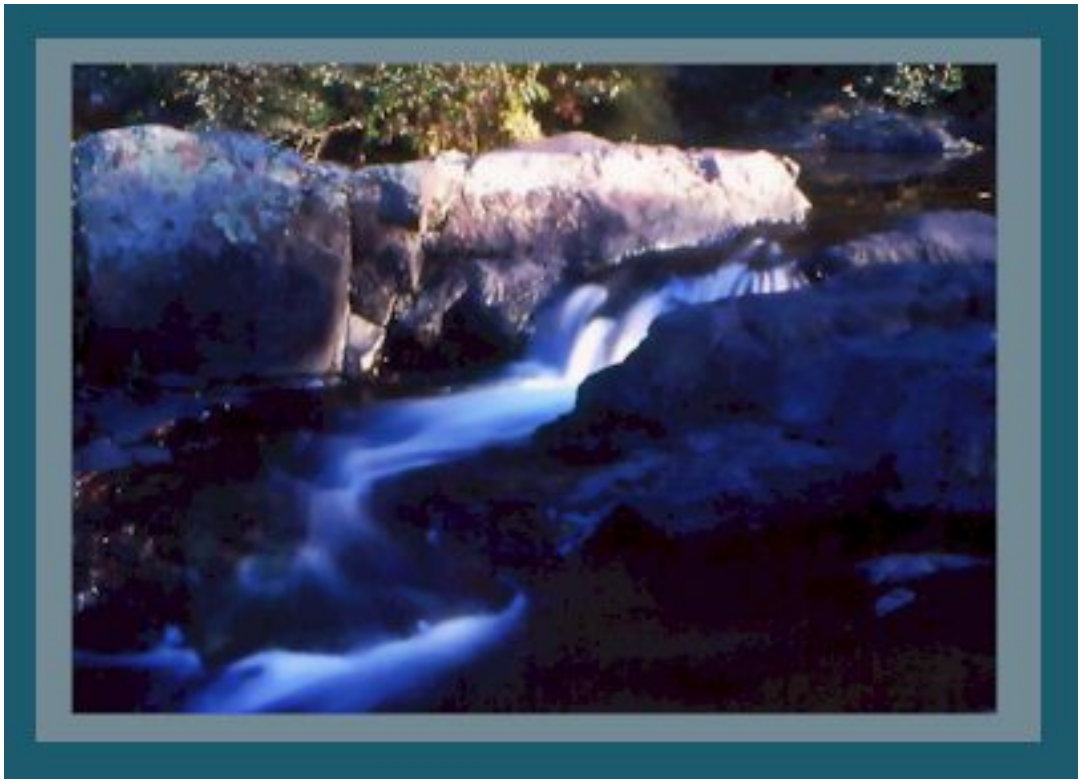
WATER QUALITY



Beneficial Use Attainment

Approximately 593 stream miles and 45 impoundment acres within the Current River Watershed are classified and have designated beneficial uses as presented in Tables G and H of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality (Table Wq01) (MDNR 2000c). These waters must meet or exceed established criteria as defined in Table A of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality for those beneficial uses (MDNR 1999a). All watershed streams and impoundments listed in Tables G and H are designated for livestock/wildlife watering as well as protection of aquatic life. In addition, the two classified impoundments within the watershed are also designated for whole body contact recreation and boating. Approximately 118 miles of the Current River from the State Line to Township (T) 31N, Range (R) 6W, Section (S) 24 are designated for irrigation, livestock and wildlife watering, protection of aquatic life, cool water fishery, whole body contact recreation, and boating. Another 19 miles of the Current River from T 31N, R6W, S 24 to Montauk Spring are designated for livestock and wildlife watering, protection of aquatic life, cold water fishery, whole body contact recreation, and boating. Sixteen other streams within the watershed also have additional designated beneficial uses. In addition to the aforementioned designated uses, the Current River has been designated as “Outstanding National Resource Waters” from its headwaters to the northern Ripley County Line (MDNR 2000c). The Little Black River is designated as “outstanding state resource waters” from T24N,R3E,S22 to T24N,R3E,S25 (MudPuppy Conservation Area). The South Prong of the Little Black River is also designated as “outstanding state resource waters” in the Little Black Conservation Area. No streams within the Current River Watershed are designated for industrial use or as a drinking water

supply.

Section 303(d) of the Federal Clean Water Law requires that states identify those waters for which current pollution control measures are inadequate (MDNR 1999a). This is accomplished by comparing data from those waters with water quality criteria established for designated beneficial uses of those waters (MDNR 1999a). Waters that do not meet their criteria are then included in the 303(d) list. The state must then conduct Total Maximum Daily Load (TMDL) studies on those waters in order to determine what pollution control measures are required and then insure those measures are implemented (MDNR 1999b). Currently, there are no streams within the Current River Watershed included in the 1998 303(d). However, five miles of the Jacks Fork River, a major tributary of the Current River which is discussed in the Jacks Fork Watershed Inventory and Assessment, from T29n, R3w, section 9 to T29n, R4w, section 26 are currently included in the 1998 303(d) list (MDNR 1999d). In this section of the Jacks fork, fecal coliform counts are periodically high indicating the presence of excessive organic wastes. The Clean Water Act requires that the 303(d) list be updated every four years (MDNR 2000d).

Chemical and Biological Quality of Streamflow

Data regarding the chemical and biological quality of stream flow within the Current River Watershed has been collected by several different entities since the 1960s. Government agencies which have conducted water quality sampling within the watershed include the Environmental Protection Agency (EPA), Missouri Department of Conservation (MDC), Missouri Department of Natural Resources Clean Water Commission, National Park Service (NPS), United States Forest Service (USFS), and the United States Geological Survey (USGS). In addition some water quality data has been collected by Stream Team organizations. The extensive amount of water quality data available for various parameters and varying time periods within the Current River Watershed makes an adequate summary of water quality data within this document impractical.

In order to avoid going beyond the scope of this document by attempting to provide a comprehensive summary of all water quality data by all agencies for all available years, nine USGS stations within the Current River Watershed were selected in order to provide a spatially broad view of selected water quality values within the Current River Watershed (Figure Wq01). These included 5 stations on the Current River, one each at Montauk and Big Springs, and two stations within the Little Black River Hydrologic Unit including one station on the Little Black River and one on Logan Creek. Water quality was analyzed using data collected between 1995 and 1999 for all stations with the exception of the stations located on Logan Creek and the Little Black River. Data collected during the period 2000-2001 was analyzed for the Little Black River station and data collected during the period 1980-1984 and was analyzed for the Logan Creek station due to the limited availability of recent water quality data for these stations. Water quality parameters selected for analysis (where available) included temperature, pH, dissolved oxygen, fecal coliform, hardness, nitrate, total ammonia nitrogen, phosphorous, dissolved lead, and dissolved zinc. In addition, total recoverable lead and zinc were analyzed for two stations. These values were compared with state standards (when available) and the number of exceedences were noted (Table Wq02).

Analysis of water quality from stations located on the Current River, as well as at Montauk and Big Springs, reveals that water quality at these stations consistently met water quality standards for the selected parameters during the years examined with the exception of fecal coliform bacteria. Three out of the seven stations examined experienced levels of fecal coliform that exceeded state standards for whole

body contact recreation. Station 07067000 (Current River at Van Buren, Mo.) experienced the highest percentage of this occurrence with a rate of 18.1% (2 out of 11 observances). At the remaining two stations, 07066510 (Current River above Powder Mill) and 07068000 (Current River at Doniphan), state standards were exceeded in 12.5% (1 of 8) and 5.9% (2 of 34) of the samples respectively. It is important to note that many of the fecal coliform values analyzed were based on non-ideal colony counts (too large a sample, colonies merged).

