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in Southwestern Minnesota

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A Brief Agrarian History of the Cottonwood River Watershed in Southwestern Minnesota¹

Daniel R. Petrolia²

The Cottonwood River Watershed is located in southwestern Minnesota, draining 1,310 square miles of land within the Minnesota River Basin. The watershed is comprised of parts of Brown, Cottonwood, Lyon, Murray, and Redwood Counties (see Figure 1).³ Prior to European settlement, this area was inhabited by the Sioux. The treaty signed at Traverse des Sioux in July, 1851, ceded to the United States all Sioux land, save a ten-mile-wide strip running along both sides of the Minnesota River from Lake Traverse to New Ulm. This land, too, became property of the United States following the 1862 U.S.-Dakota War. Fritsche reported that prior to the year 1853, when the first settler arrived, there were no white men in what is now Brown County. From that year onward, settlement took hold, with pioneers coming primarily from Germany, Austria, Norway, Denmark, and Sweden.⁴ Belgians would also make a strong claim in the area around what is now Lyon County (Amato). In 1855, Brown County was created by act of Territorial Legislature, and in 1857, the county was redrawn, and eight new counties, including Cottonwood and Murray, were formed from it. In 1862, it was again redrawn, and from it Redwood County emerged. From this new county would later emerge four more counties, including Lyon (Fritsche).

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³ The Cottonwood River Watershed covers 840,173 acres, with 35.6% of the watershed being in Redwood County, 20.5% in Brown, 18.6% in Cottonwood, 17.8% in Lyon, and 7.6% in Murray County (SWAC).

⁴ Cottonwood County was surveyed in 1858-59, and one of the Germans found by the surveyors was Charles Zierke, known as “Dutch Charlie”, after whom a creek in the watershed would be named. He is, by some accounts, the first white man to settle in the limits of the county.

The watershed abounds with streams and lakes. The Cottonwood River, along with 12 major creeks and a host of smaller streams give the watershed a total of 1,932 stream miles. The Cottonwood River originates in the *Coteau des Prairies* (prairie highland) in the west, a morainal plateau and important drainage divide, and runs the length of the watershed, emptying into the Minnesota River at the city of New Ulm. It flows approximately 150 miles, and drops 784 feet in elevation from its headwaters to its mouth (MPCA). April flow at New Ulm averages 1,075 cubic feet per second (cfs), and 190 cfs during August (USGS).⁵ There are 39 lakes, covering 4,757 acres, and 25,967 acres listed on the National Wetland Inventory (MRBDC). For agriculture in this part of the country, the concern is usually about an overabundance of water, rather than too little. Webb and Swedberg wrote that “[g]round water was seldom a problem in Redwood County, with only isolated spots needing considerable probing before water could be found. In fact, many more millions of dollars were spent in draining off ground water than in drilling to locate it” (p.243).

As the preceding quotation indicates, water bodies in the region have experienced some substantial changes over the past century. Webb and Swedberg note that within Redwood County alone, Belview Lake, Goose Lake, Horseshoe Lake, Nettiewynnt Lake, Ramsey Lake, Snyder Lake, Swan Lake, and the three lakes in Three Lakes Township were drained by ditches. Brown wrote that in Cottonwood county, "Mountain Lake, two miles long and from a half mile to one mile wide, two miles southeast from the depot and

⁵ For comparison, the Minnesota River at Jordan, MN averages 12,800 and 3,296 cfs during April and August, respectively. The Mississippi River at Baton Rouge, LA averages 781,300 and 278,700 cfs for April and August, respectively. The Mississippi carried roughly 2,345,000 cfs during the great flood of 1927 (USGS).

town of this name, has long since been drained and farmed" (p. 60). Also, the land of Highwater Township, whose name is taken from the nearby creek so-called early on for its quick rising after a rain storm, was described by Brown as "a beautiful, undulating prairie country, with frequent small prairie creeks, some of which, with the settlement of the country, have dried up" (p. 145).

