

Soil Survey Research of Johnson T. Janes Park

by
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The United States Department of Agriculture - Soil Conservation Service in cooperation with the West Virginia Agricultural Experimental Station has conducted extensive soil research which has been compiled in a survey entitled Soil Survey Wood and Wirt Counties, West Virginia and includes a vast array of material for planning of development considerations. Such research investigated soil properties as they affect agriculture, woodlands, wildlife, engineering projects, recreation and non-farm uses. The research entailed in this document examines this survey as it relates to the Johnson T. Janes Park. This information is discussed below.

General Information

Soils have been highly analyzed by soil scientists. To discuss them, soil scientists have a vernacular to describe, identify and classify soils. Though the purpose here is not to get into semantics, a detailed discussion of terms has been included for the layman.

When one wants to determine what the soil is like on their particular area, the aforementioned soil surveys are one of the best sources to consult. The first thing to do is to locate the area of interest on the aerial photographic maps enclosed within the survey. Once this area has been located, there will be a mesh of lines, much like a topographical map, which encloses all soils within a boundary. This is known as a two-lettered "soil mapping unit." This soil mapping unit is short for the soil name.

- Johnson T. Janes Park is predominately covered with soil mapping unit Ms which is short for Moshannon silt loam, low bottom, which is the name of the soil series.
- Other soils covering the park include
 - a.) Se (Senecaville silt loam): which covers the east central higher elevation portion of the park
 - b.) MoA (Moshannon silt loam, 0-3% slope): which covers the southeast corner of the park

The Moshannon silt loam covers the largest portion of the park. This soil runs the entire length of the Worthington Creek boundary on the western property line and eastward for most of the flat bottom land to the foot of the higher elevation land. Because this is the predominate soil series covering the park, the results of this research are for this soil mapping unit only. However, it is strongly suggested that if activities are to be done in either of the other areas within the park (the southeast corner or east central portion) that the pertinent information for the Senecaville silt loam (Se) and Moshannon silt loam be reviewed.

Keeping that in mind, each soil mapping unit is further described as a "capability unit."

- The capability unit for the Moshannon silt loam is Vw-1
- The V represents the "class" of the soil, which is a descriptor of the degree of

limitations for that particular class of soils.

- The w is the “subclass” of the soil, which is a descriptor of the kind of limitations for that particular subclass of soils.
- Class V soils are subject to little or no erosion but have other limitations, which are impractical to remove, that limit their use largely to pasture, woodland, or wildlife food or cover.
- Subclass w soils have water in or on them that interferes with plant growth or cultivation. However, in some soils, the wetness can be corrected by artificial drainage.
- In summary, capability unit Vw-1 soils are deep, moderately to well-drained and nearly level that occur on bottom lands along streams. The soils of this capability unit are usually from the Moshannon and Senecaville soil series. Part of the acreage of this capability unit of soils is flooded at least once annually, usually in the spring. However, the majority of the acreage is subject to flooding 2 years out of 3. Soils along streams near the Ohio River are of moderate to high fertility and easily worked. Because of flooding, soils aren’t suited to row crops, but grass and legume mixtures are suitable for hay and pasture. These too may be damaged by flooding. However, because flooding usually occurs in the spring, there is less risk of losing new seedlings if they are planted in August.

Woodlands

Major forest types in Wood County include

- oak - hickory
- maple-beech - birch
- Virginia pine - shortleaf pine - pitch pine

These constitute 87% of the wooded acreage and the remaining 13% is of other hardwood types. As such, the survey has examined the influence of soils on woodlands. The researchers developed another descriptor for the soil properties which affect woodlands. For each soil mapping unit (e.g., Ms) of each soil series (e.g., Moshannon) there is a “woodland suitability group” designation (a number from 1 to 7). Soils have been “grouped” according to characteristics that affect the growth of trees and management of the stand. Each “group” is based off the following:

- the trees generally preferred in the management of natural stands
- trees preferred for planting,
- limitations and hazards that affect management which include:
 - Plant Competition: the effect of invading plants on the stand of trees, is rated as
 - a.) *slight* if unwanted plants don’t prevent adequate regeneration or growth of trees.
 - b.) *moderate* if unwanted plants delay but don’t prevent establishment of well-stocked stands. Though planted seedlings may require some site preparation and release from unwanted plants.
 - c.) *severe* if unwanted plants prevent adequate natural or artificial regeneration. There will be a need for intensive site preparation and generally more than one release by chemical or mechanical weeding.

