

Appendix 1.11 Description of Level III and Level IV Ecoregions of Kentucky

68. Southwestern Appalachians

Ecoregion 68 is composed of low mountains, hills, and intervening valleys. A deeply incised escarpment divides Ecoregion 68 from the Interior Plateau (71) to the west. In Kentucky, Ecoregion 68 drains to the Cumberland River and contains fish and mollusc species that are not found in the Kentucky River tributaries of Ecoregions 69 or 70. Moderate to high gradient streams are common and have cobble- or boulder-dominated substrates. Low gradient streams also occur and have gravelly or sandy bottoms. Potential natural vegetation is mapped as mixed mesophytic forest; it contrasts with the oak–hickory forest of Ecoregion 71. Mixed mesophytic forests of varying composition grow on cool, moist north- and east-facing slopes and in coves. Mixed oak forests are common on drier sites including upper slopes and on south- and west-facing middle and lower slopes. Well-drained, acidic Ultisols are common on uplands and have less natural fertility than the base-rich soils of the Interior Plateau (71). Today, forests are widespread. Forest age and composition are variable and reflect logging, fire, and grazing histories. Pastureland and limited areas of cropland also occur. Overall, Ecoregion 68 is much less dominated by agriculture than Ecoregion 71 and nutrient concentrations in streams are correspondingly lower. Coal mining occurs and is responsible for the siltation and acidification of many stream segments.

68a. Cumberland Plateau

The Cumberland Plateau (68a) is composed of low hills, ridges, rolling uplands, and valleys. It is underlain by flat-lying, Pennsylvanian sandstone, shale, siltstone, conglomerate, and coal; Mississippian carbonates are absent in contrast to the nearby Plateau Escarpment (68c), Northern Forested Plateau Escarpment (70g), and Eastern Highland Rim (71g). Ecoregion 68a is mostly forested. Forest composition is highly variable. Logging, coal mining, and livestock grazing are common and limited cropland occurs on broader ridge tops and in valleys. Cleared land, as a percentage of the total, is greater than in more rugged Ecoregions 68c and 69d but less than in Ecoregion 70f. Streams have moderate to low gradients and have broader floodplains and more riparian wetlands than in the Plateau Escarpment (68c). Acidic drainage and sedimentation from coal mining have decreased the biological productivity of many streams. As a result of sedimentation, streams are generally more turbid than in Ecoregion 68c.

68c. Plateau Escarpment

The Plateau Escarpment (68c) contains narrow ridges, cliffs, and gorges. It is more rugged, dissected, and forested and has higher average stream gradients than Ecoregions 68a and 71g. Uplands are underlain by Pennsylvanian strata including cliff-forming sandstone and coal. Lower slopes and western valleys are usually underlain by Mississippian carbonates that are absent from Ecoregions 68a and 70f. Some of the highest quality streams in Kentucky occur here and have high gradients, riffles, pools, and boulder or bedrock substrates. They are home to many rare or endangered fishes and mussels and certain segments have been designated as Kentucky Wild Rivers. Other streams have cut down to Mississippian limestone and have wider valleys, lower gradients, warmer thermal regimes, higher nutrient and alkalinity levels, and a higher number of fish and mussel species. Logging and coal mining occur. Acidic drainage and sedimentation from coal mining have lowered the biological productivity of many stream reaches.

69. Central Appalachians

The dissected, forested hills and mountains of Ecoregion 69 are typically underlain by flat-lying, Pennsylvanian sandstone, shale, siltstone, conglomerate, and coal. Ecoregion 69 is higher, cooler, steeper, more rugged, and more densely forested than the Western Allegheny Plateau (70) and the Interior Plateau (71). Its potential natural vegetation is mixed mesophytic forest and contrasts

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with the oak–hickory forest of Ecoregion 71. Like in Ecoregion 68, mixed mesophytic forests grow on cool, moist north- and east-facing slopes and in coves; mixed oak forests are common on drier sites including upper slopes and south- and west-facing middle and lower slopes. White oak forests are also common and red maple is widespread, especially in secondary forests and on sites formerly occupied by American chestnut. Rugged terrain, cool temperatures, and nutrient-poor soils sharply limit agricultural potential. Surface and underground bituminous coal mines are common. Surface mines have reshaped ridges and hollows and are responsible for the siltation and acidification of many streams. Upland soils are derived from residuum and colluvium and are mostly Ultisols and Inceptisols which contrast with the Alfisols that dominate most of Ecoregion 71. Streams have moderate to high gradients and cobble or boulder substrates. They have low nutrient and ionic concentrations. Elements of the fish and mussel assemblages in the Kentucky River tributaries of Ecoregion 69 are distinct from those in the Cumberland River tributaries of Ecoregion 68.

