most of these placed in lower segments below 2100 South. Until 2004, approximately 10,000 fish were placed in the river every year and nearly 20,000 fish in the year 2000. The stocking activities were intended to support a seasonal, managed cold-water fishery. There is no evidence that significant reproduction or recruitment occurred from any of the stocked salmonids. This is demonstrated by the lack of occurrence of multiple cohorts and the need for continued stocking in the Jordan River. All aquatic life survey reports reviewed described the coldwater fish captured were large, adult fish. Indicating that recruitment, if any, is limited to hatchery stock or adult displacement from tributaries.

Although the Jordan River historically supported salmonids and UDWR stocked many rainbow trout between 1980 and 2004 (Appendix 2), these fish do not appear to have propagated. The rarity of cold water species observed through multiple surveys imply that the Jordan River failed to fully support a cold-water aquatic life use in the post-1960s as intended.

Highest Attainable Use

Federal regulations require that aquatic life uses are presumed to be attainable unless it can be demonstrated, with a Use Attainability Analysis, that one or more of the 40 CFR 131.10(g) factors prevent the attainment of the use. If the use cannot be fully attained, then highest attainable use (see 40 CFR 131.3(m)) must be designated (40 CFR 131.10(g)).

The Class 3A cold water aquatic life use is not attainable primarily because of factor 1 (40 CFR 131.10(g)): Naturally occurring pollutant concentrations prevent the attainment of the use. Water flows in the Jordan River are extensively modified by dams and diversions. The effects of these modifications on water temperatures are not “naturally occurring.” However, absent these modifications, there is no evidence to suggest that the cold water aquatic life use was, or is supportable. This segment was originally misclassified to achieve coldwater aquatic life based primarily on physical habitat and the least degraded water quality rather than thermal requirements of these species.

The cold water aquatic life use is not attainable and therefore, Class 3B: Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain is the highest attainable use. Based on the available data, existing uses will remain protected under a Class 3B use because there is little evidence that a cold water fishery was ever supported, even when stocked with cold water fish (trout).

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APPENDIX 1 Water Temperature Modeling
(available as separate document)

APPENDIX 2 Supplemental Fishery Information

Email from Mike Slater to Hilary Arens, February 3, 2016. Subject: Jordan River classification suggestions and data

Utah Division of Wildlife Resources Fish Stocking Records for Jordan River

From: **Michael Slater** <michaelslater@utah.gov>
Date: Wednesday, February 3, 2016
Subject: Jordan River classification suggestions and data
To: Hilary Arens <hilaryarens@utah.gov>
Cc: Chris Crockett <chriscrockett@utah.gov>, Jackie Watson <jackiewatson@utah.gov>

Hello Hilary,
We have reviewed some recent data collected during summer months on the Jordan River between 2007, 08 and 09. The majority of the species collected during the sampling are non-game species with some cool or warmwater sportfish species being caught occasionally. These species included Small and Largemouth bass, Yellow Perch, Black Crappie, Green Sunfish and Bluegill. All of these species were much less abundant than species such as common carp, Utah sucker, Longnose and speckled dace, Mt. sucker, Fathead minnow, Weather loch and black bullhead... In addition to this sampling data we have compiled other general information from our files and anglers input to help provide some suggestions.

I would not consider any of the Jordan River a coldwater fishery based on water temps you presented and the species present. Granted for years DWR did stock rainbow trout in the stretch between 146th south and roughly 72nd south. However, stocking of trout in the Jordan River has not occurred for approximately 14 years due to limited survival and return to anglers. We have continued periodically to stock Channel Catfish for angling opportunities because they can survive the warmer water temps.

We still receive reports from anglers and some observation of occasional brown trout being caught in the Jordan River primarily between 146th south and 123rd south. There are some different habitat features (more riffle and gravel sub-straight) in this area that allow the brown trout to persist at low numbers. I do not have any temperature data associated with this stretch to determine if that is also a contributing factor in why the brown trout and other more cool or coldwater type species are present here. The Jordan River does appear more like a stream rather than a "flat water canal" in this area.

Designation of the stretch from 146th to 90th south definitely seems different and I have no problem considering it a cool water designation. I would also suggest there may be additional consideration for the next section south as well but north of the 90th south section as we have it labeled I would not suggest the cool water designation.

Please see the spreadsheet I have included to show how DWR has classified the different sections of the Jordan River. This classification system is dated but it is still what we use to designate the fisheries of the state. The classification system uses various characteristics to set the class including aesthetics, accessibility, productivity and others. I have included this classification system details as well.