- Equipment Limitations: limitations on the use of certain types of equipment due to unfavorable soil characteristics and topographic features (e.g., internal drainage, texture, number and size of stones, may all prohibit the use of certain equipment). Limitations are rated as:
 - a.) *slight* if there are little to no restrictions on the kind of equipment or time of year it is used. If slope is the main limitation it is usually less than 15%.
 - b.) *moderate* if the time restriction on equipment use is less than 3 months (i.e., 3 months of the year in which equipment can't be used) or slope is in the range of 15% - 35%.
 - c.) *severe* if the time restriction on equipment use is greater than 3 months (i.e., equipment can't be used for more than 3 months out of the year), special equipment is required, large or numerous stones interfere with cultivation and/or harvest work, or if slope is greater than 35%.
- Erosion Hazard: the risk of gully erosion when woodland is managed or trees are harvested. This hazard is generally related to layout, construction, maintenance of roads and skid trails. Erosion hazards are rated as such:
 - a.) *slight* if no special practices are needed.
 - b.) *moderate* if some practices are necessary (e.g., water diversion from roads and skid trails).
 - c.) *severe* if intensive practices are needed. Extreme care must be taken in locating, laying out and constructing roads and skid trails in addition to diverting water during and after logging and in some places grasses must be seeded.
- Seedling Mortality: expected losses of naturally occurring or planted seedlings as a result of unfavorable soil characteristics but are not a result of plant competition. Seedling mortality limitations are rated as such:
 - a.) *slight* if less than 25% of seedlings are expected to die.
 - b.) *moderate* if 25% - 50% of seedlings are expected to die.
 - c.) *severe* if greater than 50% of seedlings are expected to die.
- a site index for specified trees
 - A "site index" is a productivity term which is expressed as average annual growth. (the height in feet a specified tree will grow on that particular "site" in 50 years).

Based on the aforementioned attributes, the Johnson T. Janes Park has been classified as "woodland suitability group 7". Woodland suitability group 7 soils have the following qualities:

- soil permeability is moderately low to moderate.
- available moisture capacity is high.
- some occasional to frequent flooding.
- most of the acreage in this classification has been cleared, although some stands of yellow poplar, sycamore and Virginia pine grow in frequently flooded areas.
- species for planting include; yellow poplar, black walnut, and white pine (Christmas trees should be Scotch pine, white pine, Norway spruce, but shouldn't

- be grown because of flooding damage).
- the site index for upland oaks is 75 - 84 and potential average annual growth is ~250 board feet/acre.
- the site index for yellow poplar is 85 - 100 and potential average annual growth is ~500 board feet/acre.
- Competition from annual weeds and grasses is *severe* (i.e., preparation and mowing is usually necessary).
- Equipment limitations is *severe* for the use of logging and hauling equipment in winter and early spring when water table is hi.
- Erosion hazards are *slight to severe* (*severe* in areas with flooding from higher slopes).
- Seedling mortality is *slight*.

