GEOMORPHOLOGY

Physiographic Region/Geology/Soils

The North River basin lies in the eastern section of the Glaciated Plains Division of Missouri (Thom and Wilson 1980), also known as the Dissected Till Plains (Figure nd). The Till Plains were formed by glaciers that deposited drift composed mostly of clay with some rock, gravel, and sand lenses (MDNR unpublished). Glacial till in the basin, which is usually less than 200 feet thick, is overlain by less than four feet of silty or silty clay loess. Till is underlain primarily by a layer of Mississippian age limestones, sandstones, and shale about 200 feet thick (Figure ge).

The watershed lies within two Major Land Resource Areas. The lower half of the basin is located within the Central Mississippi Valley Wooded Slopes (Allgood and Persinger 1980). Most of this area has rolling, narrow ridgetops and moderately steep to steep ridge slopes and valley sides. The Hatton-Keswick-Lindley-Goss soils in this area are gently sloping to steep, moderately well drained to well drained, loamy to clayey upland soils. With the exception of the cherty Goss soils, this soil association has slow subsoil permeability.

The upper half of the basin lies within the Central Claypan region. This region is nearly level to slightly rolling. Soils in this region are primarily Putnam-Mexico and Mexico-Leonard-Armstrong-Lindley associations formed in loess or glacial till. Putnam-Mexico soils are generally deep, nearly level to gently sloping soils with a silt loam surface overlying a silty clay subsoil of very low permeability. Mexico-Leonard-Armstrong-Lindley soils are deep, level to steep, well drained to poorly drained, loamy and clayey upland soils. Subsoil permeability is slow.

Stream Orders

Streams were identified on USGS 7.5 minute topographic maps and ordered according to Strahler (1957). There are 22 third-order and larger streams in the basin (Table 1). The main stem North River, a sixth-order stream, is the longest and largest. The South Fork of North River is a fifth-order stream while all other streams in the basin are fourth order or smaller.

Watershed Area

The North River watershed drains 381square miles (243,857 acres) of land. The basin is about 55 miles long and as much as 14 miles wide. The South Fork sub-basin composes about 28% of the North River watershed (106 square miles).

Channel Gradient

Channel gradients for all third-order and larger streams were determined using USGS 7.5 minute topographic maps and digitizing software (Table 1). The overall gradient for each stream is based on the

change in elevation from the stream's uppermost point to its mouth. Gradients were also calculated separately for each order within an individual stream.

The overall gradient for the North River is relatively low (5.1 feet/mile). South Fork, which flows through a region of high relief, has a much higher channel gradient (12.9 feet/mile) than any portion of the main stem North River. Gradients of smaller, third-order streams in the basin are relatively low when compared to similar sized streams in neighboring watersheds. The highest gradient for all third-order or larger streams in the basin is approximately 36 feet/mile for an unnamed tributary of South Fork.

Soil Conservation Projects

Under the authority of the Watershed Protection and Flood Prevention Act, P.L. 83-566, initial planning for a soil conservation project covering the entire basin has been conducted and an application submitted in December 1971 (Table 2). Currently, the watershed is in the planning process. There are also three SALT (Special Area Land Treatment) projects in the basin totaling 19,465 acres.

Public Areas

There area three Conservation Areas totaling 2,079 acres within the North River basin (Table 3; Figure 5-7). Callaghan Mound Access provides 1.9 miles of stream frontage along North River, although there is no boat ramp. One-half mile of South Fork North River flows through Elmslie Conservation Area. Hunnewell Conservation area includes the Missouri Department of Conservation's Hunnewell Fish Hatchery and a 228-acre public fishing lake. Private boats are currently not allowed on the lake to protect the hatchery's water supply, but boats are available for rental. Hunnewell Lake also has a barrier-free fishing dock available for disabled anglers.

