HABITAT CONDITIONS

Channel Alterations

The mouth of Crooked River was moved through channelization and levying in 1969 by the U. S. Army Corps of Engineers (USCOE) and resulted in a loss of six miles of river channel (MDC files). The Crooked River was channelized for 3 miles (starting about 1/4 mile north of the road crossing in T51N, R26W, Sec 6) and the original river channel became an isolated cutoff as a result of the modification by the USCOE (MDC 1978). The old channel mouth was plugged with a 60 inch pipe and a two way valve was installed to allow fish passage at normal water levels by the Henrietta Crooked River Drainage and Levee District (HCRDLD) in 1971-1972. This was to reduce problems with the Missouri River backing water up in the cutoff section during high water periods. Recurring problems with the HCRDLD pumping water in the cutoff below the agreed level (672.5' MSL) was documented through 1990 (MDC Ray County environmental files). In a May 1992 MDC memo (H. Kerns, NW Regional fisheries supervisor) it was noted that even with a gauge reading of 672.5' MSL the old Crooked River cutoff channel from the county road bridge to the Missouri River was just a "few isolated pockets of water" and the area appeared to have been "pumped dry". It was also mentioned that an extra two feet or even more of water in the channel would greatly benefit the fishery without affecting the surrounding row crop land. The status of this long running problem at the current time (1998) is unresolved. However, the old channel cutoff remains an important wetland and fishery resource in the Crooked River basin.

Channelization of several tributaries to the lower Crooked River was noted as of February 1978. A 4 mile reach below the road crossing at T51N, R27W, Sec 3 and a 9 mile reach of tributaries starting in T51N, R27W, Sec 10 were channelized (MDC 1978). These are located in the Missouri River floodplain, east of the town of Henrietta, Missouri. With only 14% of basin stream mileage modified by channelization (Table 4) the Crooked River basin is one of the least disturbed stream systems in Northwest Missouri. Areas of stream modification were located using orthophoto quadrangle and topographic maps and areas in the Crooked River basin that are noticeably affected by channelization are shown in Figure 6. Most of these areas are downcutting at the present time. In the upper third of the basin bedrock and gravel have limited the effects of headcutting caused by channelization. In the downstream reaches the effects from channelization are more pronounced with very steep incised channels. It appears that widening of the incised channels may be starting to occur as trees and woody debris are more frequently encountered in the area between Crooked River Conservation Area and Morton Bridge Access.

Unique Habitat

The Crooked River basin is near the transition area between the glaciated plains and the Osage plains and has a unique mix of habitats as a result. The Crooked River has more rocky substrate and is less altered than most of the streams in northwestern Missouri making it a unique resource. It is also very close to a large urban population (Kansas City) making its value as an aquatic resource even higher. The area on the Missouri River floodplain around the mouth of the Crooked River is where the wetlands in the basin are found. Wetland acreage has increased in the Crooked River basin since the mid 1950's. The increases were in shallow and deep marshes (USDA-SCS 1982). A large scour hole (approximately 40 acres in size) in the channelized lower Crooked River is frequently fished by local anglers and has the potential to be an excellent fishery resource. Some unique habitats identified in a natural features inventory (Gremaud 1987) as significant were a dry mesic prairie and a mesic forest. Notable habitats were a

dolomite savanna and a moist limestone bluff. Also notable, was a section of unchannelized prairie river (Crooked River from T54N, R29W, Sec 14 to T53N, R28W, Sec 28) in an agricultural watershed.

Improvement Projects

A streambank stabilization project installed June through September 1988, on the Crooked River CA, is the only improvement project documented in the Crooked River basin. It consists of a rock barb, a tree revetment and willow stake planting to protect a county road. A large logjam was removed with dynamite prior to project construction. Most of the problem area was stabilized, but a small area at the downstream end of the project was creating a scoured bank. Further work and assessment was recommended in 1993 by MDC.

Stream Habitat Assessment

The Crooked River basin streams vary widely in the quality and variety of habitat found in and along them. Some reaches feature clear water, rocky substrates, and are Ozarkian in nature while others are muddy drainage channels with substrates of clay, silt, and detritus. Large woody debris (log jams, rootwads, laydowns, etc.) can be found in streams throughout the basin. Areas of unconsolidated bottom sediments (sand and silt) can be found basin-wide but are less frequently encountered in the upper third of the watershed. Most basin streams have wooded corridors although they vary considerably in width and density. However, there are areas in the basin where agricultural fields are extended to the edge of streams and the wooded corridor has been eliminated.

Stream channels in the lower Crooked River basin are deeply incised due to downcutting caused by channelization. Channelization increases the velocity of a stream which in turn increases erosion of the streambed and stream banks. Additional effects of channelization on basin streams are increased erosion, increased sediment bedload, steepened banks, and increased instream woody debris. The upper reaches of the basin where the streambed is predominantly bedrock, show less effect from downcutting and erosion than the lower reaches in the basin. Stream bed and bank modification was apparent at several bridges in the basin. From visual observation, agricultural activities in the upper part of the basin appear to consist primarily of pasture grazing and hay operations with row crops predominant in lower areas of the basin. This may be a reason for improved water clarity as you move progressively higher in the basin.