69d. Dissected Appalachian Plateau

The Dissected Appalachian Plateau (69d) is composed of narrow ridges, deep coves, and narrow valleys and is mostly forested. Cool, high gradient streams with cobble and boulder substrates and extensive riffles are common. Ecoregion 69d is more rugged, more extensively forested, and has higher stream gradients than the Cumberland Plateau (68a) and the Ohio/Kentucky Carboniferous Plateau (70f). Forest composition is controlled by aspect, slope position, degree of topographic shading, and past usage and, thus, is highly variable. Ecoregion 69d is underlain by flat-lying Pennsylvanian shale, siltstone, sandstone, and coal. Surface and underground coal mining, logging, and both gas and oil production are common and have degraded surface waters. Acidic drainage and sedimentation from coal mines have decreased the biological productivity of many streams and, in some reaches, all but the most tolerant aquatic biota have been eliminated. However, gradual improvement in the control of acidic mine drainage is occurring. Nutrient levels in streams are very low and are a reflection of the ecoregion's low population density, limited agriculture, and non-carbonate rocks.

69e. Cumberland Mountain Thrust Block

The mostly forested Cumberland Mountain Thrust Block (69e) contains high, steep ridges, hills, coves, narrow valleys, and the Pine Mountain Overthrust Fault. Maximum elevation is greater than elsewhere in Kentucky. Forests are usually more mesophytic than in the Dissected Appalachian Plateau (69d) but forest composition is highly variable and controlled by aspect, slope position, past usage, and degree of topographic shading. Components of the bird, amphibian, small mammal, and plant assemblages are also distinct from Ecoregion 69d. The Cumberland Mountain Thrust Block (69e) is mostly underlain by Pennsylvanian shale, siltstone, sandstone, conglomerate, and coal. Sedimentation from coal mines, coal washing, and logging as well as acidic mine drainage have decreased the biological integrity and productivity of surface waters. Small streams are common and have high gradients, waterfalls, many riffles, few pools, and cobble or boulder substrates. Nutrient and alkalinity levels are lower, thermal regimes are cooler, and fish populations are less diverse than in Ecoregion 69d.

70. Western Allegheny Plateau

Ecoregion 70 is unglaciated, mostly forested, and underlain by horizontally bedded, often carboniferous, sedimentary rock. Its hills and ridges are more rugged than the limestone plains of Ecoregion 71 to the west or the glaciated, till-covered plains of Ecoregion 55 to the north. Maximum elevations and local relief are lower than in the Central Appalachians (69). Streams are typically cool and have moderate to high gradients. Riffles have cobble or boulder substrates. Some fish and mussel species in the Kentucky, Licking, and Little Sandy drainage basins are

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distinct from those found further south in the Cumberland River system of Ecoregion 68. Potential natural vegetation is mixed mesophytic forest; it contrasts with the oak–hickory forest of Ecoregion 71 and the less diverse beech forest of Ecoregion 55. Today, Ecoregion 70 remains mostly forested. Primary land uses are logging, livestock farming, general farming, and, in contrast to the Interior Plateau (71), surface and underground coal mining. Nutrient and alkalinity levels are higher than in Ecoregions 68 and 69 but are lower than in carbonate-dominated, agriculturally intensive, and highly populated portions of Ecoregion 71. Bituminous coal mining has caused the sedimentation and acidification of many surface water bodies. Logging, oil well brines, agricultural practices, and sewage discharges have further degraded surface water quality in Ecoregion 70.

70b. Monongahela Transition Zone

The Monongahela Transition Zone (70b) is differentiated from other ecoregions by its clayey regolith, erosion-prone soils, land slips, and rough, broken terrain. Steep, clayey slopes can be unstable when saturated and, as a result, streams can be more turbid than elsewhere in Ecoregion 70. Vandalia and Upshur soils are common and are easily erodible after disturbance. They have developed from Pennsylvanian clay shale, siltstone, and sandstone of the Monongahela and Conemaugh formations which are not widely exposed in other parts of Kentucky. Mixed deciduous–evergreen forests dominate steeper hills and ridges, pastureland is found on gentler slopes, and some cropland occurs in valleys. Streams have cobble, gravel, and sand substrates and moderate gradients.