While the values for dissolved lead at stations located on the Current River, as well as at Montauk and Big Springs did not exceed state standards in the analyzed observations, results for dissolved lead at Stations 07067500 (Big Spring near Van Buren, Mo.) and 07068000 (Current River at Doniphan) were inconclusive. It is important to note that a much more comprehensive analysis commissioned by the NPS (1995) revealed that lead concentrations exceeded the EPA acute freshwater criterion standard as well as the EPA drinking water action level in several observations between 1973 and 1995. This occurred at two sites on the Current River as well as several springs including Big Spring, Blue Spring, Round Spring, Pulltite Spring, Welch Spring, and Montauk Springs.

Analysis of water quality data for Logan Creek at Oxly, Mo. (Station 07068540) for the period 1980-1984 and for the Little Black River below Fair Dealing, Mo. (Station 07068510) for the period 2000-2001 revealed a different water quality picture than that of the rest of the Current River Watershed. At Logan Creek at Oxly, Mo., state standards were exceeded for pH (1/26 observations), dissolved oxygen (3/26 observations), and fecal coliform (4/17 observations). State standards were also exceeded at the Little Black River below Fair Dealing, Mo. for dissolved oxygen (1/12 observations) and fecal coliform (3/12 observations). The EPA- recommended standard for phosphorous was also exceeded in 2 out of 12 observations at this site. In addition to the aforementioned USGS data, Missouri stream team (MST 2001) water quality data collected in October of 1997 revealed two sites on the Little Black River which failed to meet the state standard for dissolved oxygen. This coupled with the USGS data for the Little Black River would appear to point to the possibility that water quality problems in the Little Black River occur on a relatively regular basis. The limited amount of recent (since 1995) USGS water quality data for sites in the Little Black River Hydrologic Unit makes it difficult to determine the extent and frequency of water quality problems within the unit. An expanded water quality sampling program will be needed in order to adequately monitor water quality on the Little Black River as well as determine the extent of water quality problems in the Little Black Hydrologic Unit.

As stated previously, a large amount of water quality data for a variety of parameters is available for the Current River Watershed. Water quality data is available for additional parameters from the USGS Historical Water Quality Data Website and the annual USGS Water Resources Data Reports as well as the EPA Storage and Retrieval (STORET) Database. In addition, volunteer water quality monitoring data is available from the Missouri Stream Team online database. Additional State Water Quality Standards are available in the most current document of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

USGS Pesticides National Synthesis Project

The United States Geological Survey conducted water quality samples within the Current River Watershed from 1993-1995 as part of the Pesticides National Synthesis Project in an effort to determine the spatial and temporal distribution of contamination by pesticides in the water resources of the United States (USGS 1999a). The watershed was part of the Ozark Plateaus Study Unit of the National Water

Quality Assessment Program. Four surface water sampling sites and four ground water sampling sites were selected within the watershed (Figure Wq01) (USGS 1998a and 1998b). A single sample was taken at each ground water sampling site in 1993. Two samples were collected at three of the four surface water sites between 1994 and 1995, while four samples were taken at the fourth site during the same period (USGS 1998c and 2000d).

A total of nine pesticide or pesticide related compounds were detected from samples collected within the watershed (Table Wq03). These compounds included Cis-Permethrin; Deethyl Atrazine; P,P'DDE; Tebuthiuron; Atrazine; Metolachlor; Molinate; Propanil; and Thiobencarb. Pesticide compounds were detected in a single sample collected from one of the four ground water sites. These compounds included P,P'DDE and Propanil. The surface sample sites exhibited a higher number of detections, with all four sites having detections of pesticide compounds. Site 4 had the most detections of pesticide compounds with all nine of the previously mentioned compounds present. For comparison; 39 of 43 surface water sites within the Ozark Plateaus Study Unit had detections of pesticides with 18 sites having samples with six or more pesticide detections (Bell et al. 1997). In addition 73 of 215 ground water sample sites within the Ozark Plateaus Study Unit had pesticide detections with a maximum of 5 pesticides detected in any one sample (Adamski 1996). It is important to note that the number of samples at individual sites varied. It is also important to note that analysis for specific pesticide compounds varied from site to site and/or sample to sample.

Ground Water Quality

The presence of karst features within and around the Current River Watershed such as Spring Valley Creek and Pike Creek (losing streams), increases the risk of ground water contamination from point and non-point sources of pollution located on the surface. Due to the fact that most of the watershed's population is rural, indicating that most receive their water from untreated private wells, the quality of surface water which has the potential to enter the groundwater system is important. In addition, large portions of the permanent flow within the watershed are enhanced by springs such as Montauk and Big Springs. Thus any contaminant which affects ground water quality is likely to affect surface water quality as well as drinking water quality. There are several ways in which contaminants can enter the groundwater system. These include losing streams, sinkholes, and abandoned wells. As indicated by dye traces performed within the watershed, ground water movement is not always restricted by surface watershed boundaries. This is no more effectively demonstrated than by observing the recharge area of Big Spring which receives much of its recharge from portions of the Eleven Point Watershed (Figure Ge02).

Point Source Pollution

Table Wq04 lists 21 municipal and non-municipal waste water facilities within the Current River Watershed (Figure Wq02) (MDNR 1998a, 2000e). There are 6 municipal waste water facilities within the watershed. These serve the cities/towns of Doniphan, Grandin, Naylor, Summersville, Van Buren, and Winona. Discharges from these facilities have a combined flow of approximately 0.992 million gallons per day. Table Wq04 lists individual flows for municipal facilities as well as some non-municipal facilities within the watershed.

The MDNR "Incidents of Mines Occurrences, and Prospects" (IMOP) Database contains data on 53 active mines and 134 past producers within the Current River Watershed in Missouri (MDNR 2001a). All active mines are sand and gravel removal operations with the exception of 1 sandstone quarry.

Improper gravel mining techniques and site location have the potential to threaten water quality as well as aquatic and riparian habitats within the watershed. The negative impacts of improper gravel mining have been shown to include channel deepening, sedimentation of downstream habitats, accelerated bank erosion, the formation of a wider and shallower channel, the lowering of the flood plain water table, and channel shift (Roell 1999). The highest percentage of past producers are iron mines (MDNR 2001a). Nearly all of these are surface mines which dot the watershed. When these occur as open pits they have the potential to act as a direct link to the ground water system and thus pose a threat to ground water quality if pollutants are allowed to enter. This can affect wells from which the watersheds population receives its water.

Non-point Source Pollution

Perhaps one of the more difficult challenges to address within any watershed is non-point source pollution. Whereas point source pollution can usually be traced to a single discharge point or area such as a waste water treatment plant discharge, non point source pollution, such as sheet erosion of topsoil, runoff of nutrients from pastures, or pesticide or fertilizer runoff from fields, is much more difficult to detect as well as remedy. It takes the cooperation of the landowners within a watershed to minimize non-point source pollution and its impacts.

Land disruption from road and bridge construction and maintenance as well as urban expansion often results in increased sediment loads to receiving water systems. Bridge construction can also result in stream channel modification, which affects stream flow both up and downstream from the bridge. Within the Current River Watershed, there are approximately 3,407 miles of Highways, Streets, and County and Private Roads. This is approximately 1.2 miles of road per square mile (mi/sq mi)of watershed area. Approximately 2,634 miles of these roads are probably unpaved (1.0 mi/sq mi). This is based on the assumption that most county and private roads not intersecting a municipality are unpaved. According to the Missouri Department of Transportation Highway and Bridge Construction Schedule, there are currently (2001) four state highway projects which involve drainage and/or bridge construction or maintenance scheduled within the watershed from 2001-2003 (MDT 1998).

The potential for contamination by septic systems has been shown by Aley (1972 and 1974) to be increased in areas of soluble bedrock (MDNR 1984). As part of an NPS Ozark National Scenic Riverways Groundwater Study, Aley and Aley (1987) identified pollution hazards including sewage disposal in the study region. They state that the primary type of sewage disposal within the study region is septic systems. Aley and Aley (1987) also state that according to a 1972 Missouri Clean Water Commission publication, sewage production is approximately 100 gallons per person per day. Using this information and assuming that nearly all of the populations of the municipalities within the watershed are served by municipal waste water treatment facilities, it can be estimated that 1,857,900 gallons of septic system effluent is generated per day within the Current River Watershed. Aley and Aley (1987) conclude that the “dispersed pattern of settlement in the study region is of great help in reducing groundwater contamination problems resulting from sewage disposal.” Aley and Aley (1987) state that: “Instead, problems are centered on areas with concentrated settlement”. It is important to stress that proper septic system installation and maintenance remains important to the protection of both surface and ground water systems.