Wildlife Habitat

The soils researchers for this study also examined soils for suitability as wildlife habitat. Because the expansion of industry has brought an increase in population there has been a resultant need to increase areas suitable for wildlife. Scientists have classified this information into 4 various “wildlife habitat areas” of similarity. Basis for these classifications involved;

- Kinds of wildlife;
 - open-land wildlife; birds and mammals that frequent cropland, meadows, pasture and overgrown areas consisting of grasses, weeds and shrubs. Such wildlife includes bobwhite quail, ring-necked pheasants, mourning dove, woodcocks, cottontail rabbits, meadowlarks, killdeer and sparrows.
 - woodland wildlife; birds and mammals that frequent wooded areas. Such wildlife includes ruffed grouse, wild turkeys, deer, squirrels, raccoons, wood thrushes, warblers and vireos.
 - wetland wildlife; birds and mammals that are commonly found in ponds, marshes, swamps and other wet areas. Such wildlife includes ducks, geese, herons, snipe, rails, coots, muskrat, mink and beaver.
- Elements of wildlife habitat
 - grain and seed crops; domestic grains and seed-producing annuals for wildlife food (e.g., corn, sorghum, wheat, millet, buckwheat, soybeans).
 - grasses and legumes; domestic perennial grasses and herbaceous legumes for food and cover (e.g., fescue, bluegrass, timothy, orchardgrass, reed canarygrass, clover, alfalfa, sericea lespediza).
 - wild herbaceous upland plants; native or introduced perennial grasses and forbs (weeds) generally established naturally and provide food and cover for wildlife (e.g., indiangrass, wild ryegrass, oatgrass, pokeweed, strawberries, lespedeza, beggarweed, ragweed, goldenrod, and dandelion).
 - hardwood woody plants; non-coniferous trees, shrubs and woody vines that produce fruit and foliage for food, predominately established naturally but may also be planted (e.g., oak, beech, hickory, cherry, walnut, dogwood and poplar, as well as smaller plants like grape and honeysuckle).

- coniferous woody plants; cone-bearing trees and shrubs important for mostly cover but also some food in the form of browse, seeds or fruit like cones, usually established naturally but may also be planted (e.g., Virginia pine, white pine, red cedar and hemlock).
- wetland food and cover plants; annual and perennial, wild, herbaceous plants on moist to wet sites and do not include submerged/floating aquatic plants. These plants produce food and cover for wildlife and include smartweed, wild millet, rushes, sedges, wild rice, switchgrass and cattails.
- shallow water developments; areas made by impounding water, digging excavations, water control devices and others that are all usually less than 6 feet deep (e.g., low dikes and levees; shallow dugouts; level ditches and water control devices in mostly marshy drainways or channels).
- excavated ponds; dug-out areas or areas combined with low dikes that should hold enough deep and quality water to support fish or wildlife; should be built in nearly level areas and comprised of at least 1/4 acre with an average depth of 6 ft.; also needs a permanently high enough water table or other source of unpolluted water.

Having examined the area wildlife and elements of wildlife habitat, the scientists have made the following ratings;

- well suited (designated # 1 in table below); when soil has few or no limitations to use the element of wildlife habitat
- suited (designated # 2 in table below); habitat element can be created, improved or maintained but there are moderate limitations affecting management and that moderately intensive measures are needed to overcome or correct the limitations
- poorly suited (designated # 3 in table below); habitat element can be created, improved or maintained but limitations are severe and therefore difficult and expensive measures are needed
- unsuited (designated # 4 in table below); habitat element can't be created, improved or maintained or it is impractical to do so under the prevailing conditions

Johnson T. Janes Park is predominately covered with the aforementioned Moshannon soil series (Ms). This soil series has been classed as "Wildlife Habitat Area 3" with the following qualities;

- 2/3 of the acreage within this wildlife habitat area consists of hardwood dominant woodlands.
- many formerly cultivated fields have grown up in Virginia Pine and brushy hardwoods.
- most of the area consists of small woodlots.
- cottontail rabbits are common in this wildlife habitat area and especially like to nest in hayfields and improved pastures and cover is good though food is scarce in some areas
- gray and fox squirrel feed in the oak-hickory stands and there are generally enough den trees to provide cover for them
- bobwhite quail are plentiful throughout this area
- ruffed grouse can be found in brushy hardwood edges
- white-tailed deer graze in nearby hayfields along forest edges