70d. Knobs–Lower Scioto Dissected Plateau

The Knobs–Lower Scioto Dissected Plateau (70d) contains rounded hills and ridges, narrow valleys with high gradient streams, and a few wide, locally swampy, bottoms underlain by weak shales. Cliffs occur especially in the south. High amounts of topographic and geologic variation are typical and create substantial ecological diversity. Ecoregion 70d is underlain by a mixture of Pennsylvanian-age through Silurian-age sedimentary rocks that is absent from the rest of Ecoregion 70. Ecoregion 70d is geographically adjacent and ecologically connected to the Western Allegheny Plateau (70) and, as such, is not a part of the Interior Plateau (71). Upland knobs are forested and oak and oak–pine forests predominate. Broad valleys are mostly covered by bottomland forests but some are used for livestock or general farming. Elevation, local relief, and forest density are much greater than in Ecoregions 71d, 71k, and 71l. Nutrient and ionic concentrations in streams are lower than in Ecoregions 71d and 71l. No coal mining or related stream acidity problems occur.

70f. Ohio/Kentucky Carboniferous Plateau

The hilly Ohio/Kentucky Carboniferous Plateau (70f) is a mosaic of woodland, pastureland, and cropland. Mixed deciduous–evergreen forests characterized by oaks and pines occur. Ecoregion 70f is lower and less rugged than adjacent portions of the Dissected Appalachian Plateau (69d) and Northern Forested Plateau Escarpment (70g). Characteristically, cleared land, as a percentage of the total, is greater than in Ecoregions 69d, 70g, and 70h. Valleys are less meandering, contain higher gradient streams, and have fewer wetlands than Ecoregion 68a. They lack the karst of Ecoregions 68c, 70g, and 70h. Streams are cool and have sand or boulder substrates. Fish and mussel assemblages are unlike the Cumberlandian fauna of Ecoregion 68a. Fish, macroinvertebrate, and diatom diversity is high in good quality streams. However, water quality in many stream reaches has been degraded by underground and surface coal mining, logging, agriculture, and oil production.

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70g. Northern Forested Plateau Escarpment

The hills and ridges of the Northern Forested Plateau Escarpment (70g) are very rugged and highly dissected. Cliffs, narrow valleys, and ravines are common and characteristic. Thick, resistant Pennsylvanian quartzose sandstone caps the ridges and Mississippian limestone, shale, and siltstone are exposed on lower slopes and in valleys. Karst is not extensive but does occur. Ecoregion 70g is physiographically and lithologically unlike Ecoregion 70d and is higher and more rugged than adjacent portions of Ecoregions 70f and 71d. In addition, cliffs are more numerous and higher than in Ecoregion 70h. Streams are cool and typically have moderate to high gradients, rock bottoms, and low amounts of turbidity. Fish assemblages are diverse but lack the endemic Cumberlandian species of Ecoregion 68c. Mixed oak and oak–pine forests are common and bottomland hardwood forests grow along streams. Logging and recreation are important land uses and dwellings are found on valley sides and on bottomlands. There is less agriculture and cleared land than in Ecoregion 70f.

70h. Carter Hills

The Carter Hills (70h) is composed of hills, ridges, and narrow valleys. It is covered with mixed deciduous forests containing successional cedar and pine. Resistant Pennsylvanian sandstone and conglomerate cap the ridges and Mississippian limestone is exposed in some valleys. Limestone is thicker than in Ecoregion 70g and is associated with karst topography; karst is more extensive than in Ecoregion 70g. Ecoregion 70h is physiographically and lithologically unlike Ecoregion 70d and is higher and more rugged than adjacent portions of Ecoregions 70f and 71d. In addition, cliffs are lower and fewer in number than in Ecoregion 70g. Most stream segments have upland characteristics including moderate to high gradients, rock substrate, extensive riffles, and low waterfalls. Important land uses include logging, clay mining, recreation, and livestock farming.

