

WATER QUALITY AND USE

Beneficial Use Attainment

The main stem North River from its mouth upstream to the highway 15 bridge (approximately 44 miles) is designated for boating, livestock and wildlife watering, and protection of aquatic life (MDNR 1986a). All other listed streams are designated for livestock and wildlife watering and protection of aquatic life. No streams in the basin are classified for whole-body contact recreation. The primary deterrents to recreational use in the basin are high turbidity and siltation which are direct results of poor soil management (MDNR 1986b). Excessive turbidity and siltation have not only decreased the abundance and diversity of aquatic life and habitat (Missouri Department of Conservation 1978), but have also made boating and canoeing more difficult due to locally heavy sedimentation. Although not obvious by examination of topographic maps, channelization of numerous short stream reaches has occurred throughout the basin. This activity has affected recreational use by creating high banks and steep-sided channels where access is difficult. On-site inspections should be conducted before initiating any stream improvement project to assess local stream problems, including the impacts of channelization. The lack of public access also limits recreational use.

Chemical Quality of Stream Flow

Water quality information from basin streams is scarce. The Missouri Water Pollution Control Board collected water quality data from 7 sites in the basin in 1969-70 (Missouri Water Pollution Control Board 1970). Data was collected 7 times between August 1969 and June 1970. Dissolved oxygen concentrations ranged from 5.5 to 15.0 mg/l, pH ranged from 7.2 to 8.9, specific conductance ranged from 210 to 700 micromhos/cm, iron ranged from <0.1 to 0.9 mg/l, turbidity ranged from <10 to 600 j.c.u., and fecal coliforms ranged from 10 to 170,000 bacteria/100ml. Other data is available upon request.

Fish Contamination Levels and Health Advisories

Fish contaminant monitoring has been conducted in the most downstream reach of the North River. The entire basin was included in a limited consumption advisory issued by the Missouri Department of Health for fish species with a high proportion of fat in their edible tissues (catfish, carp, buffalo, drum, suckers). Levels of concern for chlordane were reported in the early 1990s for catfish in neighboring watersheds and the Mississippi River. This advisory was lifted in 2001 due to declining chlordane levels. However, another consumption advisory was added in 2001. This new advisory, issued due to mercury contamination, recommends that pregnant or nursing women, women of childbearing age, and children 12 years of age or younger not eat largemouth bass 12 inches long or longer from anywhere in Missouri.

Water Use

There are no public water supply withdrawals in the basin. Most communities either obtain water from the Clarence Cannon Wholesale Commission, which obtains water from Mark Twain Lake, or from local wells. There are also no major industrial water users in the basin.

Point Source Pollution

Point-source pollution in the basin is low. Four small communities operate waste water treatment facilities (Table 5). Palmyra has the largest daily discharge of approximately 0.32 million gallons. One limestone quarry/settling pond is also in the basin (MDNR unpublished).

Seven animal feeding operations are registered with the Missouri Department of Natural Resources (Table 6). The largest is a swine finishing facility with 3,840 animal units located in the Hawkins Branch watershed.

Non-point Pollution

Sedimentation and turbidity are the basin's most severe water quality problems. Intensive crop farming and livestock grazing have caused extensive soil erosion throughout much of the basin. Anderson (1980) reported 18-24 tons/acre/year of sheet and rill erosion from tilled land in the basin. Erosion from permanent pasture land averaged 5-9 tons/acre/year. Gully erosion was considered severe, averaging 200-499 tons/square mile/year. As a consequence, the watershed delivered about 2.8 tons/acre of sediment to streams annually (Anderson 1980 included small, direct tributaries of the Mississippi River from the North River south to Bob's Creek in St. Charles County in these basin specific estimates). Streambank erosion contributed about 3% of the sediment to streams annually. The Natural Resource Conservation Service estimated streambank erosion rates at four sites in North River between 1980 and 1990 (R. Cheshire, NRCS, personal communication). During this ten year period, erosion rates ranged from approximately 25,000 tons/year to 49,000 tons/year. Duchrow (1974) attributed low bottom-dwelling invertebrate diversity and the low density of pollution tolerant species in the North River to sediment pollution.

Agricultural run-off, which includes fertilizer, pesticides, herbicides, and animal waste also poses a significant threat to water quality in the basin. These pollutants may lead to low levels of dissolved oxygen, elevated levels of ammonia, and excessive plant growth. Agricultural chemicals may cause low level contamination of public and private drinking water wells. Occasional exceedence of drinking water standards for the herbicides atrazine and alachlor have been reported from wells in central and northern Missouri (MDNR unpublished).

Table 5. Potential point source pollution sources in the North River basin. (Source: Missouri Department of Natural Resources)

Type	Location	Receiving Stream
Hunnewell WWTF	12 56n 9w	Browne Branch
Monroe City WWTF	13 56n 8w	Sharpsburg Branch
Novelty WWTF	11 60n 12w	North River
Palmyra WWTF	13 58n 6w	North River
Potential Stormwater Sources:		
Limestone	3 58n 10w	North River

WWTF = Waste Water Treatment Facility

Table 6. Registered animal feeding operations in the North River basin. (Source: Missouri Department of Natural Resources)

Type	Location	Number of Animal Units	Receiving Stream
Swine nursery	36 59n 10w	200	North River trib.
Swine finishing	33 58n 9w	2,880	North River trib.
Swine farrowing	11 60n 11w	20	North River
Swine finishing	29 57n 7w	500	South Fork trib.
Swine farrowing	29 57n 7w	1,192	Sees Creek
Swine finishing	7 58n 7w	1,920	Jones Branch
Swine finishing	21 58n 8w	3,840	Hawkins Branch