

APPENDIX B

Geographic Information Systems Subwatershed Soils Analysis

Geographic Information Systems (GIS) was utilized to summarize the soils present in the three subwatersheds. An ArcInfo version of ArcGIS 8.3 software was used in conjunction with the Natural Resources Conservation Service (NRCS) 1999 Soil Survey Geographic Database (SSURGO) digital soil survey of Delaware County, Indiana. The digital soil survey was projected to the Universal Transverse Mercator (UTM) North American Datum (NAD) 1983 zone 16N coordinate system. The NRCS SSURGO soil features and water features tables were joined to the Delaware county soil's polygon layer based on a common table attribute. The table attribute, MUSYM, which indicates the soil map units, was utilized for the basis of the table joins. The individual subwatershed boundaries were each clipped to the soil polygons that are within their respective boundaries. Each subwatershed, which contained only the soil polygons present within their boundaries, were turned into feature classes and saved into a personal geodatabase. The subwatersheds soils were summarized for their soil map units, soil component (series) names, hydrologic soil groups, drainage classes, soil textures, K factors, and T factors. The summarized tables were exported out of ArcGIS 8.3 and imported into Microsoft Excel files for further data summarization.

Each soil map unit has an assigned soil component (series) name, hydrologic soil group, drainage class, soil texture, K factor, and T factor. The soil map units were summarized for their individual acreage, hectares and ratio of their individual area by the total area in each subwatershed.

The soil map units represent an area dominated by one major kind of soil or an area dominated by several kinds of soil; identified and named according to the taxonomic classification of the dominant soil or soils (SSURGO, 1999). The soil component names represent the series, taxonomic unit, or miscellaneous area of the soil map unit.

The hydrologic soil groups are assigned by the groups A, B, C, or D. Hydrologic soil groups are defined as groups of soils that, when saturated, have the same runoff potential under similar storm and ground cover conditions. The soil properties that affect the runoff potential are those that influence the minimum rate of infiltration in a bare soil after prolonged wetting and when the soil is not frozen. These properties include the depth to a seasonal high water table, the infiltration rate, permeability after prolonged wetting, and the depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

Hydrologic Soil Group Descriptions

Hydrologic Soil Groups	Infiltration Rate/Runoff Potential when thoroughly wet	Drainage	Soil Texture	Rate of Water Transmission
A	High/Low	Very deep, well drained to excessively drained	Sands or gravelly sands	High
B	Moderate/Moderate	Moderately deep or deep, moderately well drained, well drained	Moderately fine to moderately coarse	Moderate
C	Slow	Has layer that impedes downward movement of water	Moderately fine or fine	Slow
D	Very slow/High	Has permanent high water table, claypan or clay layer at or near surface, or shallow over nearly impervious layer	Clayey soil that have high shrink-swell potential	Very slow

The soil drainage classes identify the natural drainage condition of the soil and refer to the frequency and duration of periods when the soil is free of saturation; classes include excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained (SSURGO, 1999). The well drained soils have a seasonal water table greater than 40 inches. Moderately well drained soils have a seasonal water table between 20 inches to 40 inches. Somewhat poorly drained soils have a seasonal water table from 10 inches to 20 inches. Poorly drained soils have a seasonal water table of less than 10 inches and very poorly drained soil's seasonal water table is near the surface.

The soil textures are relative proportions of various soil separates. The soil separates include sand, silt, and clay. Sand sized particle range from 2.00 to 0.05 millimeters (mm), silt ranges from 0.05 to 0.002 mm, and clay sized particles are less than 0.002 mm in diameter. The soil textures include loam, silt loam, silty clay loam, clay loam, clay, muck, mucky silty clay, stratified sand to very gravelly coarse sand, etc.

Soil K factors indicates the susceptibility of a soil to sheet and rill erosion by water. It is a factor used in the Universal Soil Loss Equation and the Revised Soil Loss Equation to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year (SSURGO, 1999). The soil T factors are an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period, the rate is expressed in tons per acre per year (SSURGO, 1999).