I will actually need to send this classification system later. I am away from the office and I do not have access to an electronic copy and want to get this to you rather than waiting.

Hope this info helps. Thanks, Mike

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Mike Slater
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Phone: 801-491-5651

Utah Division of Wildlife Stocking Records for the Jordan River 1980-2004

Year	Location	Number Stocked	Species	Annual Total
1980	14600 South - UtahCountyLine	2,433	Rainbow Trout	3,441
	90000 South - 146000 South	1,008	Rainbow Trout	
1981	14600 South - UtahCountyLine	638	Rainbow Trout	3,898
	90000 South - 146000 South	2,480	Rainbow Trout	
	Great Salt Lake - 2100 South	780	Rainbow Trout	
1982	14600 South - UtahCountyLine	2,001	Rainbow Trout	3,502
	90000 South - 146000 South	1,001	Rainbow Trout	
	Great Salt Lake - 2100 South	500	Rainbow Trout	
1983	14600 South - UtahCountyLine	763	Rainbow Trout	763
1987	90000 South - 146000 South	3,014	Rainbow Trout	3,014
1988	90000 South - 146000 South	5,899	Rainbow Trout	5,899
1989	Great Salt Lake - 2100 South	22,462	Channel Catfish	25,490
	90000 South - 146000 South	3,028	Rainbow Trout	
1990	2100 South - 90000 South	12,816	Channel Catfish	33,632
	2100 South - 90000 South	1,001	Rainbow Trout	
	90000 South – 146000 South	5,000	Rainbow Trout	
	Great Salt Lake - 2100 South	12,816	Channel Catfish	
	Great Salt Lake - 2100 South	1,999	Rainbow Trout	
1991	90000 South – 146000 South	8,202	Rainbow Trout	10,202
	Great Salt Lake - 2100 South	2,000	Rainbow Trout	
1992	Great Salt Lake - 2100 South	82,495	Channel Catfish	89,492
	90000 South – 146000 South	4,999	Rainbow Trout	
	Great Salt Lake - 2100 South	1,998	Rainbow Trout	
1993	90000 South – 146000 South	3,000	Rainbow Trout	6,000
	Great Salt Lake - 2100 South	3,000	Rainbow Trout	

Year	Location	Number Stocked	Species	Annual Total
1994	90000 South – 146000 South	5,503	Rainbow Trout	7,516
	Great Salt Lake - 2100 South	2,013	Rainbow Trout	
1995	90000 South – 146000 South	11,004	Rainbow Trout	14,005
	Great Salt Lake - 2100 South	3,001	Rainbow Trout	
1996	90000 South – 146000 South	5,000	Rainbow Trout	7,000
	Great Salt Lake - 2100 South	2,000	Rainbow Trout	
1997	UtahCountyLine - UtahLake	10,000	Channel Catfish	17,000
	90000 South – 146000 South	5,000	Rainbow Trout	
	Great Salt Lake - 2100 South	2,000	Rainbow Trout	
1998	UtahCountyLine - UtahLake	10,000	Channel Catfish	14,000
	90000 South – 146000 South	2,000	Rainbow Trout	
	Great Salt Lake - 2100 South	2,000	Rainbow Trout	
1999	UtahCountyLine - UtahLake	10,000	Channel Catfish	14,500
	90000 South – 146000 South	3,500	Rainbow Trout	
	Great Salt Lake - 2100 South	1,000	Rainbow Trout	
2000	2100 South - 90000 South	7,624	Channel Catfish	19,625
	Great Salt Lake - 2100 South	10,000	Channel Catfish	
	90000 South – 146000 South	2,001	Rainbow Trout	
2001	Great Salt Lake - 2100 South	10,000	Channel Catfish	12,004
	90000 South – 146000 South	2,004	Rainbow Trout	
2002	Great Salt Lake - 2100 South	10,000	Channel Catfish	12,000
	90000 South – 146000 South	2,000	Rainbow Trout	
2003	Great Salt Lake - 2100 South	10,000	Channel Catfish	10,000
2004	Great Salt Lake - 2100 South	10,000	Channel Catfish	10,000

Underlined reaches correspond to Jordan River-5, -6, or 7 Assessment Units.

APPENDIX 3 Temperature Data

(available as separate document)

Jordan River Water Temperature Data Downloaded from USEPA WQX database

Jordan River Water Temperature for the months of July and August Downloaded from the USEPA WQX database