From 1905, when the first ditch petition was approved in Cottonwood County, to 1962, about 160,000 acres (one-fourth of the land mass of the county) was affected by drainage ditches. In 1962, the county had 159 miles of open county ditches, 144 miles of open judicial ditches (which cross county lines), and 1,400 miles of tile (Webb and Swedberg). By 1987, the county had exactly as many miles of county ditches as it had county highways: 511. Additionally, there were 11,000 miles of county tile and a host of private open ditches and tile lines (Schneider). The largest ditch, by far, was Sleepy Eye Creek, authorized in 1960, that provided outlets or drainage for 259 square miles, and covered half the county.⁶ The main ditch extended 44 miles from beginning to end, and featured 49 miles of open ditch, including the main ditch, and 28 stub branches. A total of 70,538 running feet of loop in the original Sleepy Eye Creek bed was filled so that the land could be cultivated. More than 30 lateral ditches joined it, and some of the laterals had their own laterals. Another, County Ditch 102, was established in 1968, and involved 64,700 feet of open ditch and 69,300 feet of tile (Schneider).

⁶ This "creek" is, technically, Judicial Ditch 36 of Brown and Redwood Counties, and is a restructuring of an existing creek bearing the same name (Schneider). The original creek was named after Chief Sleepy Eyes, a native friendly to settlers who died in 1860 and is buried beneath a monument to him in the town bearing his name.

Other changes to the landscape are evident from early county histories. Fritsche wrote that although

all the original species of forest trees have persisted, they have deteriorated.

Hickories and poplars, eighteen to twenty-four inches in diameter and straight as a candle can no longer be found. Where is the oak and butternut that will split like glass, of which the pioneer made his shingles, rails and posts? The forest primeval is a thing of the past. (p.104)

With these changes in landscape came changes in wildlife. Fritsche continued:

The elk, beaver, buffalo, deer, and the northern rabbit have vanished in the order named. Replacing them are the rat, cotton tail, jack rabbit and grey squirrel. Countless flocks of geese and ducks covered the lakes and streams or darkened the sky as they flew from place to place. Such immense number of pigeons roosted in the forests that young trees bent or broke under their weight. There was no scarcity of fur-bearing animals, such as mink, otter, and muskrats. (p. 103)

Soils within the watershed are predominately loamy, with landscapes having a complex mixture of well- and poorly-drained soils. The poorly-drained soils are highly productive, however, due to extensive tiling and ditches (SWAC). The majority of the watershed belongs to one of three agro-ecoregions: Dryer Blue Earth Till (44.5 percent), found mostly on the north side of the Cottonwood River and west of the town of Sleepy Eye; Coteau (38.7 percent), found in the southern half of the watershed; and Wetter Blue Earth Till (12.8 percent), found in the easternmost tip of the watershed, where the

Cottonwood meets the Minnesota (Mulla and Mallawatantri). Further evidence of changes to the landscape can be found in the soil itself. Amato wrote that “topsoil was estimated to have been twenty-four to thirty inches deep when the settlers came and began to plow the land and drain the marshes, sloughs, and the small lakes that covered this area and supported an incredibly rich eco-system” (p.1). Today, after a century of cultivation, compaction, and erosion, topsoil depth is about 12 inches (Amato).

Although corn was introduced to the area by settlers shortly after the Civil War, it was a low-yielding flint variety, and besides feed for livestock, was considered to have little value, as it was believed that Minnesota was too far north to produce corn. Brown states that in "1880 the growth of Indian corn in this county was looked upon by the farmer and landowner as among the doubtful problems, and not considered at all practical" (p.203). Cottonwood and Redwood counties planted a combined 8,600 acres to corn that year (Brown; Webb and Swedberg). Brown reports that for early settlers in the region, it was wheat, oats, and flax almost exclusively, although Anderson reports somewhat more diverse figures for Redwood County in 1869: 342 acres of wheat, 167 acres of corn, 98 acres of oats, 45 acres of potatoes, 13 acres of wild buckwheat, 6 acres of barley, and 5 acres of beans.⁷

Agriculture would suffer a devastating blow during the years 1873-1878, when grasshoppers descended upon southern Minnesota and northwest Iowa. A minister, Dr. Peterson, summed up those years as follows:

⁷ Interestingly, Brown writes that an 1895 agricultural report listed 60 acres planted to sugarcane in Cottonwood County.