71. Interior Plateau

The extensive plains of Ecoregion 71 are interrupted in places by dissected uplands, knobs, a few deeply incised master streams, and large areas of karst. Local relief and drainage density are less than in higher, cooler, and wetter Ecoregions 68, 69, and 70 to the east. Physiographic patterns strongly reflect geology. Ecoregion 71 is underlain by Mississippian-age through Ordovician-age limestone, calcareous shale, sandstone, siltstone, and shale. It is lithologically unlike the unconsolidated coastal plain sediments of Ecoregion 74 or the Pennsylvanian carboniferous sedimentary rocks that underlie most of Ecoregions 68, 69, 70, and 72. Soils have developed from residuum and not from glacial till deposits as in Ecoregion 55. Alfisols are common on limestone plains and support a potential natural vegetation of oak–hickory forest and bluestem prairie; both soils and potential natural vegetation contrast with the Ultisols, Inceptisols, and mixed mesophytic forests of Ecoregions 68, 69, and 70. Stream morphology is highly variable and both high gradient streams with boulder or cobble substrates and low gradient streams with sand or gravel bottoms occur. Stream nutrient and alkalinity levels are usually higher than in Ecoregions 68, 69, and 70. Within Ecoregion 71, elements of the fish assemblages in the Green and Cumberland river basins are distinct from those in the Kentucky, Salt, and Licking basins.

71a. Crawford–Mammoth Cave Uplands

The hilly Crawford–Mammoth Cave Uplands (71a) is higher and more rugged than neighboring Ecoregions 71b and 71e. Sandstone cliffs, dissected shale valleys, and less dissected limestone valleys with well developed karst occur. Resistant Mississippian sandstone forms the uplands and cavernous Mississippian limestones are often basal; Pennsylvanian carboniferous sedimentary rocks are absent in contrast to Ecoregions 72c and 72h. In valleys underlain by thick cavernous limestone, stream density is low and sinkholes, caverns, subterranean drainage, and springs are common. Elsewhere, surface drainage is significant and streams have higher gradients than in Ecoregions 71b and 71e. Upland streams are rocky, cool and clear. Rivers are all through-

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flowing, meandering, and deeply incised into bedrock. Fish assemblages vary among river systems. A mixture of forests, pastureland, and cropland occur; farming is more widespread than in the Caseyville Hills (72h) but not nearly as extensive as in Ecoregions 71b or 71e.

71b. Mitchell Plain

The rolling Mitchell Plain (71b) is underlain by Mississippian limestones and is characterized by well developed karst, low relief, and extensive agriculture. Sinkholes, ponds, springs, sinkhole wetlands, subterranean drainage, and dry valleys occur. Stream incision is typically limited except along master streams. Drainage density is lower than in Ecoregions 71a and 71c but higher than in Ecoregion 71e. Mean elevation, relief, and stream gradient are lower than in the lithologically distinct Ecoregions 71a, 71c, and 71g. Potential natural vegetation is a mosaic of bluestem prairie and oak–hickory forest. Today, cropland and pastureland is extensive, mixed oak forests are found on steep slopes, and pin oak, swamp white oak, and sweetgum grow in poorly-drained areas. Sinkhole wetlands are common. Water quality has been degraded by municipal effluent, agricultural discharge, and bank erosion following riparian forest removal. However, nutrient concentrations are not typically as high as in Ecoregion 71e.

71c. Knobs–Norman Upland

The Knobs–Norman Upland is underlain by Pennsylvanian-age through Silurian-age sedimentary rocks. Its rounded hills and ridges are mostly forested and divide the Bluegrass (Ecoregions 71d, 71k, and 71l) from the rest of the Interior Plateau (71). Inceptisols and Ultisols occur on slopes and support mixed deciduous forests. Narrow, high gradient valleys are also common. In addition, a few wide, locally swampy valley floors occur and are used for livestock farming, general farming, and woodland. Ecoregion 71c is characterized by large amounts of geological, topographical, and ecological diversity. Overall, however, physiography, soils, lithology, and land use are distinct from the limestone- and Alfisol-dominated agricultural plains of Ecoregions 71b, 71d, 71e, and 71l. The density of perennial upland streams is far greater than on nearby limestone plains. Nutrient and ionic concentrations are much lower in streams that originate in Ecoregion 71d than outside it in heavily populated, agricultural ecoregions underlain by limestone. Fish and macroinvertebrate diversity is in between that of the Bluegrass (Ecoregions 71d, 71k, and 71l) and that of Ecoregions 71b, 71g, and 70g.

