

Ecoregions of Indiana and Ohio

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregions are directly applicable to the immediate needs of state agencies including the development of biological criteria and water quality standards as well as the establishment of management goals for nonpoint-source pollution. They are also relevant to integrated ecosystem management, an ultimate goal of most federal and state resource management agencies.

The approach used to compile this map is based on the premise that ecological regions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wilken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I is the coarsest level, dividing North America into 15 ecological regions, with level II dividing the continent into 52 regions. At level III, the continental United States contains 99 regions (United States Environmental Protection Agency [USEPA], 1997). Level IV is a further subdivision of level III ecoregions. Explanations of the methods used to define the USEPA's ecoregions are given in Omernik (1995), Griffith and others (1994), and Gallant and others (1989).

This level III and IV ecoregion map was compiled at a scale of 1:250,000; it depicts revisions and subdivisions of earlier level III ecoregions that were originally compiled at a smaller scale (USEPA 1997; Omernik 1987). The poster is part of a collaborative project primarily between the USEPA Region V, the USEPA National Health and Environmental Effects Research Laboratory, Corvallis, Oregon, the Indiana Department of Environmental Management (IDEM), the Ohio Department of Natural Resources (ODNR), the Ohio Environmental Protection Agency (Ohio EPA), the United States Department of Agriculture - Forest Service (USFS), the United States Department of Agriculture - Natural Resources Conservation Service (NRCS) (formerly the Soil Conservation Service), and the United States Department of the Interior - U.S. Geological Survey (USGS) - Earth Resources Observation Systems (EROS) Data Center.

This project is associated with an interagency effort to develop a common framework of ecological regions. Reaching that objective requires recognition of the differences in the conceptual approaches and mapping methodologies that have been used to develop the most commonly used existing ecoregion-type frameworks, including those developed by the USFS (Bailey and others, 1994), the USEPA (Omernik 1987, 1995), and the NRCS (U.S. Department of Agriculture - Soil Conservation Service, 1981). As each of these frameworks is further developed, the differences between them lessen. Regional collaborative projects such as this one in Indiana and Ohio, where agreement can be reached among multiple resource management agencies, is a step in the direction of attaining commonality and consistency in ecoregion frameworks for the entire nation.

