Ecological Site Description

Sand Dune Swale Forest F131AY017MO

- *(Quercus lyrata - Quercus phellos/Lindera melissafolia/Carex)*
- (overcup oak – willow oak/pondberry/sedge)

An Ecological Site Description (ESD) is a reference document of ecological knowledge regarding a particular land area (ecological site). An ESD describes ecological potential and ecosystem dynamics of land areas and their potential management. Ecological sites are linked to soil survey map unit components, which allows for mapping of ecological sites. (***NOTE:*** *This is a "provisional" ESD, and is subject to change. It contains basic ecological information sufficient for conservation planning and land management in Missouri. After additional information is developed and reviewed, a "Correlated" ESD will be published and will be available via the Web Soil Survey* http://websoilsurvey.nrcs.usda.gov .)

Major Land Resource Area: 131A – Southern Mississippi River Alluvium

Introduction

The Southern Mississippi River Alluvium (area outlined in red on the map; northern portion only) is a vast alluvial plain, stretching from the confluence of the Mississippi and Ohio Rivers to tidewater areas of the Gulf of Mexico. The area is formed primarily in sediments deposited by the Mississippi River, with significant contributions from the St Francis and Black Rivers west of Crowley's Ridge, in the northern part of the area. A variety of alluvial landforms are present, including natural levees, sand splays, backswamps, channels, swales, stream terraces and braided terraces. Dunes have formed from wind redistribution of alluvial sands, and loess deposits overlie older terraces to the west. Elevation ranges from about 330 feet in the north to sea level in the south. Local relief is low, and much of the area appears flat, although low escarpments and other slight changes in elevation often indicate major changes in hydrology and soils.

Sand Dune Swale Forests are within the green areas on the map (Missouri portion only; distributions farther south are currently under review). These sites are locally extensive west of the St Francis River, in Butler and Ripley counties, Missouri. They are associated with the Loess Terrace ecological sites, and are often intermingled with Sand Dune Woodland ecological sites. Soils are coarse textured, with sandy loam surface layers, and high water tables.

Physiographic Features

These sites are in nearly level broadly concave swales in areas of sand dunes. Some areas are subject to flooding and ponding.

Soil Features
These soils are very deep, with seasonal high water tables. The soils were formed under forest vegetation. Organic matter content is low. Parent material is coarse-textured alluvium. They have loamy fine sand to fine sandy loam surface layers, with loamy subsurface layers that are generally sandy loam to loamy sand. These soils are affected by seasonal wetness. Soil series associated with this site include Patterson and Tuckerman.

Ecological Dynamics
Information contained in this section was developed using historical data, professional experience, field reviews, and scientific studies. The information presented is representative of very complex vegetation communities. Key indicator plants, animals and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The Reference Plant Community is not necessarily the management goal. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

Sand Dune Swale Forests occur in on depression to nearly level soils on low terraces near adjacent dune fields that are slightly elevated above the surrounding lowlands. Many of these sites are closely associated or intergrade with sand savannas and woodlands. These areas occasionally flood, usually pond water for 3 to 12 months, and have seasonal high water tables. These conditions kept fire at bay and allowed a closed, medium height canopy (60 to 80 feet) of overcup oak, willow oak, green ash, and silver maple with a well-developed understory consisting of pondberry, as well as stiff dogwood and trumpet creeper. Ground cover was patchy consisting of perennial sedges, grasses and forbs.

Flooding, wind and ice storms were likely the most important disturbances in this system. All would have created occasional canopy gaps so that the oak species could regenerate.

Today most of these ecological sites have been converted to intensive agriculture. Only a few quality remnants exist. These remaining blocks of forest play an important role as a source of food and shelter for migrating birds. Their position and soil properties also make them good candidates for wet sand forest development and management. Planting of these later successional species on the appropriate landscape position and soils has proven to be quite successful.

Reference State Plant Community
Canopy Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
WILLOW OAK	*Quercus phellos*	10-20	80
OVERCUP OAK	*Quercus lyrata*	10-20	70
WATER OAK	*Quercus nigra*	10-20	70
GREEN ASH	*Fraxinus pennsylvanica*	10-20	60
SILVER MAPLE	*Acer saccharinum*	10-20	60
PIN OAK	*Quercus palustris*	10-20	80
RED MAPLE	*Acer rubrum*	10-20	70
SWEETGUM	*Liquidambar styraciflua*	10-20	70

Understory Trees

Common Name	Botanical Name	Cover % (low-high)	Canopy Height (ft)
PERSIMMON	*Diospyros virginiana*	5-20	40
WINGED ELM	*Ulmus alata*	5-20	15
STIFF DOGWOOD	*Cornus foemina*	5-20	15
PONDBERRY	*Lindera melissafolia*	5-20	4

Vines

Common Name	Botanical Name	Cover % (low-high)
TRUMPET CREEPER	*Campsis radicans*	5-20
CLIMBING DOGBANE	*Trachelospermum difforme*	5-20

Forbs

Common Name	Botanical Name	Cover % (low-high)
BUSHY GOLDENTOP	*Euthamia leptocephala*	5-20
STIFF BEDSTRAW	*Galium tinctorium*	5-20
COMMON WATER HEMLOCK	*Cicuta maculata*	5-20
CAROLINA SPIDER LILY	*Hymenocallis caroliniana*	5-20
VIOLET WOOD SORREL	*Oxalis violacea*	5-20
MARSH PHLOX	*Phlox glaberrima*	5-20
BLUNTLEAF BEDSTRAW	*Galum obtusum*	5-20