Crooked River basin streams are degraded but with a little help (improved agricultural practices, increased forested corridor width, and no additional stream alteration) can probably be rejuvenated. The Crooked River basin is one of the last stream systems in Northwest Missouri where this may be possible.

Table 4. Miles of channelization for streams fourth order and larger in the Crooked River basin.

Order	Streams (number)	Streams Unaltered	Original Miles	Miles Unchannelized (% of orig.)	Miles Altered (% of orig.)	Current Miles	Miles Channelized (% of current)
6	1	0	78	66 (85)	12 (15)	71	5 (7)
5	1	0	35	32 (91)	3 (9)	33	1 (3)
4	14	4	130	112 (86)	18 (14)	123	11 (9)
4,5,6	16	4	243	210 (86)	33 (14)	227	17 (7)

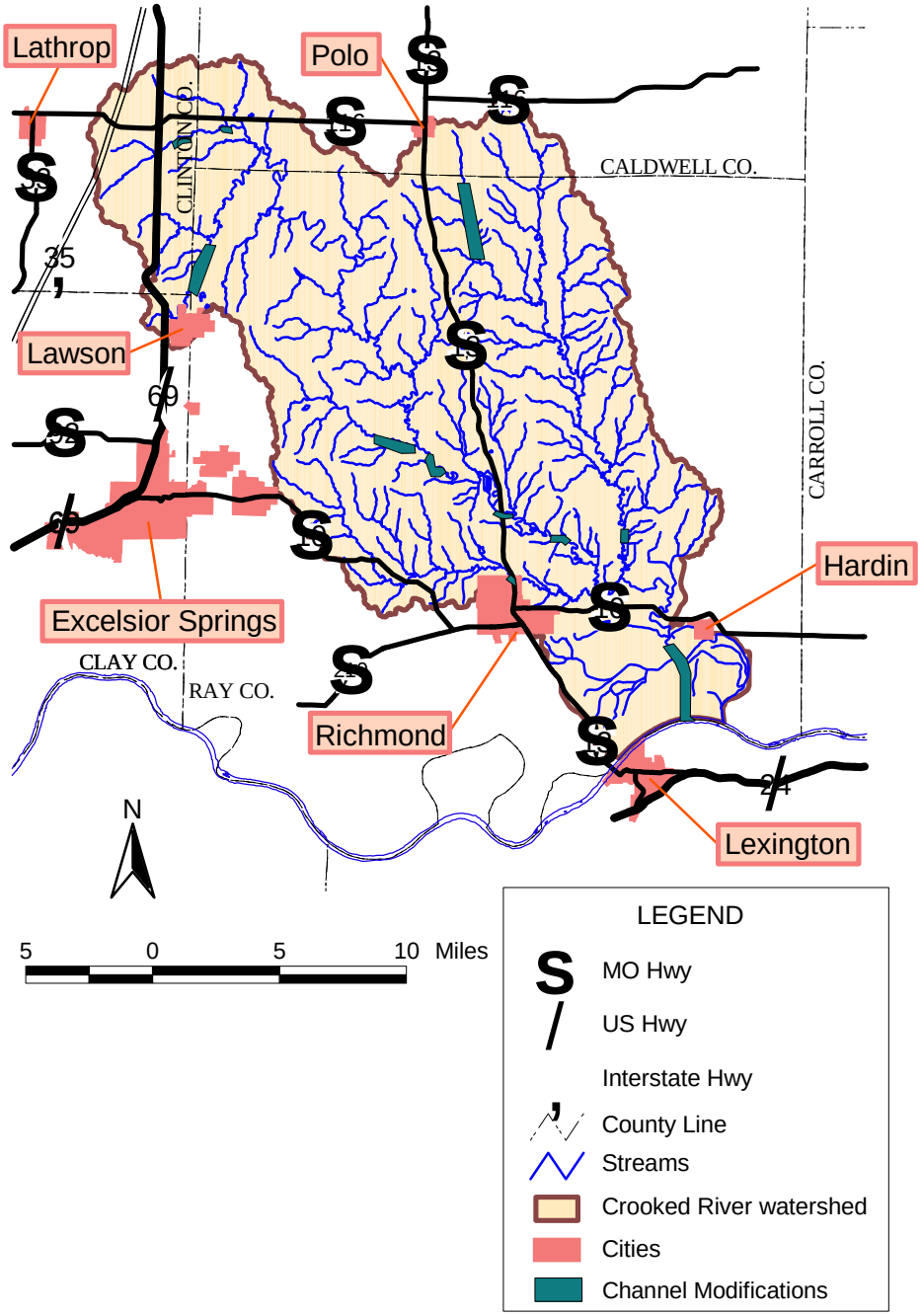

Figure 6. Areas in the Crooked River basin that are noticeably affected by channelization, located using orthophoto quadrangle and topographic maps.