I had frequently read from Exodus, tenth chapter, the following: ‘When it was morning the east wind brought the locusts, and the locusts went up over all the land of Egypt and rested in all the coasts of Egypt. Very grievous were they; for they covered the face of the earth so that the land was darkened; and they did eat every herb of the land, and all the fruit of the trees which the hail had left; and there remained not any green thing in the trees or in the herbs of the field.’ But I never expected to see anything like it myself. Those who were in southwestern Minnesota during the grasshopper years find no difficulty in believing the story of Moses. Their invasion of Egypt was but for a season, but with us they remained five years. (Brown, p. 323)

Although exact figures on damage done by the grasshoppers are difficult to find, in July of 1874, the Cottonwood County auditor reported the following percentages of grain destroyed: seventy-five to one-hundred percent of wheat, fifty-five to one-hundred percent of oats, twenty-five to seventy-five percent of corn, and sixty to one-hundred percent of flax. As a result, the state legislature appropriated \$25,000 in a seed wheat bill for destitute settlers, and in May of 1874, a grasshopper convention was held in Windom (Brown). Other pest invasions would include another grasshopper event in 1941, greenbugs in 1953 and 1957, and armyworms in 1955 and 1959 (Anderson).

Interest in corn grew after 1900, when farmers began turning away from wheat, and when an influx of farmers from Illinois and Iowa moved in, determined to prove that Minnesota was not too far north for corn. Corn production would expand even more during the late 1920s and early 1930s, when University of Minnesota hybrid varieties

were introduced. These varieties' resistance to major diseases would give corn production a distinct advantage over that of wheat. In 1900, there were 164,500 acres devoted to wheat in Redwood County, and only 33,400 acres of corn. By 1921, however, 527,372 acres of corn were harvested in the five-county-area, and only 78,585 acres of wheat. By 1960, there were 861,300 corn acres and under 33,000 wheat acres (USDA).

Acreage devoted to oats took second place perennially, trailing wheat during the early years, then corn, until the introduction of soybeans would displace it permanently. Oat production stood at 495,594 acres for the five counties in 1921. That number would be cut in half by 1960, and halved again by 1970. By 1980, oats stood at 88,600 acres (USDA). Webb and Swedberg noted that early farmers planted flax as the first crop on newly broken prairie soil. Wilt disease would dampen flax production, however, as farmers came to believe that it should not be sown in the same field more than once in seven years. Flax production for 1921 was 27,568 acres across the five counties, and would reach its production peak in 1940 when linseed oil, a derivative of flax, was in high demand: 260,000 acres. Barley and rye were grown during the early part of the century, with 50,053 and 46,944 acres harvested in 1921, respectively. Barley would grow in popularity, peaking in the 1940s, while rye acreage would steadily decline. By the 1970s, barley acreage was below 2,000 and rye had disappeared. Hay was popular at the turn of the century, both for its feed value, and as a rotation crop. In 1921, there were 242,795 acres of hay harvested, but its popularity would decline each decade, and by 1990, only 75,900 acres would be harvested. Potatoes were grown in small quantities up through the 1950s, then disappeared thereafter (USDA).

Soybeans were practically unknown until 1937. Soybean acres began appearing in county reports by the 1940s (Lyon County reported 500 acres in 1940), yet in a 1942 Lyon County annual report it was said that "acreage has decreased. Farming here does not lend itself to soybeans" (Anderson, p.207). When first introduced, they were used primarily for silage and hog pastures (Anderson). Nevertheless, soybean acreage continued to grow, especially after the introduction of new varieties in 1947. By 1950, the five counties were planting 137,700 acres of beans, and by 1960, soybeans had caught up with oats. Soybeans could be easily assimilated into the region because it planted and cultivated like corn and could be combined like grain. By 1970, 487,100 acres were planted, and soybeans were the number two crop in the region.

Long before soybeans, however, farmers in the region came to recognize the value of conservation and the need to replenish the soil. Anderson states that legumes "were becoming common in the early 1900's for building soil, and a lot of the work accomplished through township leaders" (p.204). A public campaign in Lyon County resulted in over 90,000 pounds of sweet clover being used in 1923 and 45,000 pounds of grim alfalfa between 1924 and 1925, covering about 12,000 acres. In 1962, the Redwood County conservation district recommended implementation of 57,000 acres under contouring, 2,200 miles of terracing, 10,318 acres in stripcropping, 874 erosion-control structures, 75 miles of wind breaks, and 800 ponds (Webb and Swedberg). Brown wrote of "health groves" of soft maple, cottonwood, willow, ash, box elder, and elm planted by settlers that served as windbreaks. In 1968, over 84,000 trees were planted in Lyon County as windbreaks (Anderson).