➤ raccoon, woodchucks, gray and red fox are common throughout most of the area
 A table summarizing some key features of the Moshannon (Ms) soil series is given here;

Table 1. - Suitability of soils for elements of wildlife habitat and for kinds of wildlife

Soil and map symbol	Elements of wildlife habitat								Kinds of wildlife		
	Grain and seed crops	Grasses and legumes	Wild Herbaceous plants	Hard-wood woody plants	Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Excavated ponds	Open-land wildlife	Wood-land wildlife	Wet-land Wildlife
Moshannon (Ms)	3-4	2-3	1	1	2	4	4	4	4	1	4

Based off the information on this table, it would appear that the Johnson T. Janes park is best suited for woodland habitats (# 1 ratings) and not so for wetland habitats (# 4 ratings). However, this is probably not true if an on-site investigation is made.

Engineering properties of the Moshannon soil series

There is an abundant amount of information regarding soil properties pertinent to engineering properties. However, for the purpose of the Johnson T. Janes Park development, the information is too vast and of less concern to list here. For those interested, it is suggested that they consult the Soil Survey of Wood and Wirt Counties from which this document is entirely referenced. Before any engineering project, this data should be reviewed.

Recreational and Non-farm Uses of Soils

Because of industrial expansion, and resultant increased housing needs, recreational facilities are in greater demand but have developed slowly. Because the soils along the Ohio River are good, which includes most of the area of Parkersburg, WV, these soils were first taken up by industry and housing. Thus it may be necessary to located many recreation facilities on soils in other areas. Most soils in this area have properties that limit suitability for recreation and non-farm uses and have been examined by the soil scientists conducting research here.

Limitations include:

- building sites; refers to buildings less than 3 stories tall with a basement below the surface (this rating is based upon depth to bedrock, degree of slope, depth to water table, hazard of flooding, slippage and does not include sewage disposal; for buildings without basements, depth to bedrock is less important)
- disposal of sewage effluent; refers to suitability for effluent disposal from septic tanks depending on slope, depth to hi water table, permeability, hazard of flooding and slippage and depth to bedrock; disposal from septic tank effluent is difficult on soils that are clayey, slowly permeable, have high water table, subject to flooding (a *slight* rating means that the soil is generally well suited as filter fields for septic tanks; *moderate* rating means the site is less suitable than the *slight* rating and therefore larger fields may be needed; *severe* rating means an investigation is

- needed to determine soil condition which may be unsuitable
- impoundments and sewage lagoons; are impoundments greater than 1/2 acre in size; sewage lagoons are shallow ponds for sewage disposal via oxidation (basis of ratings include; bedrock depth and type, permeability, hazard of flooding, slippage, degree of slope and stability of fill material) sandy soils underlain by sand and gravel or shallow to bedrock have *severe* limitations.
 - lawns; good lawn maintenance or establishment capability (based on soil texture, depth, degree of slope, depth to water table, stoniness, droughtiness, flooding hazard).
 - extensive play areas; areas left in natural state for picnicking, etc., (based on soil texture, slope, high water table, flooding hazard) most have *moderate* limits though these same limits may be *severe* for athletic fields.
 - athletic fields; nearly level areas are needed, soils with clayey, gravelly or stony surface layers are *severely* limited in (additionally, soil depth, depth to water table and flooding hazards should be considered)
 - streets and parking lots; the criteria considered are very similar to highways so please see engineering section, of particular note are depth to seasonal high water table, bedrock depth, shrink, swell potential, suitability for road fill, highway limitations, slope, flooding hazard and susceptibility to frost action)
 - access roads; for light to medium weight vehicles factors include; soil depth, stoniness, depth to water table, slope, hazard of flooding, slippage (slope and bedrock depth are less important than when considering the area for streets and parking lots)
 - campsites; for tents and trailers, the area must be sufficiently level and large, offer privacy, and include tables, fireplaces and parking areas (fewer limitations for tents than for trailers)