71d. Outer Bluegrass

The rolling to hilly Outer Bluegrass (71d) contains sinkholes, springs, entrenched rivers, and intermittent and perennial streams. Local relief is variable but is usually less than in the geomorphically distinct Knobs–Norman Upland (71c). Discontinuous glacial outwash and leached, pre-Wisconsinan till deposits occur in the north from Louisville to Covington. Glacial deposits do not occur elsewhere in Kentucky. Ecoregion 71d is mostly underlain by Upper Ordovician limestone and shale. Natural soil fertility is higher than in the shale-dominated Hills of the Bluegrass (71k). Today, pastureland and cropland are widespread and dissected areas are wooded. At the time of settlement, open savanna woodlands were found on most uplands. On less fertile, more acidic soils derived from Silurian dolomite, white oak stands occurred and had barren openings. Cane grew along streams and was especially common in the east. Distinct vegetation grew in areas underlain by glacial drift (see summary table). Upland streams have moderate to high gradients and cobble, boulder, or bedrock substrates. Mean stream density is greater than in Ecoregion 71l but less than in Ecoregion 71k. Mean summer stream temperatures are much warmer than in Ecoregions 71b, 71c, and 71e. Concentrations of suspended sediment and nutrients can be high.

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71e. Western Pennyroyal Karst Plain

The weakly dissected Western Pennyroyal Karst Plain (71e) is underlain by Middle Mississippian limestones and is extensively farmed; it is both physiographically and lithologically distinct from surrounding ecoregions. Sinkholes, ponds, springs, sinking streams, and dry valleys occur. Underground drainage is well developed, stream density is low, and soils are quick to dry. Most upland streams have limited discharge or are intermittent or ephemeral; they become laden with suspended sediment after heavy rains. Deeper, more intense dissection occurs near incised master streams which are fed by cool, nitrate-rich groundwater. Fish assemblages vary among river systems. Potential natural vegetation is mapped as a mosaic of bluestem prairie and oak–hickory forest. Barrens (i.e. bluestem prairies) were once more widespread than elsewhere in Kentucky. Today, extensive tobacco, livestock, corn, soybean, and small grain farming occurs.

71f. Western Highland Rim

The Western Highland Rim (71f) is a hilly area that is bisected by the Tennessee River and the Cumberland River valleys. Ecoregion 71f is much more wooded and rugged than the nearby agricultural plains of Ecoregions 71e and 74b. It is underlain by Mississippian limestone and shales and, in the west, by Cretaceous-Paleocene shale, siltstone, and sandstone. Ridges and hills are often capped by cherty gravels and veneered by thin loess. Karst valleys underlain by limestone also occur. Ecoregion 71f is lithologically distinct from Ecoregions 71a, 71e, 72h, and 74b. Potential natural vegetation is oak–hickory forest; it lacks the barrens (i.e. bluestem prairies) of Ecoregions 71e and 74b. Upland soils tend to be cherty, droughty, low in fertility, and are mostly covered by mixed oak forests. Some agriculture occurs on flatter interfluvies and in valleys. Recreation is an important land use in the Land-Between-the-Lakes area. Streams are cool and clear. They have moderate gradients and gravel and sand substrates. Stream alkalinity and hardness vary from east to west but are usually greater than in Ecoregion 74. Fish assemblages vary among river systems.

71g. Eastern Highland Rim

The Eastern Highland Rim (71g) is a diverse ecoregion with undulating plains, hills, and karst. Near the Cumberland River, steep bluffs, springs, cascades, and wide bottomlands occur. The degree of dissection is variable. Overall, nearly level terrain is more extensive than in Ecoregion 71f and stream density is greater than in the lower, less rugged Ecoregion 71e. Ecoregion 71g is mostly underlain by Mississippian limestone, chert, shale, siltstone, and sandstone; it is lithologically distinct from the Pennsylvanian carboniferous sedimentary rocks of Ecoregions 68, 69, and 70. Potential natural vegetation is mapped as oak–hickory forest but, in ravines near the Cumberland Plateau (68a), forests are mixed mesophytic in character. Today, white oak dominates upland forests and bottomland trees grow along streams. Streams are nutrient-rich and moderate in gradient. Riffle substrates are composed of cobble, gravel, or bedrock. Fish, macroinvertebrate, and mussel biodiversity is greater than in the Bluegrass (Ecoregions 71d, 71k, and 71l).