Indiana Endangered and Threatened Species List

November 16, 1999

ENDANGERED, THREATENED AND RARE SPECIES DOCUMENTED FROM DELAWARE COUNTY, INDIANA

SPECIES NAME	COMMON NAME	STATE	FED	SRANK	GRANK
VASCULAR PLANT					
CAREX ALOPECOIDEA	FOXTAIL SEDGE	SE	**	S1	G5
GLYCERIA BOREALIS	SMALL FLOATING MANNA-GRASS	SE	**	S1	G5
MATTEUCCIA STRUTHIOPTERIS	OSTRICH FERN	SR	**	S2	G5
SILENE REGIA	ROYAL CATCHFLY	ST	**	S2	G3
TRICHOSTEMA DICHOTOMUM	FORKED BLUECURL	SR	**	S2	G5
TRIFOLIUM STOLONIFERUM	RUNNING BUFFALO CLOVER	SE	LE	S1	G3
VALERIANELLA CHENOPODIIFOLIA	GOOSE-FOOT CORN-SALAD	SE	**	S1	G5
VERONICA ANAGALLIS-AQUATICA	BROOK-PIMPERNELL	ST	**	S2	G5
WISTERIA MACROSTACHYA	KENTUCKY WISTERIA	SR	**	S2	G5
MOLLUSCA: BIVALVIA (MUSSELS)					
ALASMIDONTA VIRIDIS	SLIPPERSHELL MUSSEL	**	**	S2	G4G5
EPIOBLASMA TORULOSA	RANGIANA NORTHERN RIFFLESHELL	SE	LE	S1	G2T2
LAMPSILIS FASCIOLA	WAVY-RAYED LAMPMUSSEL	SSC	**	S2	G4
PLEUROBEMA CLAVA	CLUBSHELL	SE	LE	S1	G2
PLEUROBEMA CORDATUM	OHIO PIGTOE	SSC	**	S2	G3
PTYCHOBANCHUS FASCIOLARIS	KIDNEYSHELL	SSC	**	S2	G4G5
TOXOLASMA LIVIDUS	PURPLE LILLIPUT	SSC	**	S2	G2
TOXOLASMA PARVUM	LILLIPUT	**	**	S2	G5
VILLOSA FABALIS	RAYED BEAN	SSC	**	S1	G1G2
REPTILES					
CLEMMYS GUTTATA	SPOTTED TURTLE	SE	**	S2	G5
CLONOPHIS KIRTLANDII	KIRTLAND'S SNAKE	SE	**	S2	G2
EMYDOIDEA BLANDINGII	BLANDING'S TURTLE	SE	**	S2	G4
SISTRURUS CATENATUS	CATENATUS EASTERN MASSASAUGA	SE	**	S2	G3G4T3T4
THAMNOPHIS BUTLERI	BUTLER'S GARTER SNAKE	SE	**	S1	G4
BIRDS					
ARDEA HERODIAS	GREAT BLUE HERON	**	**	S4B,SZN	G5
BOTAURUS LENTIGINOSUS	AMERICAN BITTERN	SE	**	S2B	G4
LANIUS LUDOVICIANUS	LOGGERHEAD SHRIKE	SE	**	S3B,SZN	G5
NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON	SE	**	S2B	G5
NYCTICORAX NYCTICORAX	BLACK-CROWNED NIGHT-HERON	SE	**	S1B,SAN	G5
RALLUS ELEGANS	KING RAIL	SE	**	S1B,SZN	G4G5
MAMMALS					
LYNX RUFUS	BOBCAT	SE	**	S1	G5
MYOTIS SODALIS	INDIANA BAT OR SOCIAL MYOTIS	SE	LE	S1	G2
TAXIDEA TAXUS	AMERICAN BADGER	SE	**	S2	G5

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SPECIES NAME	COMMON NAME	STATE	FED	SRANK	GRANK
HIGH QUALITY NATURAL COMMUNITY					
FOREST - FLATWOODS CENTRAL TILL PLAIN	CENTRAL TILL PLAIN FLATWOODS	SG	**	S2	G3

STATE: SX=extirpated, SE=endangered, ST=threatened, SR=rare, SSC=special concern, WL=watch list, SG=significant,** no status but
rarity warrants concern
FEDERAL: LE=endangered, LT=threatened, LELT=different listings for specific ranges of species, PE=proposed endangered,
PT=proposed threatened, E/SA=appearance similar to LE species, **=not listed

(Indiana Dept. of Natural Resources, Division of Nature Preserves. 1999. List of Endangered, Threatened and Rare Species – Delaware County. <http://www.state.in.us/dnr/naturepr/species/index.html>.)