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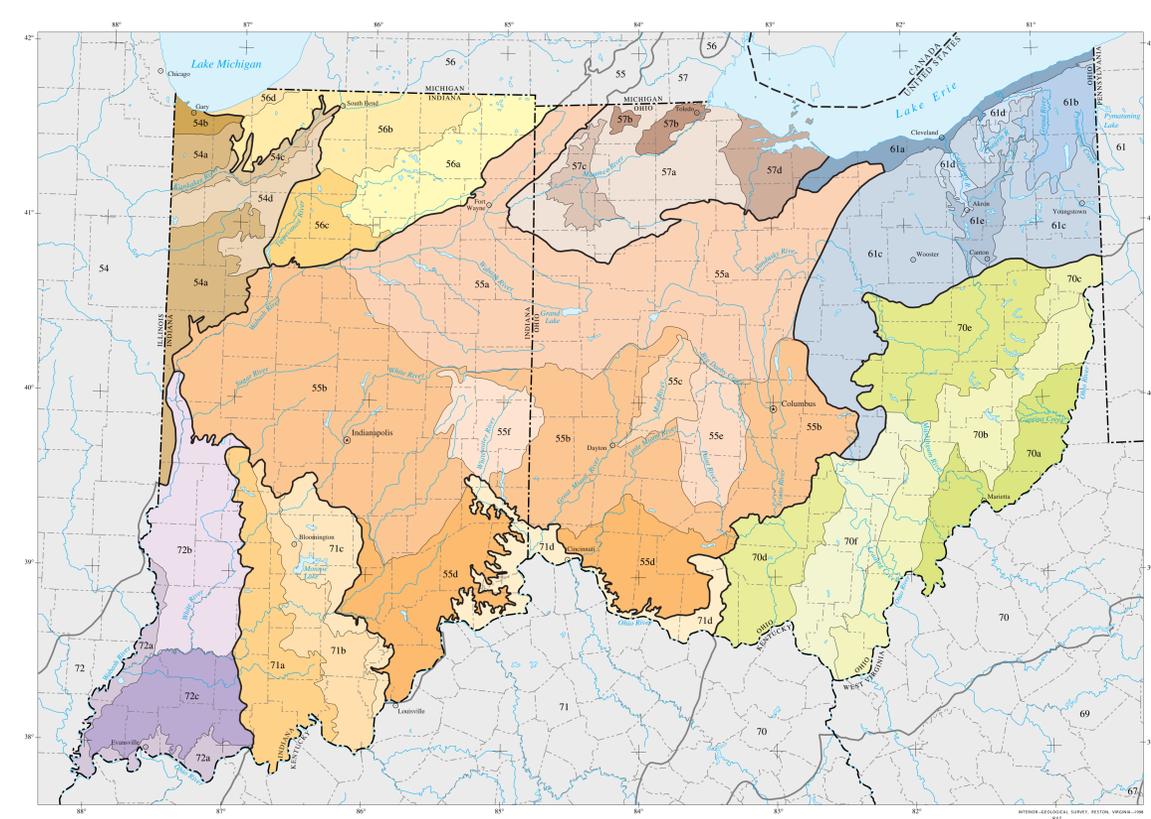
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54. Central Corn Belt Plains
Extensive prairie communities were native to the glaciated plains of Ecoregion 54; they were a stark contrast to the hardwood forests that grew farther east on the drift plains of Ecoregions 55 and 56. Beginning in the nineteenth century, the natural vegetation was gradually replaced by agriculture. Farms are now extensive on the dark, fertile soils of Ecoregion 54 and grow, primarily, corn and soybeans; cattle, sheep, and, especially, hogs are also raised, but they are not as dominant as farther west in the drier Western Corn Belt Plains (47). Agriculture has affected stream chemistry, turbidity, and habitat.

54a The Illinois/Indiana Prairies ecoregion is undulating and characterized by dark, very fertile soils. Today, corn, soybean, and livestock farming has replaced the original prairie and oak-hickory forest; woodland is largely confined to riparian areas. Low gradient, silt-bottomed streams have cut into the limy glacial and lacustrine deposits of Ecoregion 54a; they are warm in the summer, impacted by field runoff and channelization, and often carry a large amount of suspended sediment.

54b The Chicago Lake Plain ecoregion is a nearly level coastal strip with beach ridges, marshy swales, and sand dunes. It is differentiated from inland ecoregions by its lake-moderated climate and native beach-dune plant communities. Ecoregion 54b has lower dunes, fewer woodlands, and more urban-industrial activity than Ecoregion 56d.

54c The Kankakee Marsh ecoregion was once covered by extensive northern swamp forests, wet prairies, and bulrush-cattail marshes. Today, most of these distinctive communities are gone and only a narrow wooded corridor remains along the Kankakee River. Elsewhere, corn, soybean, and livestock farming is dominant on artificially drained soils that were derived from outwash deposits.

54d The Kankakee Sand Area ecoregion is distinguished from adjacent ecoregions by its extensive, plain and silt sheet dunes. Natural soil drainage properties are very poor; wetlands are gone and only a narrow wooded corridor remains along the Kankakee River. Elsewhere, corn, soybean, and livestock farming is dominant on artificially drained soils that were derived from outwash deposits.

55. Eastern Corn Belt Plains
Ecoregion 55 is primarily a rolling till plain with local end moraines. It has higher colored soils than Ecoregion 54, but the pre-Wisconsinan till which is restricted to the southern part of Ecoregion 55. Originally, natural tree cover was greater than Ecoregion 54; beech forests were common on Wisconsinan soils while beech forests and elm-shrub swamp forests dominated the wetter pre-Wisconsinan soils. Today, extensive corn, soybean, and livestock production occurs and has affected stream chemistry and turbidity.