In addition the University of Missouri operates the Greenley Farm in the headwaters of North River near Novelty, Missouri. There is approximately one mile of stream on the farm. The City of Palmyra's Wells Park also has frontage on lower North River. A boat access will be constructed in the park in 2003 or 2004.

Corps of Engineers Jurisdiction

The North River basin is under the jurisdiction of the Rock Island District of the Army Corps of Engineers. Applications for 404 permits should be sent to: Clock Tower Building, P.O. Box 2004, Rock Island, IL 61204-2004, (309) 794-5351.

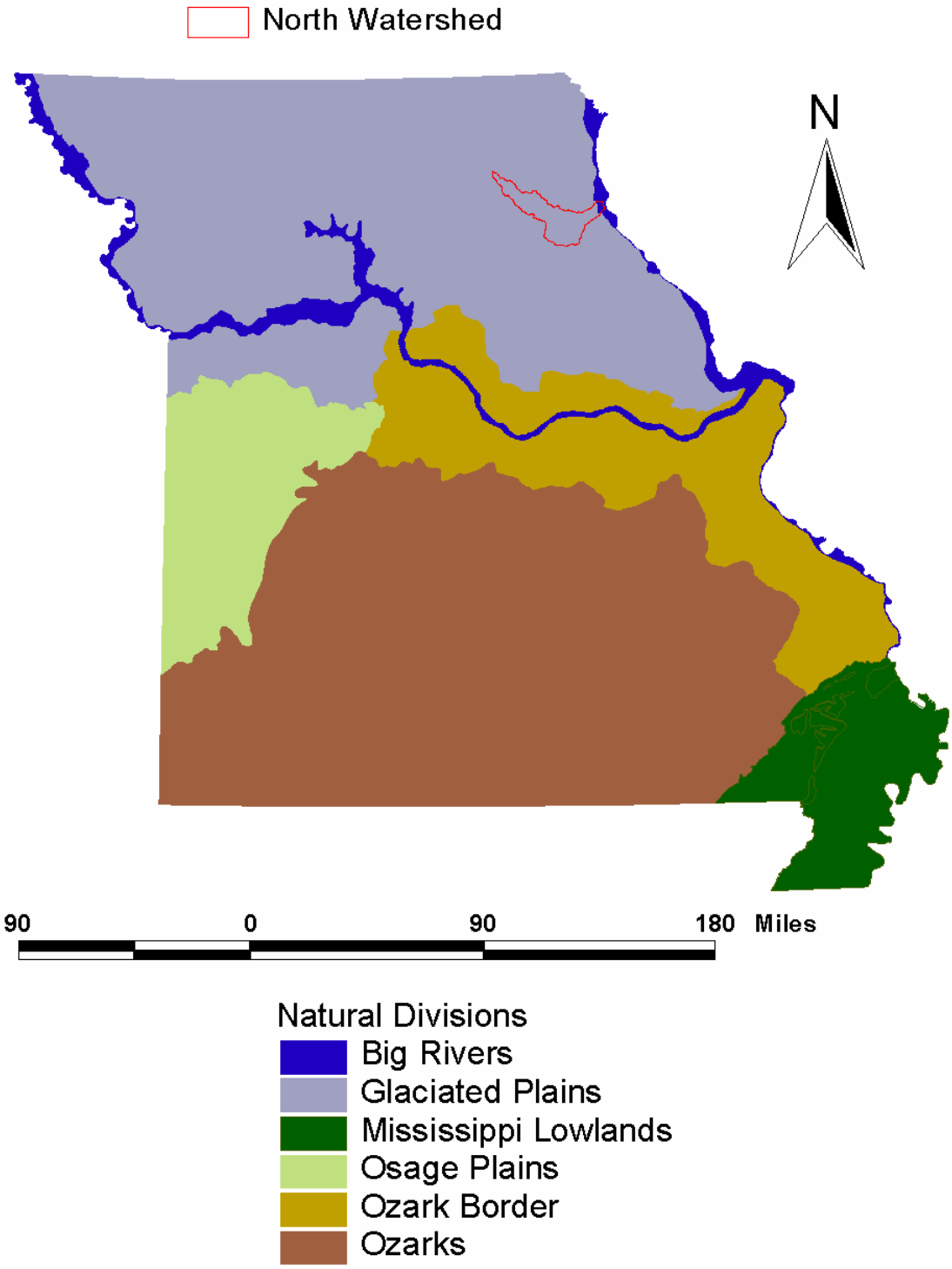

Figure nd. Natural divisions of the North River Watershed, in Missouri.