Non-Point source contaminants of forestry activities within the Ozark National Scenic Riverways Groundwater Study Region were determined not to be significant enough to be designated by Aley and Aley (1987) as a hazard area within the study region. However, in certain areas of the study region, they

did observe localized erosion “related primarily to logging roads and skid trails in rugged terrain” and concluded that “as a result, logging in the study region undoubtedly contributes to the sediment load of the springs in the Riverways”. It is important to note that since publication of this report a considerable amount of land within the study region has been transferred to public ownership.

As with other watersheds in the area, livestock, and in particular cattle populations, can potentially adversely affect both surface and ground water quality within the Current River Watershed. This is especially true when livestock are allowed to linger in riparian zones. Current estimates of livestock populations based on watersheds appear to be scarce if not non-existent. Much of the livestock population data currently available is based on county estimates. Applying this data proportionally to a watershed is a dubious method, at best, due to the potential variability of spatial distribution of livestock populations within counties. Land cover may provide a partial clue: Approximately 80.1% of the land cover within the Current River Watershed is Forest . Land cover within the riparian corridor reflects this characteristic with an estimated 78.7 percent consisting of forest. A high percentage of forest cover within the watershed would tend to indicate lower livestock populations. In addition, a high percentage of timbered riparian corridor would indicate, perhaps, more limited access to streams by livestock. Without good watershed-based livestock population data, much is left to speculation. What can be stated reliably is that limiting the presence of livestock from the riparian corridor is an effective way to help insure both surface and groundwater quality.

Other non-point pollution concerns within the Current River Watershed are recreation oriented. These include the large numbers of floaters (including people using johnboats, canoes, and innertubes) and people on summer weekends as well as horse trail rides and the associated facilities which are located along the Jacks Fork, a major tributary of the Current River. As stated previously, a portion of the Jacks Fork is currently included on the 303d list due to high fecal coliform counts which periodically exceed state standards for whole-body contact recreation indicating the presence of excessive organic wastes (MDNR 1994 and USGS 2001c). The USGS in cooperation with the NPS is currently conducting a multiphase study to determine the locations, magnitude, and sources of microbiological contamination on the Jacks Fork (USGS 2001c). Additional information regarding this study can be found in the USGS Fact Sheet 026ñ01: Assessment of Microbiological Contamination of the Jacks Fork within the Ozark National Scenic Riverways, Missouri--Phase 1.

An increased awareness by the public will be important to the protection of both surface and ground water quality from non-point sources of pollution within the Current River Watershed.

Water Pollution and Fish Kill Investigations

Eight water pollution incidents have been investigated in the Current River Watershed since 1990 (Table Wq05) (MDC 2001a). The stream impacts associated with these incidents ranged from 100 yards to greater than one mile, with the impacts of two incidents unknown. No known fish kills were observed in relation to any of the eight incidences.

Water Use

Water use data for the Current River Watershed (including the Jacks Fork) obtained from the USGS National Water Use Database (1998d) indicate that total water withdrawn from the Current River Watershed in 1995 was 34.99 million gallons per day (mgd). Most of the water withdrawn from the watershed was from the groundwater system. Groundwater withdrawn from the watershed was 29.46

mgd while surface water withdrawn was 5.53 mgd.

Estimated water withdrawal for irrigation purposes was the most prevalent use within the Current River Watershed in 1995 (USGS 1998d). Combined groundwater and surface withdrawals for irrigation equaled 30.38 mgd. Domestic (household) use was the second most prevalent within the Current River Watershed with domestic deliveries equaling 2.51 mgd. Self-supplied water withdrawn in 1995 for domestic use equaled 1.08 mgd.

Major water use information for the Current River Watershed was obtained from the MDNR, Division of Geology and Land Survey. The MDNR maintains records of "major" (those facilities capable of withdrawing 100,000 gallons/day or more) surface and ground water users throughout the state. Recent records (1997) indicate there were a total of 40 major water users withdrawing over 4 billion gallons of water from 125 groundwater and surface water wells and/or intakes combined (Table Wq06)(MDNR 1997). The majority of water (68.5%) was acquired from ground water withdrawals. The remaining 31.5%, comprising surface water withdrawals, all came from the Little Black River. Of the 40 permitted major water users, 5 were public entities with total withdrawals (all groundwater) totaling 218,813,900 gallons or 4.6% of total withdrawals for 1997.

Recreational Use

The Current River Watershed, and specifically the Current River, receives a high amount of recreational use. In 1982, the recreational value of the Current River Watershed was ranked 1 out of 37 major watersheds in Missouri (MDC and MDNR 1982). Results were obtained by surveying professional staff from six state and federal agencies. The main threat to the Current River, which was expected to result in a lower ranking in the future, was intensive recreational use.

Much of the recreational use within the watershed is associated with the Current River and specifically the ONSR. Recreational use estimates indicate that total annual visits to the ONSR averaged 1,546,299 between the years 1996 and 2000 (Table Wq07) (NPS 2001). Apart from bus tours, driving tours, etc. The top three activities were angling, canoeing, and camping. Of these three activities, angling was the most prevalent; accounting for an estimated average of 148,983 visitors annually.

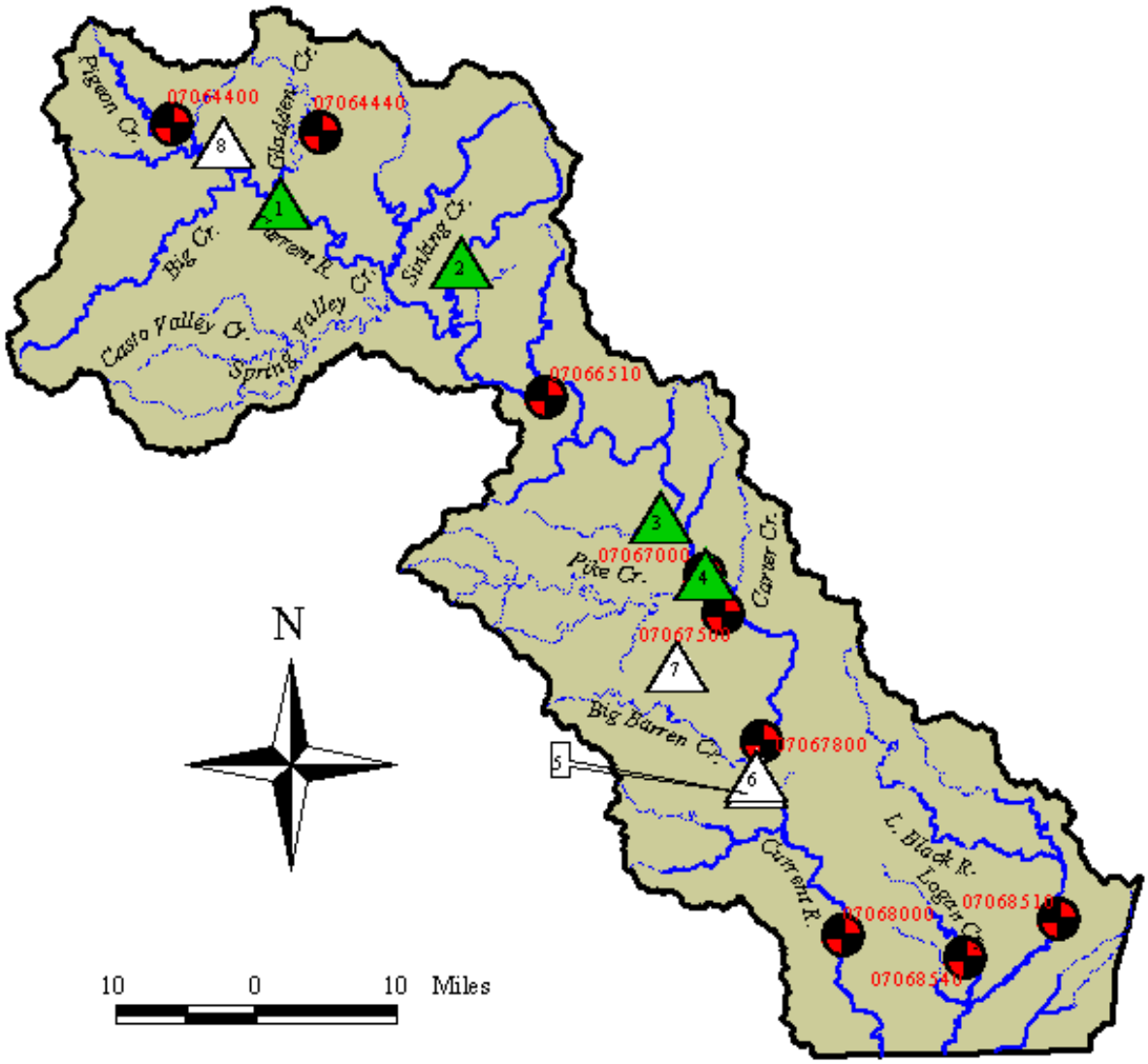
In 1985, The National Park Service initiated a River Use Management Plan in order to help insure that the Current River, as well as the Jacks Fork, would continue to provide quality and diverse recreational opportunities to the public. This plan was designed, in part to “protect the river environment and provide a variety of quality recreational experiences for visitors” (NPS 1989). Canoe use and motorboat use were addressed as part of this plan.