55a The Clays, High Lime Till Plains ecoregion is transitional between the Loamy, High Lime Till Plains (55b) and the Maumee Lake Plains (57a); soils are less productive and more acidified than Ecoregion 55b and support fewer swampy areas than Ecoregion 57a. Corn, soybean, wheat, and livestock farming is dominant and has replaced the original beech forests and scattered elm-shrub swamp forests. No exceptional fish communities exist in the turbid, low gradient streams of Ecoregion 55a.

55b The Loamy, High Lime Till Plains ecoregion contains soils that developed from loamy, limy, glacial deposits of Wisconsinan age; these soils typically have better natural drainage than Ecoregion 55a. Today, extensive corn, soybean, and livestock farming is dominant on the nearly level terrain; today, corn, soybean, and livestock production is widespread.

55c The Mad River Interlobate Area ecoregion is flanked by end moraines and received concentrated outwash deposits that filled preglacial valleys. Abundant ground water feeds its deep, cold water streams that contain an abundance of riffle-inhabiting fish species. Originally, beech forest, mixed oak forest, and extensive fresh fen/wetland prairies were common in Ecoregion 55c. Today, extensive corn, soybean, dairy, and livestock farms as well as urban activity occur. Woodland still grows on steep sites and along riparian corridors; fresh water fen/wetland prairies can also be found locally.

55d The Pre-Wisconsinan Drift Plains ecoregion is differentiated from the surrounding ecoregions by its deeply-leached, acidic, pre-Wisconsinan till and thin loess; widespread areas of nearly level, very poorly drained wetlands are also distinctive. In addition, some dissected areas occur. Streams often have sustained runoff and biotic diversity than those of Ecoregion 55b. Originally, beech forests and elm-shrub swamp forests were dominant, but today, corn, soybean, and livestock farming also occurs.

55e The Darby Plains ecoregion once had a distinct assemblage of mixed oak forest; many prairies occurred on its end moraines, gravel-filled preglacial valleys, and seasonally wet areas. Today, tree density is less than in Ecoregion 55b and very large, productive crop and livestock farms occur on its level to undulating terrain. Big Darby Creek, a State and National Scenic River, has high fish diversity.

55f The Whitewater Interlobate Area ecoregion has distinctive cold water, coarse-bottomed streams that are perennial and fed by abundant ground water. The residue dune, northern still, and banded sculpin occur; they are absent or uncommon in Ecoregion 55b. Unique Ozarkian invertebrates also occur in Ecoregion 55f. Dolomitic drift and metlwater deposits are characteristic and overlie limestone, calcareous shale, and dolomitic mudstone.

56. Southern Michigan/Northern Indiana Drift Plains
Ecoregion 56 is distinguished from adjacent ecoregions by its many lakes and marshes as well as its wider assortment of landforms, soil types, soil textures, and land uses. Broad till plains with thick and complex deposits of drift, paludobeach ridges, relic dunes, moraine hills, kames, drumlins, multi-water channels, and kettles occur. Feed grain, soybean, and livestock farming as well as woodlots, quarries, recreational development, and urban-industrial areas are common. An assortment of soils developed under oak-hickory forests, northern swamp forests, or beech forest. Bogs and bog soils are also locally common. Low to medium gradient streams occur and often have rocky bottoms and low amounts of suspended sediment.

56a The Lake Country ecoregion is a hummocky and pitted moraine area characterized by many pot-hole lakes, ponds, marshes, bogs, and clear streams. The well-drained end moraine and kames once supported oak-hickory forests whereas wetter areas had beech forests or northern swamp forests; today, many poorly-drained fields had tar-naked swamps, cattail-bulrush marshes, or sphagnum bogs. Today, marshes and woodland remain but corn, soybean, and livestock farming is dominant; recreational and residential developments commonly surround the lakes of Ecoregion 56a.