71h. Outer Nashville Basin

The Outer Nashville Basin (71h) in Kentucky contains untillable steep ridges and bluffs and cultivated terraces and floodplains along the meandering, downcutting Cumberland River. Springs occur in bluffs and feed waterfalls. Soluble limestone, dolomite, and weak shales of Mississippian-age through Ordovician-age are typically exposed. Potential natural vegetation is oak–hickory forest and, in moister areas, mixed mesophytic forest. Today, forests, pastures, and hay, tobacco, corn, soybean, and small grain farming occur. Cumberland River tributaries are productive, nutrient-rich, and mostly moderate in gradient. Macroinvertebrate communities more closely resemble those of the Bluegrass (Ecoregions 71d, 71k, and 71l) than the adjacent Eastern Highland Rim (71g). However, fish assemblages are Cumberlandian and are similar to those of

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Ecoregion 71g. Flow on the Cumberland River in Ecoregion 71h is dam-controlled; cold reservoir discharge has eliminated nearly all native fish and mussel fauna downstream to the Tennessee border.

71k. Hills of the Bluegrass

The mostly forested Hills of the Bluegrass (71k) is underlain by Upper Ordovician calcareous shale, siltstone, and limestone. It is lithologically unlike the Knobs–Norman Upland (71c), Outer Bluegrass (71d), and Inner Bluegrass (71l). Upland soils are fairly high in phosphorus, potassium, and lime but are not as naturally fertile as Ecoregions 71d and 71l; they support young, mixed forests rich in white oak, hickory, and cedar. The Hills of the Bluegrass (71k) has steeper terrain, droughtier soils, lower soil fertility, higher drainage density, and is more erosion-prone than Ecoregions 71d and 71l. As a result, less than ten percent of Ecoregion 71k is suited to row crop agriculture and the rest is wooded, pastureland, or hayland. Stream nutrient levels are generally lower than in Ecoregions 71d and 71l. Upland streams are often intermittent and have cobble, boulder, or bedrock substrates. Gradients are steeper than in Ecoregion 71l. Fish and macroinvertebrate assemblages are similar to Ecoregions 71d and 71l but have elements that are distinct from Ecoregion 71c.

71l. Inner Bluegrass

The nearly level to rolling Inner Bluegrass (71l) is a weakly dissected agricultural plain containing extensive karst, intermittent streams, and expanding urban-suburban areas that originally developed near major springs. Deep, forested gorges also occur along the Kentucky and Dix rivers. The Inner Bluegrass (71l) is characteristically underlain by Middle Ordovician Lexington Limestone and is lithologically distinct from the rest of Ecoregion 71. Very fertile Alfisols and Mollisols have developed from the residuum of underlying phosphatic limestone; natural soil fertility is greater than in Ecoregion 71k. The original open woodlands, savannas, and swamp forests have been largely replaced by agriculture and urban-suburban-industrial areas. However, deciduous forests containing eastern redcedar still occur in ravines, along the Kentucky River, and near streams. Thoroughbred horse farms, cattle grazing, tobacco, alfalfa, and hay farming are common land uses. Some upland streams are very warm and have seasonally variable flows but others, fed by major springs, are colder and have plentiful perennial flow. In either case, they have moderate to low gradients, cobble or bedrock substrates, and fish assemblages that are similar to the Outer Bluegrass (71d) and the Hills of the Bluegrass (71k). Higher gradient streams draining into the Kentucky River gorge have macroinvertebrate and fish assemblages that are more typical of the Knobs–Norman Upland (71c) than the rest of Ecoregion 71l. Agriculture contributes sediment, nutrients, pesticides, and pathogens to surface water; algal blooms and low concentrations of dissolved oxygen occur especially where the riparian tree canopy has been removed. Wastewater discharge and runoff downstream of urban areas release trace metals into some streams. Package waste treatment plants for small residential subdivisions often discharge into dry valleys, produce effluent-dominated streams, and have a high failure rate. The Kentucky River has some of the highest nitrite plus nitrate and phosphate concentrations in Kentucky. It has been impounded by a series of locks and dams, causing the number of pool-inhabiting fish to increase at the expense of upland habitat species.