As part of the River Use Management Plan, the Jacks Fork and the Current River were divided into zones with the establishment of maximum levels of canoe use designated as low (up to 10 canoes per mile), medium (11-40 canoes per mile), and high (41-70 canoes per mile)(Figure Wq03). In some zones, the established maximum level of canoe use was different between weekends (Friday-Sunday)/holidays and weekdays (Monday-Thursday). The Current River was divided into 8 zones with zone 7 being divided into sub-zones “A” and “B” as listed in Table Wq08. Zones 5,6,7a, were designated for low canoe use at all times. Zones 1, 4, and 7b were designated for medium canoe use at all times. While zones 2 and 3 were designated for medium canoe use on the weekdays and high canoe use on during weekend and holiday periods. According to the River Use Management Plan, over 85% of the canoeists floating the rivers obtain canoes from concessionaires Thus, the primary method of the NPS for

attaining target levels of canoe use is by limiting the number and distribution of canoes to each concessionaire by zones and districts (NPS 1989).

Figure Wq01.

Current River Watershed
Water Quality Stations



Legend

- USGS Water Quality Station
- USGS Pesticide Sampling Site (Ground Water)*
- USGS Pesticide Sampling Site (Surface)*

*See table Wq03.

Figure Wq02.

Current River Watershed
Point Source Discharges

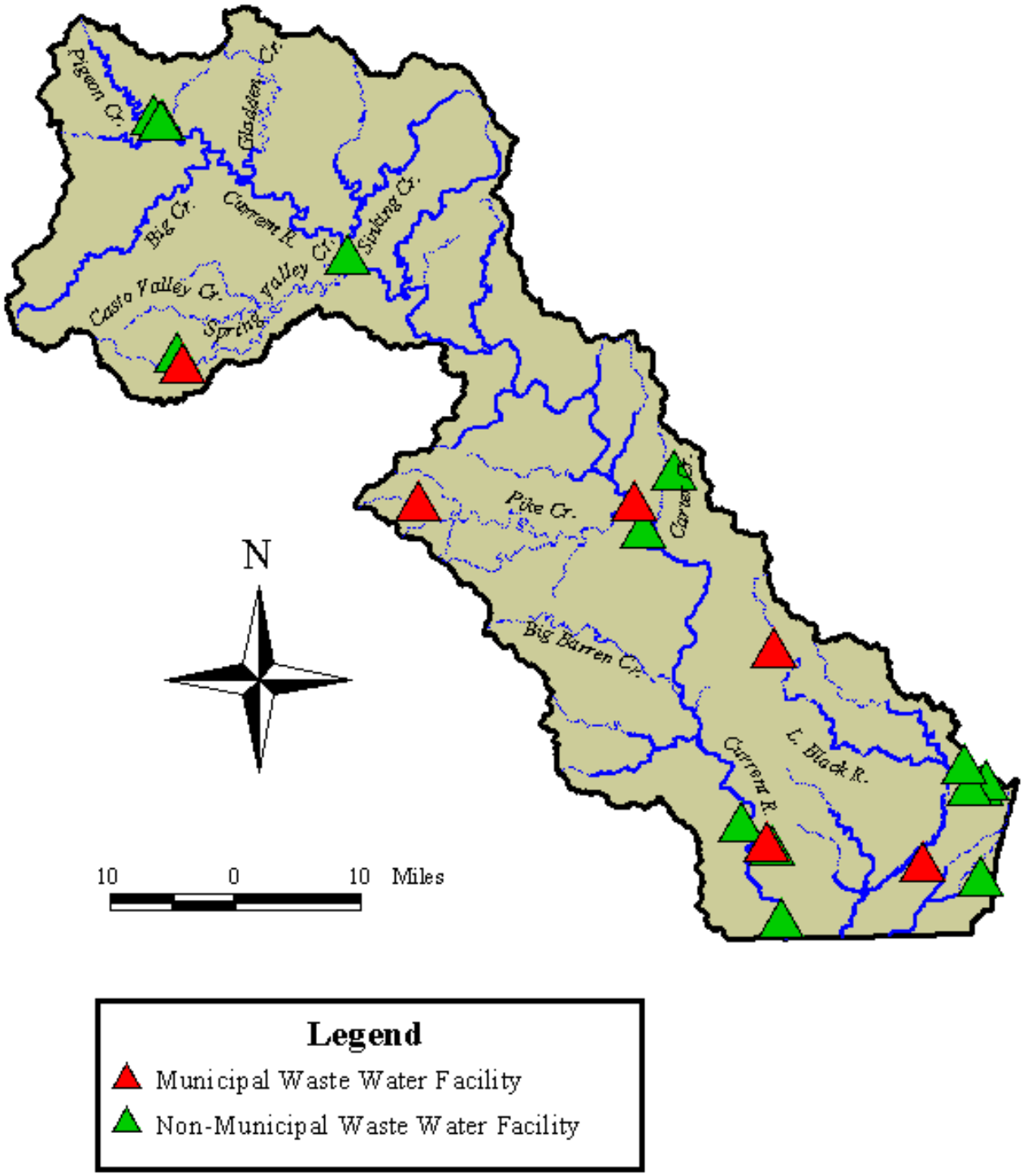


Figure Wq03.