56b The Elkhart Hill Plains ecoregion is punctuated by end moraines, kames, and lacustrine flats; kettlehole lakes occur but are much rarer than in Ecoregion 56a while sand dunes are less common than in Ecoregions 54d or 56d. Oak-hickory forests and beech maple forests once dominated Ecoregion 56b but, today, corn, soybean, and wheat farming is more extensive than woodland. Land use is more diversified than in the Eastern Corn Belt Plains (55).

56c The Middle Tippecanoe Plains ecoregion is level to rolling and covered by ground moraine, dunes, end moraines, and lacustrine deposits. The Tippecanoe River basin in this area has cooler water and greater species diversity than found in adjacent areas of Ecoregions 54 and 55. Its cold water tributaries are fed by abundant ground water; their temperature and fish fauna are distinct from those of Ecoregion 56b.

56d The Michigan Lake Plain ecoregion is a sandy coastal strip with beaches, high dunes, beach ridges, musky intertidal depressions, and swales. Its lake-moderated climate as well as its beach and dune plant communities differentiate it from inland ecoregions. Ecoregion 56d has greater relief, higher woodland density, more forests in its swamps community, and less made-land than the Chicago Lake Plain (54b). Urban and industrial activity as well as fruit and vegetable farming occurs; scattered woodland grows on the lee side of dunes and in some poorly-drained areas.

57. Huron/Erie Lake Plains
Ecoregion 57 is a broad, fertile, nearly flat plain punctuated by relic sand dunes, beach ridges, and end moraines. Originally, soil drainage was typically poorer than in Ecoregion 55 and elm-shrub swamp and beech forests were dominant. Oak savanna was typically restricted to the well-drained areas; well-drained dunes and beach ridges. Today, most of the area has been cleared and an intensively drained and contains highly productive farms producing corn, soybeans, livestock, and vegetables; urban and industrial areas are also extensive. Stream habitat and quality have been degraded by channelization, ditching, and agricultural activities.

57a The Maumee Lake Plains ecoregion is poorly-drained and contains clayey lake deposits, water-worked glacial till, and fertile soils. Elm-shrub swamp forests and beech forest were once extensive; marshes and bogs occurred along the coast. They have been replaced by productive, drained farmland. Shagbark, low gradient rivers wind through Ecoregion 57a and have high suspended sediment loads of clayey silt that endanger biota.

57b The Oak Openings ecoregion is a belt of low, often wooded, sand dunes and paludobeach ridges that are situated among the broad, nearly flat, agricultural plains of Ecoregion 57a. Well-drained, sandy soils are common and originally supported mixed oak forests and oak savanna; poorly-drained depressions with wet prairies were also found. Today, general farms, residential development, oak woodlands, and sand quarries occur.

57c The Paulding Plains ecoregion is a part of the lake plain and is characterized by clayey lacustrine sediment and extensive, very poorly-drained, siltic soils such as the

61. Erie/Ontario Drift and Lake Plain
Low lime drift and lacustrine deposits blanket the rolling to level terrain of Ecoregion 61. Lakes, wetlands, and swampy streams occur where stream networks are degraded or where the land is flat and clayey. Soils are often lower in carbonate and naturally less fertile than those of other glaciated ecoregions. Urban development, industrial activity, and agriculture are widespread and scattered woodland also occurs. Lake Erie's influence substantially increases the growing season, winter cloudiness, and snowfall of the northern areas.

61a The Erie Lake Plain ecoregion is a nearly level coastal strip of lacustrine deposits punctuated by beach ridges and swales. Its lake-moderated climate sets it apart from other ecoregions and its annual growing season is often several weeks longer than inland areas. Urban-industrial settings, ports, fruit-vegetable farms, and nurseries have developed on the plain.

61b The Mosquito Creek/Pymatung Lowlands ecoregion is characterized by poor drainage, wetlands, low-gradient streams, and moisture tolerant woodlands. It is nearly flat and is underlain by clayey till and fine lacustrine deposits. Originally, beech forests were common; today dairy farms and woodlots occur.

