Appendix C:

Van Buren County
Natural Resource Papers

Geology

Soils

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Hydrologic System

Wetlands

Water Bodies
Southwest Michigan is located on the southwestern flank of the Michigan Basin. A bedrock feature centered on Gratiot County, this structural depression resembles a gigantic set of nested bowls. Everywhere in southwest Michigan bedrock units slope gently to the center of the Basin. The oldest bedrock units underlie the glacial deposits in Berrien and Cass Counties, and the rocks immediately underlying the glacial sediments are progressively younger towards the center of the basin. Berrien, Cass, St. Joseph, Branch and most of Van Buren, Ottawa, Muskegon, Kalamazoo and Calhoun Counties are underlain by shale. Eaton, Ionia, most of Kent and portions of Kalamazoo, Calhoun, Barry, Muskegon and Ottawa Counties are underlain by sandstone or sandstone and shale.

**The Michigan Basin**
Quaternary Geology Map – *Van Buren County*
Soils

The soil characteristics of Van Buren County reflect the strong glacial influence, which left behind both healthy and un-healthy, well-drained and poorly draining soils. However, the County has an abundance of soils well suited for agricultural production.

The State divides into two general regions, namely, (1) the southern half of the Lower Peninsula, which has the most farms, the largest amount of land in crops, the highest yields per acre, and the greatest volume and value of crops, animals, and animal products, and (2) the remainder of the state which has poorer agricultural conditions and much less volume and value of farm production.

This is an important fruit region of Michigan, the major fruits being apples, peaches, grapes and pears. Strawberries, raspberries, blueberries, asparagus, tomatoes, muskmelons and mint are important specialty crops. Dairying is the major livestock enterprise. Farmers in general have a wide choice in the selection of fruit and vegetables crops. Largely because of the lighter soils, yields of field crops usually are not high.

The major factors determining the selection of enterprises in this area are the climate, topography and nearby markets. Lake Michigan and the rolling to hilly land combine to make climatic conditions favorable to fruit production. The soils range from sands of low productivity to sandy loams and loams of relatively high productivity.
Hydric Soils Map – Van Buren County
Prime Agricultural Soils Map – *Van Buren County*
Topography

Topography in Van Buren County ranges from knobby ridges and basin-like depressions in the terminal moraine areas to gentle slopes and flat bottomland on the outwash and river flood plains. The hills of the Kalamazoo moraine rise 160 to 190 feet above the till plain and Paw Paw Lake. The internal relief on the moraine is 50 to 75 feet. The basins are 25 feet or more below the outwash level. The hills of the Valparaiso moraine rise as much as 150 feet above the surrounding areas. Relief on this moraine varies considerably across the County. The Lake Border moraine has little relief. The highest elevation in the County is about 1,060 feet above sea level in Antwerp Township, Section 35.

Moraines are landforms created directly by the wasting ice sheet. Often they are composed of glacial till—a sediment of mixed character, with many rocks and stones, laid down as the ice rapidly melts. End moraines are irregular ridges of glacial sediments that form at the margin or edge of the ice sheet. These landforms represent a stillstand of the ice, having formed as the ice margin remained in one position while internally the ice was bringing sediment forward and continuously depositing it at the margin. Each moraine forms an upland landscape, where the soils are usually drier. However, end moraines are often rolling and quite hilly, and for that reason many are forested today—the slopes are too steep for long-term cultivation.
Topography Map – Van Buren County
Hydrologic System

The Van Buren County hydrologic system contains multiple major watersheds. A watershed is a geographic area in which water, sediments, and dissolved materials drain from higher elevations to a common low-lying outlet or basin or point on a larger stream, lake, underlying aquifer, or estuary.

Most of Van Buren County is contained within three major watersheds: the Paw Paw River, which drains almost two-thirds of the County; the Dowagiac River, flowing southwesterly into Cass County; and the Black River, which drains the northwestern portion of the County near the City of South Haven. In addition, the Paw Paw River and the Dowagiac River Watersheds are part of the larger St. Joseph River Watershed.