Current River Watershed

Accesses and National Park Service Canoe Density Zones

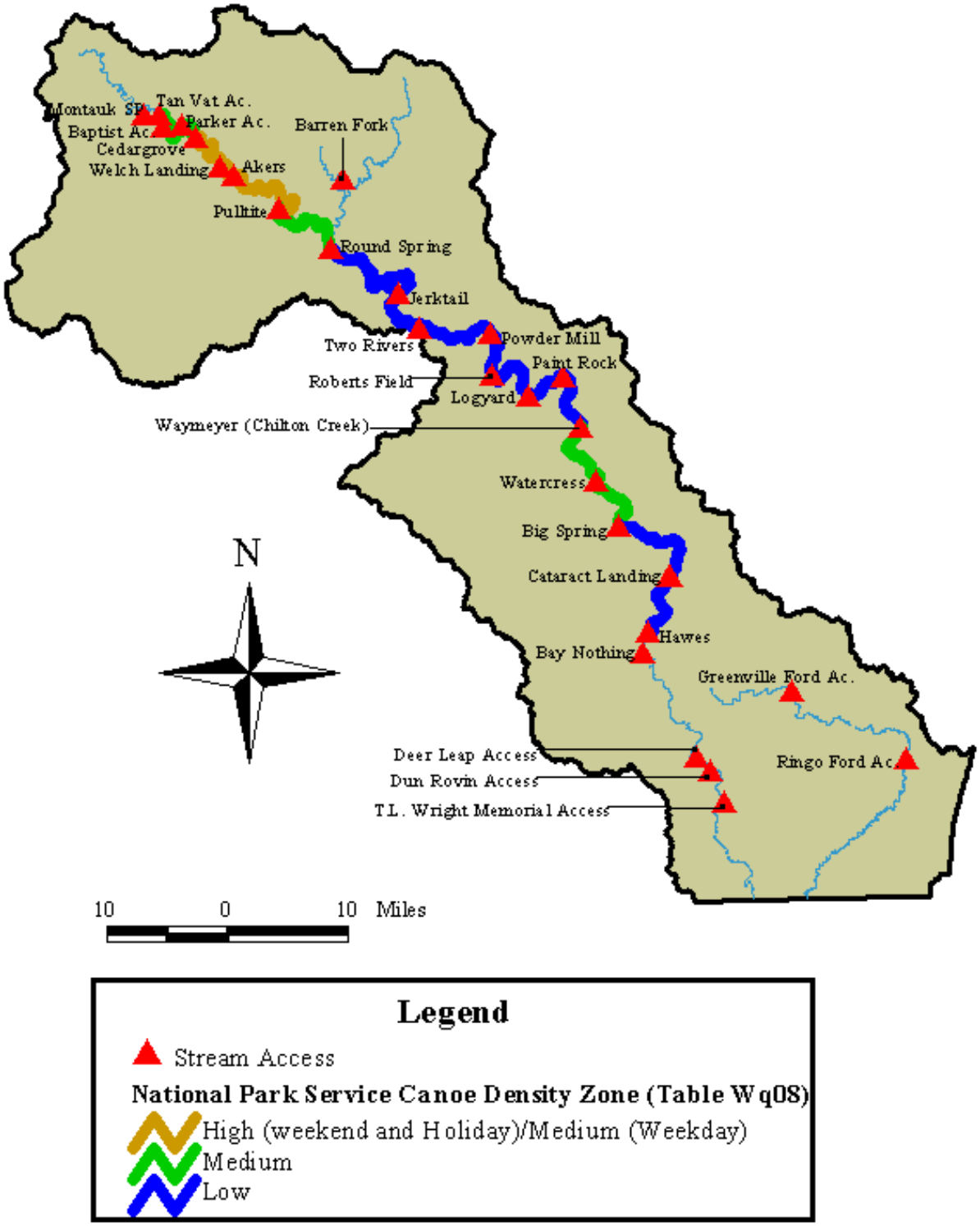


Table Wq01. Missouri Department of Natural Resources use designations for selected streams and impoundments within the Current River Watershed (MDNR 2000c). Locations are given in section, township, range format.

[1] **L1**-Lakes used primarily for public drinking water supply.

L2-Major reservoirs.

L3-Other lakes which are waters of the state. For effluent regulation purposes, publicly owned lakes are those for which a subtantial portion of the surrounding lands are publicly owned or managed.

P-Streams that maintain permanent flow even in drought periods.

C-Streams that may cease flow in dry periods but maintain permanent pools which support aquatic life.

[2] **lww**-livestock & wildlife watering

aql-protection of warm water aquatic life and human health-fish consumption.

cdf-cold water fishery

clf-cool water fishery

wbc-whole body contact recreation

btg-boating & canoeing

irr-Irrigation

Stream Name	Class[1]	Miles acres*	From	To	Designated Use[2]
Ashley Cr.	P	2.5	Mouth	35,32n,7w	lww,aql
Barren Fork	P	2.0	Mouth	20,31n,4w	lww,aql,cdf
Barren Fork	P	7.0	20,31n,4w	32,32n,4w	lww,aql
Bean Cr.	C	6.0	Mouth	9,32n,8w	lww,aql
Bear Camp Cr.	C	4.5	Mouth	31,26n,1e	lww,aql
Bear Claw Spr.	P	0.2	Mouth	33,30n,08w	lww,aql
Beaver Dam Cr.	P	8.0	Mouth	9,24n,4e	irr,lww,aql,wbc
Beaver Dam Cr.	C	2.0	9,24n,4e	5,24n,4e	lww,aql
Bee Rock Hollow	C	1.4	Mouth	3,31n,7w	lww,aql
Big Barren Cr.	C	19.0	Mouth	32,26n,2w	lww,aql,clf,wbc
Big Cr.	C	27.0	Mouth	5,29n,8w	lww,aql,clf
Big Cr.	P	18.0	Mouth	5,31n,2w	lww,aql,wbc
Blair Cr.	C	4.0	31,30n,2w	18,30n,2w	lww,aql
Blair Cr.	P	8.0	Mouth	31,30n,2w	lww,aql
Briar Cr.	C	6.0	Mouth	13,23n,1e	lww,aql
Buffalo Cr.	P	5.0	Mouth	20,24n,1e	irr,lww,aql
Cave Fork Cr.	C	3.0	Mouth	10,24n,1w	lww,aql
Current R.	P	118.0	State Line	24,31n,6w	irr,lww,aql,clf,wbc, btg

Current R.	P	19.0	24,31n,6w	Montauk Spr.	lww,aql,cdf,wbc,btg
Cypress Ditch #1	C	9.0	State Line	1,22n,4e	lww,aql
Cypress Cr.	C	3.0	Mouth	24,23n,3e	lww,aql
Dew Pond Hol.	C	3.2	Mouth	15,30n,7w	lww,aql
Dirt House Hol.	C	1.9	Mouth	28,29n,07w	lww,aql
Ditch #2	P	2.0	State Line	30,22n,4e	lww,aql
Ditch to Ditch #2	P	1.5	Mouth	24,22n,3e	lww,aql
Ditch #2	C	8.0	30,22n,4e	2,22n,4e	lww,aql
Dry Bone Cr.	C	1.0	Mouth	20,30n,7w	lww,aql
Flat Cr.	C	6.0	Mouth	20,24n,3e	lww,aql
Gladden Cr.	C	13.5	13,31n,6w	5,32n,5w	lww,aql
Gladden Cr.	P	2.0	Mouth	13,31n,6w	lww,aql
Gordon Cr.	P	2.0	Mouth	15,32n,3w	lww,aql
Gordon Cr.	C	0.5	15,32n,3w	11,32n,3w	lww,aql
Harris Cr.	C	4.5	Mouth	Hwy. 142	lww,aql
Harviell Ditch (#3)	C	16.0	State Line	14,23n,5e	irr,lww,aql
Hodge Cr.	C	2.0	28,32n,4w	16,32n,4w	lww,aql
Huldy Hol.	C	2.0	Mouth	28,31n,7w	lww,aql
Hurricane Cr.	C	6.0	Mouth	Hwy. 21	lww,aql
L. Rocky Cr.	C	1.0	12,28n,3w	1,28n,3w	lww,aql
L. Rocky Cr.	P	1.0	Mouth	12,28n,3w	lww,aql
L. Blair Cr.	C	2.0	Mouth	6,29n,2w	lww,aql
L. Pike Cr.	C	2.0	Mouth	3,26n,2w	lww,aql
L. Black R.	P	25.0	State Line	31,24n,5e	irr,lww,aql,wbc,btg
L. Black R.	P	16.0	31,24n,5e	9,24n,3e	irr,lww,aql,clf,wbc btg
L. Sinking Cr.	C	1.0	26,32n,3w	26,32n,3w	lww,aql
L. Sinking Cr.	P	4.0	Mouth	26,32n,3w	lww,aql
Little Cr.	C	4.0	Mouth	26,32n,4w	lww,aql
Logan Cr.	P	5.5	Mouth	36,23n,3e	lww,aql
Logan Cr.	C	6.0	36,23n,3e	9,23n,3e	lww,aql
Loggers Lake	L3	25*	10,15,31n,3w		lww,aql,wbc,btg
Mash Cr.	C	2.0	12,30n,4w	35,31n,4w	lww,aql
Mash Cr.	P	0.5	Mouth	12,30n,4w	lww,aql
Middle Prong	C	1.0	Mouth	29,30n,3w	lww,aql
Mill Cr.	P	2.0	Mouth	8,27n,1w	lww,aql
Mill Cr.	C	2.0	8,27n,1w	1,27n,2w	lww,aql
N. Prong L. Black R.	C	10.0	32,25n,3e	35,26n,2e	lww,aql
N. Fk. Buffalo Cr.	C	4.5	18,24n,1e	21,24n,1w	lww,aql
N. Fk. Buffalo Cr.	P	2.0	20,24n,1e	18,24n,1e	lww,aql
N. Prong L. Black R.	P	3.0	9,24n,3e	32,25n,3e	lww,aql
N. Ashley Cr.	P	0.5	35,32n,7w	34,32n,7w	lww,aql
N. Ashley Cr.	C	8.0	34,32n,7w	34,32n,8w	lww,aql
N. Pr. Beaverdam Cr.	C	3.0	5,24n,4e	19,25n,4e	lww,aql

