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Brief History of Development Affecting Spring Creek Watershed

The character of Spring Creek watershed, which runs into the Cannon River on the north edge of Northfield, Minnesota, has been dramatically influenced by the amount of agricultural, recreational, and residential development that has taken place since white settlement began in the early 1850's. Although historical documents are rarely specific to Spring Creek, they do allow for a general picture of the early development in the area that would have affected Spring Creek.

Treaties that allowed control and relocation of the Indian tribes of southeastern Minnesota were signed in 1851. This cleared the way for the construction of roads that allowed white settlers to begin moving to the area. Those settlers that first came to Rice County found that they were living on or near the border between a forested landscape, called the "Big Woods", and the prairie. In fact, "The country contained almost equal parts of prairie and forested lands," (Larsen, 1931). These two environments were roughly divided by the Cannon River, with the forest extending from the Cannon to the west for at least 50 miles and the prairie running east from the Cannon. There was a small (2-5 mile-wide) belt of forested land bordering the Cannon to the east. Larsen described the landscape as follows, "On the southeastern side of the Cannon River, the land was characterized by a gently rolling surface, almost bare of trees except along the courses of the small streams." The trees were mostly oak and aspen in the eastern strip, and the Big Woods were more diverse.

Faribault was the first permanent settlement in the early 1850's in Rice County, but by 1854 there were several claims occupied in what would become Northfield. These early settlers claimed, "Our crops look well, beyond our expectation, but the best of all, is we have the finest and purest water in the US in abundance," (Larsen, 1931). They were settled along the Cannon River, with its many tributary streams, including Spring Creek. Early settlers were subsistence farmers, with additional income from logging, tapping maple trees, and gathering ginseng root from the forest.

The scale, and therefore the effects, of agriculture changed dramatically in the next 20 years. Small-scale agriculture gave way to surplus farming as the population grew from 20 families in 1856 to between 600-800 people in 1860. Primary crops were wheat, other grains, and dairy products. However, forests remained important in the local economy, and there were still far fewer acres under cultivation than those left unplanted. By 1868 the population was 1800 and there was still a variety of ecological zones. Frederick Frink, writing in 1868, said "This town[(Northfield)] presents inducements for the investment of capital in farming, its surface is beautifully diversified with prairies, groves, and running streams." By 1882 the population had reached 3000 and the forests were no longer mentioned. Instead it was said that "Northfield is surrounded by one of the finest agricultural districts in the state of Minnesota," (Neill, 1882). By 1977 91% of Rice County's total area was classified as farmland and three-fourths of the county's land was under cultivation (Land Use Suitability, 1972).

The increase in agriculture on the plains above and around Spring Creek have had a distinct effect on the hydrologic character of Spring Creek, and this has influenced the geomorphic changes linked to the stream. While I did not find data from Spring Creek

itself that documents this, there is an example from the Cannon River Wilderness Park. Tillman Farley and David Tolley, 1979 graduates of Carleton College, wrote their comps on the behavior of the tributary stream that flows through the valley into the Cannon River. This stream, although much smaller than Spring Creek, also has extensive agricultural development upslope from it along its entire length.

They found that the stream had a constant rate of incision that showed a dramatic increase at some point about 125-150 years ago. In fact, this new incision rate is more characteristic of streams in arid environments, rather than one in the humid Minnesota climate. A change in rate of erosion is caused by a change in precipitation or in vegetation. In this case, the precipitation rate remained relatively stable, while the amount and type of vegetation changed under cultivation. The sudden increased rate of incision corresponded temporally to the agricultural development of the higher elevations. The devegetation, plowing, and planting of the fields affected the surface infiltration capacity, porosity, and permeability, which caused increased sediment yield and runoff. These changes all affected the erosive behavior of the stream, resulting in the markedly faster rate of incision, beginning 125-150 years ago that Tolley and Farley observed (Tillman, Farley, 1979).

Increased rate of agricultural development is one possible cause of change of Spring Creek. According to the 1977 land use suitability survey, "Erosion, often aided by man's activities, is the most significant geologic force at work in Rice County." As demonstrated, the changes that are caused by erosion can be seen in changes in incision rates and channel development. Although an increased rate of erosion, due to agricultural development, is very important, there are other changes associated with humans that

directly affect Spring Creek. One of these is urban development. Changes as a result of urban development are often very direct, including physically altering the streambed. They may also include changes in the infiltration rates, permeability, and porosity of the areas being developed.

Steady population increases meant that more and more water was needed. Wells were often private and shallow, without documentation, however in 1882 there were at least three private wells that were noted. These wells were sunk to depths between 27 and 90 feet. It was not until 1894 that the city waterworks system was installed, using water from an artesian well that was sunk to 670 feet. By 1910, however, this same well was drawing water from 360 feet, (Curtiss, 1910). Today the city of Northfield gets its water from five wells that draw from the Prairie du Chien and the Jordan aquifers. The first and oldest well (1910) is temporarily not in use. Of the remaining four wells, two of them draw from both the Prairie du Chien and three of them draw exclusively from the Jordan. They are all between 365 and 400 feet deep. Northfield city water expects to close the shallowest wells in the future, as they show signs of contamination from surface pollutants, (Northfield City Water Department) *personal comm.*

Many of the most direct changes that have occurred along Spring Creek have been connected with the development of Carleton College. In 1857 the first land was donated by Northfield residents to start a school that would later be Carleton. This land included part of Spring Creek near the confluence with the Cannon River, (Headley, 1966). The first big alteration to the streambed occurred in 1898 when part of Spring Creek was dredged, creating a small lake on Carleton campus for purposes of recreation. This lake flooded in the spring and the stream returned to its old streambed until 1916,

when Lyman Lakes were established in their present location. The lakes are dredged periodically. In 1921 Bell Field was constructed (Leonard, 1904). To do this the stream was shifted to the north and remains there to this day. The College built several small dams on and upstream of the Lakes, which help to control spring flooding.

The character of Spring Creek upstream of Carleton College is also affected by urban development and landscaping. The stream bed is altered by the use of riprap, the devegetation of the banks, and the use of culverts to direct water under roads and trails. The golf course and upstream housing developments landscape and pave large areas of the watershed. The first nine holes of the golf course were constructed in the early 1920's. ^{This part of the golf course was} ~~These holes were~~ constructed on the east side of Prairie Street and the area affected included a section of Spring Creek (Northfield Golf Club) ^{plus. conn.}.

Spring Creek, eroding for thousands of years through glacial till and bedrock, has seen dramatic change in the last 150 years of its existence. In the early 1850s white settlers began making their mark on Rice County. Their desire for timber and clear farmland eventually resulted in the destruction of nearly all the forest and prairie that used to cover this area. The Spring Creek watershed was undoubtedly affected by the changing character of the vegetation as the percentage of land under cultivation increased steadily over a century and a half. The increasing amount of farmland is indicative of the increasing population in and around Northfield. Northfield's population increased from two or three families in 1854 to over approximately 15,000 people today. Spring Creek watershed has been subjected to changes from the construction of the golf course, Carleton projects, housing developments, and roads.

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