61c The Low Lime Drift Plain ecoregion has a rolling landscape composed of low rounded hills with scattered end moraines and kettles; its terrain is distinct from the unglaciated, wooded, hilly country of Ecoregion 70 and its soils are usually less naturally fertile than the high lime till plains of Ecoregion 55. Urban-industrial activity as well as

70. Western Allegheny Plateau
The hilly and wooded terrain of Ecoregion 70 was not muted by glaciation and is more rugged than the agricultural till plains of Ecoregions 55 and 61. Extensive mixed mesophytic forests and mixed oak forests originally grew in Ecoregion 70. Today, most of its rounded hills remain in forest; dairy, livestock, and general farms as well as residential developments are concentrated in the valleys. Horizontally-bedded, sedimentary rock underlies the region and has been mined for bituminous coal.

70a The Permian Hills ecoregion is rugged, wooded, and, commonly, too steep to be farmed. High gradient streams without acidity problems are characteristic and have developed on the underlying Permian shale, sandstone, and coal; on the shale, the streams are often ephemeral and without large riffle-inhabiting fish populations.

70b The Monongahela Transition Zone has rounded hills and ridges that are generally less rugged than Ecoregion 70a but are still steep. Unstable, clayey regolith has developed on the underlying coal bearing strata but is largely absent from Ecoregions 70c, 70d, and 70e. Gas wells, coal mining, and reclaimed land are locally extensive and associated stream degradation is common. Forests occupy steeper areas; dairy, livestock, and general farms are common.

70c The Pittsburgh Low Plateau ecoregion has rounded, forested hills and narrow, agricultural valleys; it is largely unglaciated in contrast to neighboring Ecoregion 61c. Medium textured soils are common and are markedly different from the clayey soils of Ecoregion 70b; high gradient streams with rocky bottoms and associated fauna communities are locally abundant in Ecoregion 70c. The original forest was largely mixed oak forest with some chestnut and high forest cover rates. The original forest was largely mixed oak forest with some chestnut and high forest cover rates. The original forest was largely mixed oak forest with some chestnut and high forest cover rates.

71. Interior Plateau
Ecoregion 71 has rolling to deeply dissected, rugged terrain with areas of karst topography common on the Mitchell Plain (71b). Maximum elevations and local relief are greater than in Ecoregion 72. The original forest vegetation shared its beech component with Ecoregion 55 and oak-hickory forests occurred on the well-drained, upper slopes. The soils of Ecoregion 71 developed from the underlying sandstone, siltstone, shale, and limestone and are not from till like those of Ecoregion 55. Land use/land cover is a transition between the crop and livestock farms of Ecoregion 55 and the forests of Ecoregion 70; hay, grain, cattle, hog, and poultry farming occurs and woodland is common.

71a The Crawford Uplands ecoregion is heavily dissected by medium to high gradient streams and is more rugged and wooded than Ecoregion 71b. Oaks are found on well-drained upper slopes, mixed mesophytic forests occur in coves as well as on north facing slopes, and specialized plant communities dominate the eastern sandstone-limestone cliffs. General farms occur especially in the west and in the low valleys.

71b The Mitchell Plain is differentiated from adjacent ecoregions by its karst topography, low relief, residential-urban areas, and limestone quarries; its peripheral hills are wooded. The north experienced poor Wisconsinan glaciation and is flatter and more poorly-drained than the unglaciated part which is dominated by silt loams, underground drainage, and terra rossa soils. Soils are leached and largely developed from less and limestone. Western mesophytic forests were once dominant; karst wetland communities and limestone glades also occurred and were the major examples of these communities in Indiana.

71c The Norman Upland ecoregion is mostly forested in contrast to Ecoregion 55b, 55d, and 71b which are adjacent and less rugged. It is characterized by dissected high hills and knobs, narrow valleys, and medium to high gradient streams. The silt loam soils were derived from loess, siltstone, shale, or sandstone. Originally, oak-hickory forests grew on the uplands and beech forests were found in the valleys. Today, chestnut oak has replaced American chestnut on the well-drained upper slopes; Virginia pine grows on the southern uplands.