Parker Hol.	P	2.0	Mouth	20,32n,6w	lww,aql,cdf
Pigeon Cr.	C	6.0	8,32n,7w	34,33n,8w	lww,aql
Pigeon Cr.	P	6.0	Montauk Spr.	8,32n,7w	lww,aql,cdf
Pike Cr.	P	3.0	Mouth	34,27n,1w	lww,aql,clf
Pike Cr.	C	22.0	34,27n,1w	27,27n,3w	lww,aql
Pine Valley Cr.	C	6.5	Mouth	13,28n,1w	lww,aql
Pond Spring Br.	P	1.9	Mouth	15,30n,8w	lww,aql
Ripley Co. Lake	L3	20*	10,23n,1e		lww,aql,wbc,btg
Rocky Cr.	P	2.0	Mouth	6,28n,2w	lww,aql
Rogers Cr.	C	9.4	Mouth	28,28n,2w	lww,aql
S. Prong L. Black R.	C	6.0	Hwy. 21	33,25n,2e	lww,aql
S. Prong L. Black R.	P	5.5	9,24n,3e	Hwy. 21	lww,aql
S. Prong Beaverdam Cr.	C	6.5	5,24n,4e	27,25n,3e	lww,aql
S. Fk. Buffalo Cr.	C	4.0	30,24n,1e	34,24n,1w	lww,aql,clf
S. Ashley Cr.	P	5.0	Mouth	9,31n,7w	lww,aql
S. Ashley Cr.	C	2.0	9,31n,7w	18,31n,7w	lww,aql
S. Fk. Buffalo Cr.	P	2.0	20,24n,1e	30,24n,1e	lww,aql,clf
Sinking Cr.	P	21.0	Mouth	8,32n,3w	lww,aql,clf,wbc
Spring Valley Cr.	P	7.5	Mouth	35,30n,5w	lww,aql
Spring Valley Cr.	C	10.0	35,30n,5w	6,29n,5w	lww,aql
Spring Alec Hol.	P	1.5	Mouth	29,30n,2w	lww,aql
Spring Alec Hol.	C	1.0	29,30n,2w	21,30n,2w	lww,aql
Sutton's Cr.	P	1.0	Mouth	12,29n,4w	lww,aql
Sycamore Cr.	C	1.0	Mouth	15,27n,3w	lww,aql
Trib to L. Rocky Cr.	C.	1.0	Mouth	1,28n,3w	lww,aql
Trib. to Big Cr.	C	3.0	Mouth	4,29n,8w	lww,aql
Trib. to Big Cr.	C	2.0	Mouth	2,29n,8w	lww,aql
Trib. to N. Pr. Beaverdam Cr.	C	1.0	Mouth	19,25n,4e	lww,aql
White Oak Hol.	C	2.0	Mouth	28,32n,5w	lww,aql
Yoga Spring	P	0.1	Mouth	29,30n,7w	lww,aql

[1] **L1-**Lakes used primarily for public drinking water supply.

L2-Major reservoirs.

L3-Other lakes which are waters of the state. For effluent regulation purposes, publicly owned lakes are those for which a subtantial portion of the surrounding lands are publicly owned or managed.

P-Streams that maintain permanent flow even in drought periods.

C-Streams that may cease flow in dry periods but maintain permanent pools which support aquatic life.

[2] **lww-**livestock & wildlife watering

aql-protection of warm water aquatic life and human health-fish consumption.

cdf-cold water fishery

clf-cool water fishery

wbc-whole body contact recreation

btg-boating & canoeing

irr-Irrigation

*****Acres given for Impoundments.

Note: This table is not presented as a final authority.

Table Wq02 (1 of 6). Water quality data for selected stations and parameters within the Current River Watershed (MDNR 2000c, USGS 2001b). Selection of state standards used for comparison of values at each site are based on the MDNR use designations corresponding to the section of stream sampled and include the following: I Protection of aquatic life, II Human Health Protection-Fish Consumption, IV Irrigation, V Livestock and Wildlife Watering, VI Whole-body-contact recreation, VII Groundwater.

N/O No observations **N/A** Not Available **e** Laboratory estimated value.

k Non-ideal count of colonies (too large a sample, colonies merged)

[1] Based on maximum chronic and acute standards for cold-water fishery. Levels are pH and temperature dependent. For specific criteria at varying pH and temperatures consult Table B of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

[2] Based on maximum chronic and acute standards for general warm-water fishery. Levels are pH and temperature dependent. For specific criteria at varying pH and temperatures consult Table B of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

[3] State standard for phosphorus is currently unavailable. The Environmental Protection Agency currently recommends a maximum of 0.1mg/L for rivers (Christensen and Pope 1997).

[4] Based on maximum chronic and acute standards for all waters. Levels are hardness dependent. For specific criteria at varying hardness consult Table A of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

[5] Based on maximum chronic and acute standards for cold water fishery. Levels are hardness dependent. For specific criteria at varying hardness consult Table A of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

Station: 07064400 (Montauk Springs at Montauk, MO) Period: 1995-1999

Parameter	State Standard					Measure	Exceedence
	I	II	V	VI	VII	Min-Max	
Temperature (ºF) (cold water fishery)	68.0 Max					55.2-61.34	0/9
pH	----------6.5-9.0---------					7.17-8.05	0/9
Oxygen, dissolved (mg/L) (cool water fishery)	6.0 Min					7.9-10.0	0/9
Coliform, fecal (colonies / 100 ml)				200		1-115	0/9
Hardness (mg/L as $CaCO_3$)						N/O	N/A
Nitrate-N (mg/L)					10	N/O	N/A
Nitrogen, Total Ammonia (mg/L as N)	0.1-32.1[1]					<0.012-0.024	0/5
Phosophorus, Total[3] (mg/L as P)						<0.02-<0.03	N/A

Lead, Dissolved (ug/L)	9-150[4]				N/O	N/A
Lead, Total Recoverable				15	N/O	N/A
Zinc, Dissolved (ug/L)	172-337[5]				N/O	N/A
Zinc, Total Recoverable (ug/L)				5000	N/O	N/A

Table Wq02. (2 of 6)