By the 1920s, though, use of commercial fertilizer was common (Anderson). Webb and Swedberg wrote in 1964 that “Redwood county soil still was considered fertile after a century of cultivation, but in 1959, 56 percent of county farms were doctored with fertilizer” (p.242). In 1959, nitrogen fertilizer needs for corn per acre were generally between eighty and one-hundred pounds, with less necessary when corn followed alfalfa (Webb and Swedberg). Reliance on fertilizer would grow continuously, and today, average nitrogen use in the watershed averages between one-hundred fifty and one-hundred seventy-five pounds per acre.

Prior to the tractor, this area abounded with livestock. Early settlers relied on oxen, as horses were found to be too weak to pull the breaking plow through the sod, and could not be depended upon to survive the harsh winters. There sometimes arose difficulties with the oxen, however, as Gilbert McDougal reported that his father, John, had "bought a pair of oxen from Ole Flore. But the oxen were accustomed to a Norwegian accent and wouldn't obey McDougal's orders given in a broad Scottish burr" (Webb and Swedberg, p.250).

As settlers became more settled, and as more corn was planted, livestock numbers would rise, and horses would begin to replace oxen. Fritsche wrote in 1919:

[F]ew counties in the state now boast of finer stock than Brown County. This applies to horses, cattle, swine and other stock. The recent horse shippers declare that no place in Minnesota affords them the pleasure and profit in purchasing horses that is found in this county. The draft horse type is among the best in the United States. (p.361)

The horse population in Redwood County would peak in 1920 at 17,986, and would steadily decline thereafter, such that by 1960, the number of horses in the county was 1,063 (Webb and Swedberg). This part of the state was also a major producer of dairy products around the turn of the century. In 1895, there were 6 creameries in Cottonwood County, and by 1913, there were 7, producing 671,317 pounds of butter. At the 1893 World's Fair in Chicago, a Windom man took the gold medal for butter from a dairy plant (Brown).

In addition to horses and oxen, settlers raised cattle, sheep, and hogs. The 1868 Redwood County rolls showed 101 horses, 297 head of cattle, 277 sheep, and 67 swine (Brown, 1916). In 1930, there were 93,100 milk cows and 420,000 hogs in the region. Dairy cow numbers would fall dramatically, and by 2001, there were fewer than 20,000. Beef cattle production would pick up in the 1960s, with 23,200 head for the five-county region, only to fall to 19,400 by 1990. Sheep would peak in 1960, at 55,600, only to fall thereafter (USDA). Changes in hog farming, however, would result in twice as many head as in 1930. In the early 1960s, a farm may have had between fifteen and twenty sows farrowing twice a year on pasture, whereas by the mid-1980s, it was common to have between one-hundred and one-hundred fifty farrowing continuously throughout the year in confinement (Schneider).