71d The Northern Bluegrass ecoregion is deeply dissected and has some ephemeral streams in the east. The east is unglaciated whereas the plains and hills of the west were marked by low-bed pre-Wisconsinan till and discontinuous forest. Ecoregion 71d is underlain by Ordovician limestone and shale which distinguishes it from other nearby ecoregions. Its lower crestal elevations, glacial soils, limestone bedrock, and sinkholes distinguish it from Ecoregion 70b; its ruggedness, lack of frigidities, and often natural vegetation differentiate it from the affiliated soils of Ecoregion 55d. In addition, Ecoregion 71d lacks the high lime, Wisconsinan till of Ecoregion 55d. Originally, in Indiana, western mixed mesophytic forests and oak-hickory forests grew and they occupied many northern species. Today, the ecoregion is a mosaic of forest and agriculture with urban-industrial activity occurring in the valleys. The Ohio River valley forests grew on the well-drained upland soils while western mesophytic forests occurred on more poorly-drained soils; some southern plains reached their northern distributional limit in Ecoregion 72c. Today, the woodland has been mostly cleared for corn, soybeans, wheat, livestock, and vegetable farming as well as extensive surface coal mines.

72. Interior River Lowland
This broad, undulating lowland was formed in non-carbonaceous sedimentary rock. Large upland areas along the Wabash River are veneered by windblown material which thin eastward. Pre-Wisconsinan ice once covered much of the ecoregion and till deposits can be found locally north of the White River. Many wide, flat-bottomed, terraced valleys occur and are filled with alluvium as well as outwash, siltstone, and lacustrine deposits. Bottomland hardwood forests, swamps, and beech forests occur on poorly-drained, nearly level sites along the Wabash and Ohio rivers whereas the upland areas had beech forests and oak-hickory forests. Patterns of land use are more varied than in the neighboring ecoregions. Drained alluvial soils are farmed for feed grains and soybeans. Undrained valleys sites are used for forage crops, pasture, or woodlots; upland soils are used for mixed farming and livestock. Extensive strip mining as well as crop and livestock production have impacted stream water quality and stream habitat; sheet erosion can be severe on upland soils that are covered by thin, erodible topsoils.

72a The Wabash Bottomlands ecoregion is found along the lower Wabash and Ohio rivers. Ecoregion 72a contains the most pronounced Mississippi-type biotic assemblage in Indiana and, historically, significant numbers of waterfowl have wintered here. The low, nearly level flood plains, terraces, and bays are composed of alluvial and outwash deposits; they were seasonally inundated before flood control and were once covered by bottomland hardwood forests. Today, some woodland remains but, mostly, the land is used for corn, soybean, wheat, alfalfa, or livestock farming; poor drainage and droughtiness are critical factors controlling land use.

72b The Glaciated Wabash Lowlands ecoregion is often mantled by till or windblown silt and sand. The loamy to sandy till deposits are pre-Wisconsinan in age and are older and more loess than the glacial drift of Ecoregions 54a and 55b. The original vegetation included beech forest and oak-hickory forest; relic sand dunes sometimes

72c The Southern Wabash Lowlands ecoregion is undulating to rolling and has many wide, shallow valleys. It lies to the south of Ecoregion 72b and is pre-Wisconsinan till plain; relic dunes and wind-blown silt deposits occur in the west, and shale and sandstone bedrock is exposed in the east. Ecoregion 72c is further characterized by its long growing seasons and neutral to acid soils. Originally, oak-hickory forests grew on the well-drained upland soils while western mesophytic forests occurred on more poorly-drained soils; some southern plains reached their northern distributional limit in Ecoregion 72c. Today, the woodland has been mostly cleared for corn, soybeans, wheat, livestock, and vegetable farming as well as extensive surface coal mines.