Station: 07064440 (Current River below Montauk State Park) Period: 1995-1999

Parameter	State Standard				Measure	Exceedence
	I	II	V	VI	Min-Max	
Temperature (ºF) (cold water fishery)	68.0 Max				56.3-60.26	0/9
pH	----------6.5-9.0---------				7.3-7.8	0/9
Oxygen, dissolved (mg/L) (cool water fishery)	6.0 Min				8.9-12.4	0/9
Coliform, fecal (colonies/100 ml)				200	4-560k	1/10
Hardness (mg/L as $CaCO_3$)					N/O	N/A
Nitrogen, Total Ammonia (mg/L as N)	0.1-32.1[1]				0.024-0.060	0/9
Phosophorus, Total[3] (mg/L as P)					<0.02	0.07
Lead, Dissolved (ug/L)	9-150[4]				N/O	N/A
Zinc, Dissolved (ug/L)	172-337[5]				N/O	N/A

Station: 07067500 (Big Spring near Van Buren , MO) Period: 1995-1999

Parameter	State Standard					Measure	Exceedence
	I	II	V	VI	VII	Min-Max	
Temperature (ºF) (cold water fishery)	68.0 Max					54.7-59.72	0/29
pH	----------6.5-9.0---------					6.8-7.8	0/29
Oxygen, dissolved (mg/L) (cool water fishery)	6.0 Min					8.0-11.5	0/29
Coliform, fecal (colonies / 100 ml)				200		1-67k	0/28
Hardness (mg/L as $CaCO_3$)						113-186	
Nitrate-N (mg/L)					10	N/O	N/A
Nitrogen, Total Ammonia (mg/L as N)	0.1-32.1[1]					<0.012-0.024	0/21
Phosophorus, Total[3] (mg/L as P)						<0.02-<0.05	0/24
Lead, Dissolved (ug/L)	9-150[4]					<1.0-<100.0	?/10
Lead, Total Recoverable					15	<1.0-1.4	0/13

Zinc, Dissolved (ug/L)	172-337[5]				<1.0-<20.0	0/10
Zinc, Total Recoverable (ug/L)				5000	<1.0-<40.0	0/13

Table Wq02 (3 of 6).

Station: 07066510 (Current River above Powder Mill) Period: 1995-1999

Parameter	State Standard					Measure	Exceedence
	I	II	IV	V	VI	Min-Max	
Temperature (ºF) (cool water fishery)	84.0 Max					61.2-68.5	0/8
pH	----------6.5-9.0---------					7.5-8.4	0/8
Oxygen, dissolved (mg/L) (cool water fishery)	5.0 Min					9.3-10.7	0/8
Coliform, fecal (colonies / 100 ml)					200	4-470k	1/8
Hardness (mg/L as $CaCO_3$)						N/O	N/A
Nitrogen, Total Ammonia (mg/L as N)	0.1-32.1[1]					<0.012-0.036	0/5
Phosophorus, Total[3] (mg/L as P)						0.02-0.05	0/5
Lead, Dissolved (ug/L)	9-150[4]					N/O	N/A
Zinc, Dissolved (ug/L)	172-337[5]					N/O	N/A

Station: 07067000 (Current at Van Buren , MO) Period: 1995-1999

Parameter	State Standard					Measure	Exceedence
	I	II	IV	V	VI	Min-Max	
Temperature (ºF) (cool water fishery)	84.0 Max					36.3-75.2	0/19
pH	----------6.5-9.0---------					7.7-8.4	0/19
Oxygen, dissolved (mg/L) (cool water fishery)	5.0 Min					8.7-14.0	0/19
Coliform, fecal (colonies / 100 ml)					200	2.0-1600k	2/19
Hardness (mg/L as $CaCO_3$)							84-180
Nitrogen, Total Ammonia (mg/L as N)	0.1-32.1[1]					0.018-0.067	
Phosophorus, Total[3] (mg/L as P)						<0.01-0.09	
Lead, Dissolved (ug/L)	9-150[4]					<1.0-<1.0	0/7
Zinc, Dissolved (ug/L)	172-337[5]					<1.0-14.0	0/7

Table Wq02 (4 of 6).

Station: 07067800 (Current River below Hawes Campground) Period: 1995-1999

Parameter	State Standard					Measure	Exceedence
	I	II	IV	V	VI	Min-Max	
Temperature (ºF) (cool water fishery)	84.0 Max					61.3-70.7	0/8
pH	----------6.5-9.0---------					7.5-8.2	0/8
Oxygen, dissolved (mg/L) (cool water fishery)	5.0 Min					9.0-11.1	0/8
Coliform, fecal (colonies / 100 ml)					200	2-28k	0/8
Hardness (mg/L as $CaCO_3$)						N/O	N/A
Nitrogen, Total Ammonia (mg/L as N)	0.1-32.1[1]					0.012-0.048	0/4
Phosophorus, Total[3] (mg/L as P)						<0.02-0.02	0/4
Lead, Dissolved (ug/L)	9-150[4]					N/O	N/A
Zinc, Dissolved (ug/L)	172-337[5]					N/O	N/A

Station: 07068000 (Current River at Doniphan, Mo) Period: 1995-1999

Parameter	State Standard					Measure	Exceedence
	I	II	IV	V	VI	Min-Max	
Temperature (ºF) (cool water fishery)	84.0 Max					38.1-83.3	0/58
pH	----------6.5-9.0---------					7.2-8.4	0/58
Oxygen, dissolved (mg/L) (cool water fishery)	5.0 Min					6.8-13.4	0/57
Coliform, fecal (colonies / 100 ml)					200	1-5700k	2/57
Hardness (mg/L as $CaCO_3$)						133-176	
Nitrogen, Total Ammonia (mg/L as N)	0.1-32.1[1]					0.012-0.036	0/34
Phosophorus, Total[3] (mg/L as P)						0.02-0.05	0/34
Lead, Dissolved (ug/L)	9-150[4]					<1.0-<100.0	?/18
Zinc, Dissolved (ug/L)	172-337[5]					<1.0-<20.0	0/18

Table Wq02 (5 of 6).

Station: 07068510 (Little Black River below Fairdealing, Mo) Period: 2000-2001

Parameter	State Standard					Measure	Exceedence
	I	II	IV	V	VI	Min-Max	
Temperature (ºF) (warm water fishery)	90.0 Max					33.9-80.6	0/12
pH	----------7.1-7.9---------					7.1-7.9	0/12
Oxygen, dissolved (mg/L) (warm water fishery)	5.0 Min					4.5-12.0	1/12
Coliform, fecal (colonies / 100 ml)					200	1k-310	3/12
Hardness (mg/L as $CaCO_3$)						113-160	
Nitrogen, Total Ammonia (mg/L as N)	0.1-50.6[2]					e0.10-1.8	0/12
Phosophorus, Total[3] (mg/L as P)						<0.02-0.96	2/12
Lead, Dissolved (ug/L)	9-150[4]					0.09-<100	N/A
Zinc, Dissolved (ug/L)	172-337[5]					51-39	0/2

Station: 07068540 (Logan Creek at Oxly, Mo) Period: 1980-1984

Parameter	State Standard					Measure	Exceedence
	I	II	IV	V	VI	Min-Max	
Temperature (ºF) (warm water fishery)	90.0 Max					35.6-80.6	0/26
pH	----------6.5-9.0---------					6.3-8.0	1/26
Oxygen, dissolved (mg/L) (warm water fishery)	5.0 Min					3.0-11.8	3/26
Coliform, fecal (colonies / 100 ml)					200	7-1100	4/25
Hardness (mg/L as $CaCO_3$)						N/O	
Nitrogen, Total Ammonia (mg/L as N)	0.1-50.6[2]					0.001-0.132	0/26
Phosophorus, Total[3] (mg/L as P)						<0.01-0.1	0/26
Lead, Dissolved (ug/L)	9-150[4]					N/O	N/A
Zinc, Dissolved (ug/L)	172-337[5]					N/O	N/A

N/O No observations **N/A** Not Available **e** Laboratory estimated value.

k Non-ideal count of colonies (too large a sample, colonies merged)

1 Based on maximum chronic and acute standards for cold-water fishery. Levels are pH and temperature dependent. For specific criteria at varying pH and temperatures consult Table B of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

2 Based on maximum chronic and acute standards for general warm-water fishery. Levels are pH and temperature dependent. For specific criteria at varying pH and temperatures consult Table B of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

3 State standard for phosphorus is currently unavailable. The Environmental Protection Agency currently recommends a maximum of 0.1mg/L for rivers (Christensen and Pope 1997).