Surface water features - lakes, streams, rivers, and ponds - are directly affected by land development. Soil erosion, impermeable surfaces (such as parking lots and roofs), soil contamination, and recreational activities can each affect surface water quality. Watershed degradation can occur through various sources. Non-point source pollution poses one of the greatest threats to surface water. Rather than occurring from one major source, like a sewage treatment plant or industrial use, non-point source pollution results from rainfall or snowmelt moving over and through the ground. As this runoff moves, it picks up and carries away natural and human-made pollutants. These are deposited into lakes, rivers, wetlands, ponds, and groundwater.
Hydrologic System – Van Buren County
Wetlands

Wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and fens (EPA definition).

Prairie fens are found in the former oak-savanna prairie region of southwest Michigan. They are very rich in calcium and magnesium. Typical plants found in prairie fens are switch grass, Indian grass, big bluestem, sedges, rushes, Indian plantain, and prairie drop seed. The wettest part of a prairie fen, which is usually found near the water source, is called a "sedge flat" because members of the sedge family dominate the vegetation. The "fen meadow" is the largest part and is more diverse with many lowland prairie grasses and wildflowers. Slightly elevated areas, especially around the upland edge, also support tamarack, dogwood, bog birch, and poison sumac.

Wetlands provide groundwater recharge, pollution control, wildlife habitat and other important functions, and together with other natural features, they contribute to our sense of rural character. Wetlands are among the most productive ecosystems in the world.

Wetlands also perform functions that include natural water quality improvement, flood protection, shoreline erosion control, opportunities for recreation and aesthetic appreciation, and natural products for use at no cost. Wetlands serve as a filter by intercepting surface-water runoff from higher dry land before the runoff reaches open water. As the runoff water passes through, wetlands retain excess nutrients and some pollutants, and reduce sediment that would clog waterways and affect fish and amphibian egg development. In addition to improving water quality through filtering, some wetlands maintain stream flow during dry periods.
and replenish groundwater, on which many Americans depend groundwater for drinking.

Wetlands offer flood protection by serving as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater, and floodwaters. This combined water storage and braking action lowers flood heights and reduces erosion. Wetlands within and downstream of urban areas are particularly valuable, as they work to counteract the greatly increased rate and volume of surface-water runoff from pavement and buildings. Preserving and restoring wetlands can help to provide the level of flood control otherwise provided by expensive dredge operations and levees.

According to the EPA, more than one-third of the United States' threatened and endangered species live only in wetlands, and nearly half use wetlands at some point in their lives. Many other animals and plants depend on wetlands for survival. In fact, an international agreement was developed to protect wetlands of international importance because some species of migratory birds are completely dependent on certain wetlands and would become extinct if those wetlands were destroyed.

At the present time, the EPA estimates that the lower 48 states contained an estimated 105.5 million acres of wetlands in 1997, compared to over 220 million acres present in the 1600’s. The years from the mid-1950s to the mid-1970s were a time of major wetland loss, and 22 states, including Michigan, lost over 50% of their wetlands before conservation efforts began in the 1980’s.

These losses, as well as degradation, have greatly diminished our nation's wetlands resources; as a result, we no longer have the benefits they provided. The increase in flood damages, drought damages, and the declining bird populations are, in part, the result of wetlands degradation and destruction. However, loss rates have declined due, in part, to implementation and enforcement of wetland protection
measures, as well as the elimination of some incentives for wetland drainage. Public education and outreach about the value and functions of wetlands, private land initiatives, coastal monitoring and protection programs, and wetland restoration and creation actions have also helped reduce overall wetland losses.
The water resources of Van Buren County include productive groundwater reservoirs and a network of streams, rivers and many inland lakes. Van Buren County has over 300 lakes and ponds ranging in size from less than .1 acre to up to 300 acres. In addition to this abundance of inland water, Van Buren County also possesses 13 miles of Lake Michigan shoreline.

The water bodies in the County contribute greatly to local economic development opportunities and have become a great attraction for residential development. In addition, Van Buren water bodies are an important source of recreation and tourism, where residents and visitors can relax on sandy beaches, fish, boat, and practice other water sports like skiing and tubing. Water resources are a valuable regional asset and are not tied to jurisdictional boundaries.