72. Interior River Valleys and Hills

Ecoregion 72 in Kentucky is made up of nearly level lowlands that are dominated by agriculture and forested hills. It is characteristically underlain by carboniferous sedimentary rock and is lithologically distinct from the limestones, calcareous shales, and dolomites of the Interior Plateau (71) and the unconsolidated coastal plain sediments of the Mississippi Valley Loess Plains (74). Broad, low gradient valleys occur and are filled with alluvium, loess, and lacustrine deposits. Drainage conditions and terrain strongly affect land use. Wetlands are common on lowlands and

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bottomlands. Bottomland deciduous forests and swamp forests were once extensive on poorly-drained, nearly level, lowland sites but most have been replaced by cropland and pastureland. Hilly uplands remain mostly forested. Ecoregion 72 includes Kentucky's Western Coal Fields. Extensive surface and underground coal mines occur and have significantly degraded downstream habitat and water quality. Silt and sand dominate lowland channels while upland streams are rockier. Streams typically have lower nutrient, alkalinity, and hardness levels than Ecoregion 71. Fish assemblages are lowland in character and are rather similar to those found in Ecoregion 74 although several species are unique to a particular river basin.

72a. Wabash–Ohio Bottomlands

The Wabash–Ohio Bottomlands ecoregion is composed of nearly level, poorly-drained floodplains and undulating terraces. Wetlands, ponds, abandoned channels, oxbow lakes, and low ridges occur. Potential natural vegetation is mapped as southern floodplain forest. Ecoregion 72a is lower, more poorly-drained, and has a different natural vegetation than other parts of Ecoregion 72. Today, some woodlands remain but livestock, alfalfa, corn, soybean, and wheat farming is extensive. Land use is affected by seasonally high water tables and localized flooding. Low gradient streams with silt or sand bottoms occur and are inhabited by Ohio River-type fish fauna. Channelization and drainage ditches are common.

72c. Green River–Southern Wabash Lowlands

The Green River–Southern Wabash Lowlands (72c) is dominated by agriculture and coal mining. Wide, poorly-drained, low gradient valleys filled with alluvial and lacustrine deposits are extensive and low hills mantled with loess occur. Ecoregion 72c is largely underlain by Pennsylvanian carboniferous sedimentary rocks of the Sturgis and Carbondale formations that are not exposed in the higher, more rugged, and more wooded Ecoregion 72h. Bottomland forests were once common and oak–hickory forests grew on the better-drained upland sites. Today, some forests and wetlands remain but cropland, pastureland, and both underground and surface coal mining are now extensive. Siltation from mining and agriculture has increased flooding and prompted remedial channelization projects. Channelized streams lack riparian forests and have very warm water, high turbidity, and limited concentrations of dissolved oxygen. Acid coal mine runoff has decreased biological productivity in streams; many tributaries have low numbers of fish and fish species while others are entirely devoid of fish. Macroinvertebrate and fish communities are similar to those in Ecoregion 72a but are less diverse than in the upland streams of Ecoregion 72h.

72h. Caseyville Hills

The dissected Caseyville Hills (72h) is dominated by forests and pastureland and is mantled by thin loess. Valleys are narrower and are much less extensive than in Ecoregion 72c but are wider, deeper, and more numerous than in Ecoregion 71a. Ecoregion 72h is underlain by Pennsylvanian sandstones, siltstones, shales, and coal of the Tradewater and Caseyville formations and Mississippian Chesterian limestones, sandstones, siltstones, and shales. These formations are absent from the lower, less rugged, and less wooded Ecoregions 72a and 72c. Limestone is much less common than in the Interior Plateau (71). Potential natural vegetation is oak–hickory forest and forests remain common. Today, livestock and hay farming, logging, oil production, and coal mining are the dominant land uses. However, coal mining is less extensive than in Ecoregion 72c. Upland perennial streams are cooler and have higher gradients, rockier substrates, better water quality, more diverse habitats, and more productive fish and macroinvertebrate communities than Ecoregion 72c.