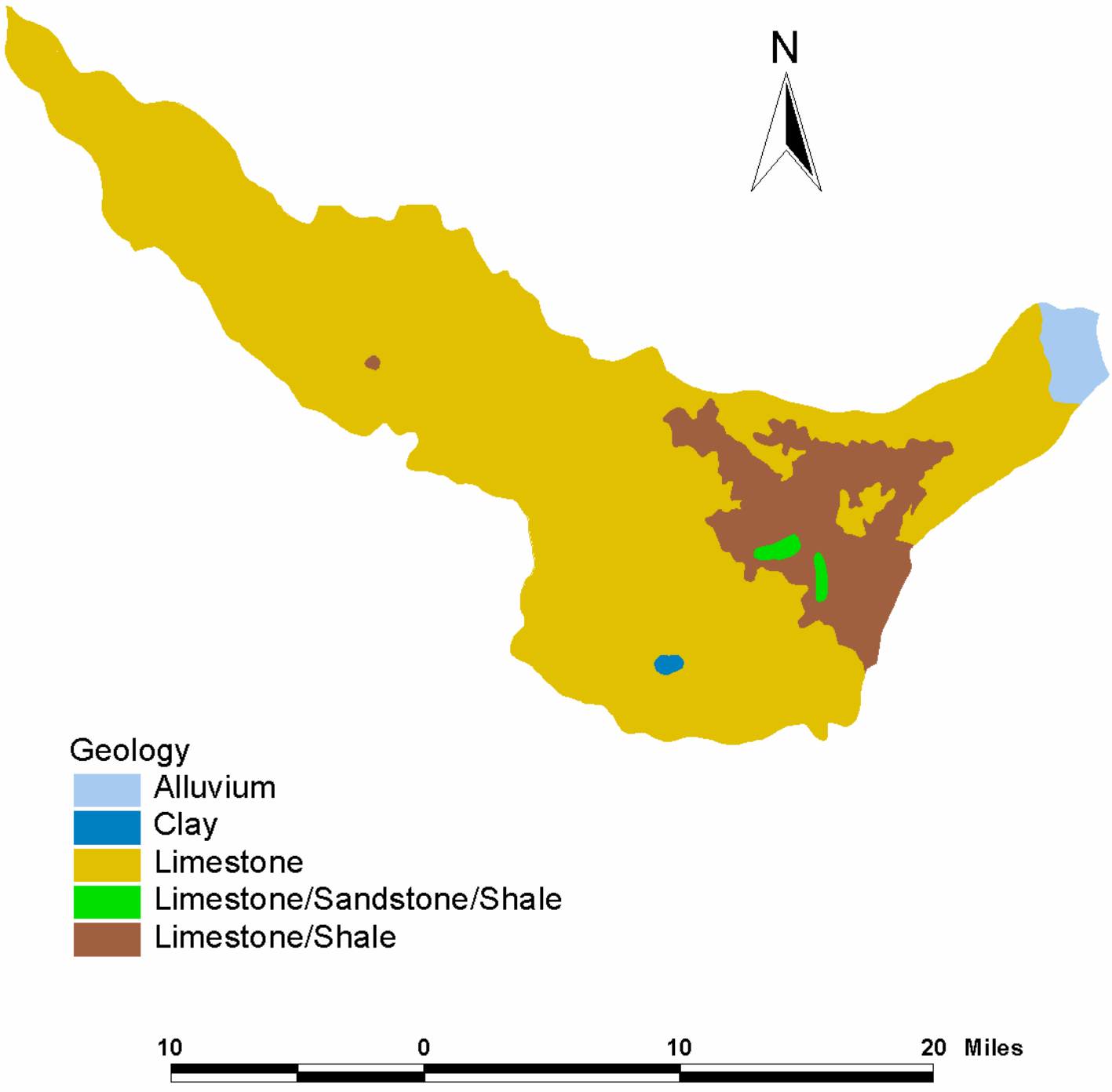

Figure ge. Geological formations of the North River Watershed, in Missouri.

Table 1. Location, mileage, and habitat information for all third-order and larger streams in the North River basin. Location=section, township, range at mouth of the stream. nm=not measurable.

Stream Location	S - T - R	Order	Length Miles	Overall-By order
North River	3 58n 5w	6	78.2	5.1-^{6}2.6, ^{5}5.4, ^{4}3.9, ^{3}6.4
South Fork	34 58n 7w	5	18.3	12.9-^{5}5.8, ^{4}10.9, ^{3}11.9
Tiger Fork	2 58n 9w	4	17.9	9.8-^{4}6.9, ^{3}9.5
Weldons Br.	10 58n 9w	3	6.5	24.6-^{3}14.8
Clear Creek	7 58n 9w	3	4.1	27.0-^{3}18.1
Mesner Br.	3 58n 10w	4	11.0	11.8-^{4}nm, ^{3}9.8
Garnett Br.	12 59n 11w	3	10.8	10.2-^{3}7.5
Lost Br.	28 60n 11w	3	8.9	11.8-^{3}7.3
Lick Creek	29 58n 6w	3	8.6	23.7-^{3}9.4
Sees Creek	10 57n 7w	4	2.3	15.0-all 4th order
West Br.	22 57n 7w	4	6.3	28.8-^{4}20.1, ^{3}28.6
Cedar Creek	7 57n 7w	3	6.4	28.9-^{3}28.1
Pee Dee Cr.	15 57n 8w	3	8.5	21.9-^{3}23.4
Sharpsburg Br.	21 57n 8w	4	11.3	14.1-^{4}11.4, ^{3}16.9