4 Based on maximum chronic and acute standards for all waters. Levels are hardness dependent. For specific criteria at varying hardness consult Table A of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

5 Based on maximum chronic and acute standards for cold water fishery. Levels are hardness dependent. For specific criteria at varying hardness consult Table A of the Rules of the Department of Natural Resources Division 20-Clean Water Commission Chapter 7-Water Quality.

Table Wq03. Results of Pesticides National Synthesis Project water quality sampling for pesticide compounds within the Current River Watershed (USGS 1998c and 2000d).

Station	Name	Type	Pesticide Compound Detected
1	Current R. below Akers	S	Cis-Permethrin, Deethyl Atrazine, P,P'DDE, Propanil,Tebuthiuron
2	Big Creek @ Mauser Mill	S	Deethyl Atrazine, P,P'DDE,
3	Rogers Cr. near Van Buren	S	Deethyl Atrazine, Atrazine
4	Current R. @ Van Buren	S	Cis-Permethrin, Deethyl Atrazine, P,P'DDE, Tebuthiuron, Atrazine, Metolachlor, Molinate, Propanil,Thiobencarb
5	N/A	GW	P,P'DDE, Propanil
6	N/A	GW	Non Detection
7	N/A	GW	Non Detection
8	N/A	GW	Non Detection

Type: **S**-Surface **GW**-Ground Water

Pesticide	Pesticide Type
Cis-Permethrin	Insecticide
Deethyl Atrazine	Degradation Product
P,P'DDE	Degradation Product (DDT)
Propanil	Herbicide
Tebuthiuron	Herbicide
Atrazine	Herbicide
Metolachlor	Herbicide
Molinate	Herbicide
Thiobencarb	Herbicide

Table Wq04. Municipal and non-municipal waste water facilities within the Current River Watershed (MDNR 1998a, 2000e).

Facility Name	County	Facility[1] Type	Receiving Stream	Flow[2]
Doniphan Municipal WWTF	Ripley	POTW	Trib. to Current R.	0.456
Dorris Plumbing & Septic	Butler	SLDGE	Trib. L. Black R.	ND
Grandin Sewer Lagoon	Carter	POTW	N. Prong L. Black R.	0.035
Hillview Elem School WWTF	Butler	SKL	Trib. to Ditch No.3	0.002
J B's Store	Butler	CAR W	Trib. L. Black R.	ND
Lone Star School	Ripley	SKL	Trib. to Current R.	0.002
MDC, Montauk Fish Hatchery	Dent	TROUT	Spring Br/current R.	23.250
MDNR, Montauk State Park	Dent	STROF	Trib. Current R.	ND
MDNR, Montauk State Park	Dent	PARKS	Current R.	0.033
Mm, Van Buren Quarry	Carter	QUAR	Carter Cr.	ND
Naylor Municipal WWTF	Ripley	POTW	Ditch No 2	0.075
Rideout Custom Backhoe	Ripley	GRAVW	Current R	ND
River House	Ripley	HEAL	Beasley Cr./Current R.	0.009
Shands Country Inn Station	Butler	SER S	Trib. L. Black R.	0.002
Summersville WWTP	Shannon	POTW	Trib. Spring Valley Cr.	0.09
Twilight Club, Inc	Butler	CLUB	Trib. L. Black R.	0.006
USNPS, Round Sprgs WWTP	Shannon		Jacks Fork to Current	ND
USNPS, Big Springs WWTP	Carter		Current R	ND
Van Buren WWTF	Carter	POTW	Trib to Current R.	0.131
Vaughn Const & Redi Mix	Texas	LIM Q	Trib. Spring Valley Cr.	ND
Winona WWTF	Shannon	POTW	Pike Cr.	0.175

Note: Table is not a final authority. Data subject to change.

1 Facility Type: POTW-Publicly Owned Treatment Works, CAR W-Car/Truck Wash, SLDGE-Sludge disposal/haulers, SKL-School, Trout-Trout Fish Hatcheries, STROF-Stormwater runoff, PARKS-State Park, QUAR-Quarry, GRAVW-Gravel Washing, HEAL-Health Care (Private),

SER S-Service/Gas Stations, CLUB-Country Club, LIM Q-Limestone Quarry

2 Flow units in millions of gallons per day.

ND= No DATA

Table Wq05. Fish kill and water pollution impacts investigated within the Current River Watershed from 1990-2000 (MDC 2001a).

Date	County	Stream	Cause	Fish Kill	Damage
07/01/1996	Ripley	Little Black R.	?	No	<1/4 mile
12/15/1996	Texas	Tributary to Big Cr.	Yellow paint (latex based)	No	1+ miles
02/22/1997	Carter	Aldrich Valley Cr.	Unleaded gasoline	No	<1/4 mile
03/04/1997	Reynolds	Big Cr.	?	No	<1/8 mile
08/27/1998	Dent	Gordon Cr.	Siltation.	No	100 yards.
02/22/1994	Shannon	Barren Fork	Gasoline	No	0 miles
07/07/1995	Ripley	Little Black R.	Roofing Cement	No	Unknown

?=No data given

Table Wq06. Major water users within the Current River Watershed (MDNR 1997).

Owner	Source	Total Gallons Pumped in 1997	Acres Irrigated
City of Grandin	Ground Water	10,463,100	0
City of Doniphan	Ground Water	59,900,000	0
	Ground Water	59,900,000	0
City of Winona	Ground Water	20,963,000	0
	Ground Water	17,326,700	0
	Ground Water	6,038,900	0
Ozark National Scenic Riverways	Ground Water	3,289,300	0
PWSD #4	Ground Water	8,457,400	0
	Ground Water	32,475,500	0
Total Public		218,813,900	0
Total Private	Ground Water	3,021,218,720	5,114
Total Private	Little Black River	1,490,483,146	1,636
Watershed Total		4,730,515,766	6,750

Table Wq07. Recreational use for selected activities within the Ozark National Scenic Riverways, Current River (NPS 2001).

Activity	1996	1997	1998	1999	2000	Average
Anglers	121,558	153,384	163,777	157,193	149,003	148,983
Hunters	42,830	31,576	32,645	37,203	33,679	35,587
Canoeists	131,848	139,606	119,555	125,681	121,606	127,659
Tubers	35,771	32,017	35,199	39,244	44,196	37,285
Boaters	56,729	75,769	70,633	67,528	82,221	70,576
Picknickers	75,862	74,897	70,551	71,880	76,601	73,958
Camping (Campground)	106,872	121,824	97,160	107,284	103,528	107,334
Camping (Backcountry)	11,778	14,137	15,721	27,231	21,621	18,098
Group Campers	11,920	11,859	10,750	10,870	8,414	10,763
Riders	11,514	33,014	21,383	17,439	22,726	21,215
Total Visits*	1,475,942	1,602,504	1,547,989	1,536,301	1,568,758	1,546,299

*Includes tour busses, driving tours, etc.

Table Wq08. Maximum canoe densities for the Current River, Ozark National Scenic Riverways (NPS 1989).

Zone	Name	River Miles	Maximum Level of Use	
			Weekends/ Holidays	Weekdays
1	Tan Vat-Cedar Grove	7.3	Medium	Medium
2	Cedar Grove-Akers	7.7	High	Medium
3	Akers-Pulltite	9.1	High	Medium
4	Pulltite-Round Spring	9.7	Medium	Medium
5	Round Spring-Two Rivers	18.1	Low	Low
6	Two Rivers-Powder Mill	6.9	Low	Low
7a	Powder Mill-Chilton Cr.	19.8	Low	Low
7b	Chilton Cr.-Big Spring	11.9	Medium	Medium
8	Big Spring-Hawes	15.7	Low	Low

Low (up to 10 canoes per mile)

Medium (11-40 canoes per mile)

High (41-70 canoes per mile)