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73. Mississippi Alluvial Plain

Ecoregion 73 is mostly a flat, broad alluvial plain with river terraces, swales, and levees providing the main elements of relief. Soils are typically finer-textured and more poorly-drained than the upland soils of Ecoregion 74. However, better-drained loamy, silty, and sandy soils also occur. Winters are mild and summers are hot. Bottomland forests dominated by water-tolerant oaks and swamp forests of tupelo and bald cypress were once common. Grasslands occurred on well-drained sandy sites. Much of the natural vegetation has been cleared and drained for cultivation. Streams are extremely low in gradient and have sandy to muddy substrates. Fish assemblages, with the exception of a few rare and sporadically occurring species, are similar to those in the lowland streams in Ecoregion 74.

73a. Holocene Meander Belts

The Holocene Meander Belts (73a) contains floodplains, low terraces, levees, abandoned channels, oxbow lakes, wetlands, and bayous. Soils are derived from deep Quaternary alluvium and are naturally fertile. They support a potential natural vegetation of southern floodplain forest that is distinct from the oak–hickory forest of nearby upland ecoregions. Aquatic communities are largely lentic in nature and Mississippian-type biotic assemblages occur. Undrained areas are subject to seasonal flooding. Elsewhere, drainage canals and field drains are common. Extensive wetland drainage and bottomland forest clearance has occurred in Ecoregion 73a. Today, the ecoregion is dominated by soybean, corn, small grain, and livestock farming. Only limited areas of bottomland forests and swamps still occur. The remaining bottomland forests are dominated by water-tolerant oaks, maples, sweetgum, sugarberry, sycamore, American elm, and pecan. The remaining swamps contain many southern species that are near their northern distributional limits including bald cypress and tupelo. Water and marsh birds are abundant.

74. Mississippi Valley Loess Plains

Ecoregion 74 in far western Kentucky consists of irregular plains, gently rolling hills, and, near the Mississippi River, bluffs. It is characteristically covered by thick loess and alluvium and is underlain by unconsolidated coastal plain sediments that are susceptible to rapid erosion. Ecoregion 74 is lithologically distinct from the consolidated bedrock of the Interior Plateau (71) and the Interior River Valleys and Hills (72). Ecoregion 74 has less relief than Ecoregions 71 and 72. Elevations and relief are much lower than in the Appalachian Mountains (i.e. Ecoregions 68, 69, and 70). Potential natural vegetation is oak–hickory forest and is unlike the southern floodplain forest of the Mississippi Alluvial Plain (73). Forested wetlands were once extensive but have been replaced by extensive cropland and pastureland. Streams typically have low gradients and gravelly to sandy bottoms. Stream alkalinity and hardness levels are lower than in Ecoregion 71. Fish assemblages, with the exception of several locally endemic species, are similar to those of Ecoregions 72 and 73. Virtually all of the major stream systems have been channelized to some degree.

74a. Bluff Hills

The highly dissected Bluff Hills (74a) is a narrow belt of rugged terrain that is mantled by thick loess and underlain by unconsolidated coastal plain sediments. The Bluff Hills (74a) ecoregion is highly susceptible to landslides and erosion if disturbed. Ecoregion 74a is higher and more rugged than adjacent ecoregions. Steep hills, bluffs, winding ridges, and narrow valleys occur and have a mosaic of macroenvironments. Drier uplands are covered in oak–hickory forest and mixed oak forests. Mesic slopes have closed forests that are dominated by sugar maple, bitternut hickory, yellow-poplar, and beech. Aquatic habitats and fish assemblages are more typical of uplands than of nearby Ecoregions 73a and 74b. Intermittent and ephemeral streams are common and have silty or sandy bottoms. Higher gradient stream reaches with gravel substrates also occur.

Appendix 1.11 Continued.

74b. Loess Plains

The Loess Plains (74b) is a productive agricultural area that is composed of gently rolling uplands, broad bottomlands, and terraces. It is mantled by thick loess and alluvium and is underlain by weak, unconsolidated coastal plain sediments. Ecoregion 74b is lithologically distinct from higher, more easterly ecoregions. Potential natural vegetation is a mosaic of oak–hickory forest and bluestem prairie and is unlike the southern floodplain forest of Ecoregions 72a and 73a. Grasslands and forested wetlands were once widespread here and in the Western Pennyroyal Karst Plain (71e). Most of the original vegetation has now been replaced by cropland. Extensive corn, soybean, wheat, hay, tobacco, livestock, and poultry farming occurs. Agricultural runoff has degraded surface water quality. High turbidity and siltation are common in the streams and rivers of Ecoregion 74b. Many channelized streams occur.