Sherry Br.	19 57n 8w	3	4.0	33.5-^{3}23.3
Browne Br.	36 57n 9w	3	3.9	26.9-^{3}30.9
Hawkins Br.	23 58n 8w	3	8.4	23.3-^{3}26.7
Unnamed	15 58n 8w	3	2.7	35.9-^{3}24.5
Merrills Br.	17 58n 8w	3	5.9	28.6-^{3}17.5
Unnamed	3 58n 10w	3	3.0	30.0-^{3}24.4
Middle Br Sees Creek	27 57n 7w	3	5.6	27.7-^{3}29.8
Unnamed	2 56n 8w	3	4.9	23.5-^{3}19.9

Table 2. Soil conservation projects in the North River basin.

County	PL-566	SALT	EARTH
Knox, Marion, Ralls, Shelby, Monroe		North River* Basin (242,500 A)	
Marion		Lick Creek (6,500 A)	
Marion		Hawkins Branch (6,790 A)	
Marion		Big Branch (6,175 A)	

*waiting priority

Table 3. Publicly owned Conservation Areas (CA) and stream accesses (AC) located in the North River basin.

Area Name	Mile of Stream Frontage	Acres	Development[1]
Elmslie CA	0.5	238	P,PC,H,F
Callaghan Mound AC	1.9	127	P,PC,H,F
Greenly Farm	1.0	700	P, R
Hunnewell CA	0.3	1,714	P,BRL,R,PC,F,H
Palmyra Park AC	0.45	200	P, R, F

1-P=parking lot, BRL=lake boat ramp, R=restroom, PC=primitive camping, F=fishing, H=hunting