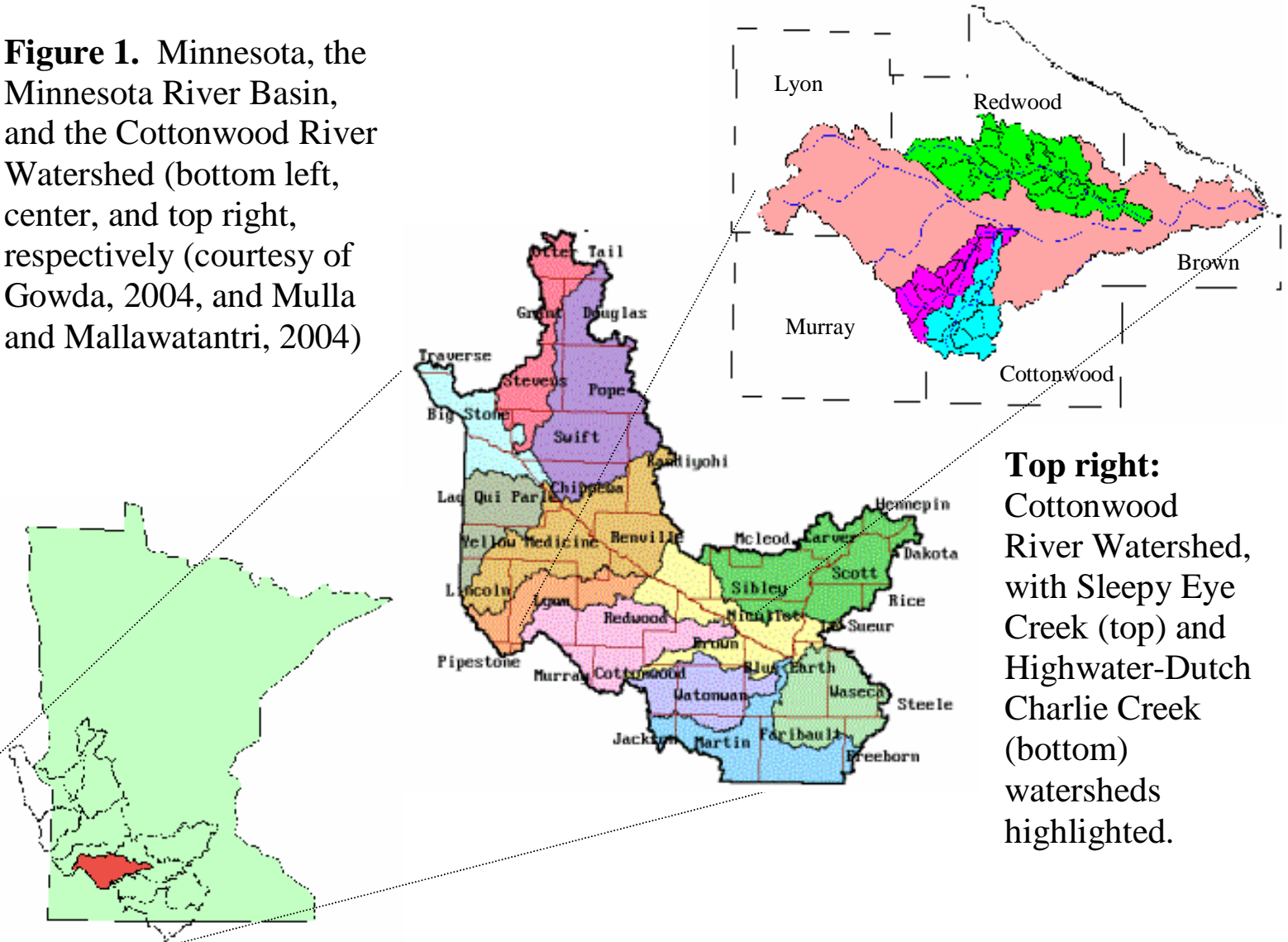
Today, the region is almost completely devoted to corn and soybeans, with 88 percent of the watershed being planted to those two crops. In 2001, the five counties that lie, in part, in the watershed planted a combined 891,100 acres to corn and 883,700 acres to soybeans. Hay was harvested on 56,500 acres. Only 8,600 acres were devoted to

wheat and 7,800, to oats. Sweet corn and green peas were grown on a limited basis in Brown and Redwood Counties, and 3,400 acres of sugar beets were planted in Redwood County. Flax, barley, rye, and potatoes have disappeared. For livestock, in 2001 there were 22,400 beef cattle, 17,600 milk cows, and 13,600 sheep scattered across the five-county area. Hog production has exploded, with 877,000 head being reported for that year (USDA). As of September 2003, there were 81,278 acres enrolled in the Conservation Reservation Program for the five-county area (about 3.5% of total area) (FSA).

In 1999, a report issued by the Redwood-Cottonwood Rivers Control Area identified the Sleepy Eye Creek and the Coteau streams of the Cottonwood River Watershed as contributing a significant amount of nitrogen load to the Cottonwood River, which in turn, contributes this load to the Minnesota River, then to the Mississippi, and finally, to the Gulf of Mexico (RCRCA). As this and other environmental issues come to the fore of the agricultural-policy debate, there will be added pressure for changes in agricultural practices toward more environmentally-benign farming methods.⁸ Consequently, this watershed may experience additional changes to the landscape in the years ahead.

⁸ For further reading on this issue, see Petrolia (2005).

Figure 1. Minnesota, the Minnesota River Basin, and the Cottonwood River Watershed (bottom left, center, and top right, respectively (courtesy of Gowda, 2004, and Mulla and Mallawatantri, 2004)



Top right: Cottonwood River Watershed, with Sleepy Eye Creek (top) and Highwater-Dutch Charlie Creek (bottom) watersheds highlighted.

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