Grasses and sedges

Common Name	Botanical Name	Cover % (low-high)
HOP SEDGE	*Carex lupulina*	5-20
SHORELINE SEDGE	*Carex hylinolepis*	5-20
TUFTED SEDGE	*Carex brevior*	5-20
INDIAN WOODOATS	*Chasmanthium latifolium*	5-20
VIRGINIA WILDRYE	*Elymus virginicus*	5-20

Site Interpretations

Wildlife

- Moist conditions with abundant coarse woody debris make this type important for many herptiles.
- Ephemeral pools provide important amphibian breeding habitat.
- Periodic inundation and acorns provide important habitat for migrating ducks (especially mallards) and breeding ducks including wood ducks and hooded mergansers.
- Important migratory songbird stopover sites and seasonal inundation important for water birds.
- Birds associated with early-successional stages include Common Yellowthroat, Willow Flycatcher, Carolina Wren, Yellow Warbler, Song Sparrow, and Prothonotary Warbler (if snags are available). Birds associated with mid-successional stages are American Redstart, Northern Parula, and Willow Flycatcher.
- Birds associated with late-successional stages are Wood Duck, Hooded Merganser, Barred Owl, Cerulean Warbler, Yellow-throated Warbler, Prothonotary Warbler, Pileated Woodpecker, Swainson's Warbler (sites with giant cane or sapling/brambles dominated understory), Yellow-throated Vireo, Brown Creeper, and Yellow-crowned Night Heron.

- Reptiles and amphibians associated with these sites include: marbled salamander, mole salamander, small-mouthed salamander, central newt, midland brown snake, broad-banded water snake, western mud snake, gray tree frog, northern spring peeper, blanchard's cricket frog, southern leopard frog, western painted turtle, and red-eared slider.

Forestry

- Management: Estimated site index values range from 50 to 70. On the wettest sites, timber management opportunities may be limited. Management of these groups is often difficult because of the great variation in species, age, stocking levels and seasonal wetness. Use seed-tree, group selection, or clear cutting regeneration methods. Maintain adequate riparian buffer areas.

- Limitations: Wetness from high water table. Use of equipment may be restricted in spring and other excessively wet periods. Restrict activities to dry periods or surfaced areas. Planting is extremely difficult during spring periods.

Glossary

Backslope – a hillslope profile position that forms the steepest and generally linear, middle portion of the slope.

Backswamp – marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces

Calcareous – the presence of calcium carbonate in the soil parent material within the rooting zone; relatively alkaline

Claypan – a dense, compact, slowly permeable layer in the subsoil having much higher clay content than the overlying material

Chert – hard, extremely dense or compact crystalline sedimentary rock, consisting dominantly of interlocking crystals of quartz

Cliff – a significant vertical, or near vertical, rock exposure

Dolomite – a type of sedimentary rock that is a carbonate mineral composed of calcium magnesium carbonate

Drainageway – the upper most reach of a stream channel system characterized by little meandering

Dry – a site where soil moisture is limiting during the growing season; low available water capacity

Dune – a low mound, ridge, bank or hill of loose, wind-blown sand

Exposed – steep, south and west-facing slopes, which are warmer and drier than other slope aspects

Flatwoods – a type of woodland that occurs on soils with a root restricting subsoil layer within 20 to 30 inches, resulting in very slow runoff and ponding that remains saturated for most of the winter and early spring months but dries out and becomes very dry in the summer months; plants that grow there must be adapted to both conditions

Floodplain – the nearly level plain that borders a stream and is subject to inundation under flood-stage conditions

Footslope – a hillslope position at the base of a slope where hillslope sediment (colluvium) accumulates

Forest – a vegetative community dominated by trees forming a closed canopy and interspersed with shade-tolerant understory species

Fragipan – a dense, brittle subsoil horizon that is extremely hard and compact when dry

Glade – open, rocky, barren vegetative community dominated by drought-adapted forbs and grasses, typically with scattered, stunted woody plants

Igneous –bedrock formed by cooling and solidification of magma. Granite and rhyolite are typical igneous bedrocks in Missouri

Limestone – a type of sedimentary rock composed largely of calcium carbonate

Loess – material transported and deposited by wind and consisting predominantly of silt-size particles

Loamy – soil material containing a relatively equal mixture of sand and silt and a somewhat smaller proportion of clay

Marsh – a type of wetland that is dominated by herbaceous rather than woody plant species

Moist – a site that is moderately well to well drained and has high available water capacity, resulting in a well-balanced supply of moisture (neither too dry nor too wet).

Mudstone – blocky or massive, fine-grained sedimentary rock in which the proportions of clay and silt are approximately equal

Natric – a soil horizon that displays a blocky, columnar, or prismatic structure and has a subhorizon with an exchangeable-sodium saturation of over 15%

Outwash – stratified sediments of sand and gravel removed or “washed out” from a glacier by melt-water streams

Prairie – a vegetative community dominated by perennial grasses and forbs with scattered shrubs and very few trees

Protected – steep, north- and east-facing slopes, which are cooler and moister than other slope aspects

Residuum - unconsolidated, weathered, or partly weathered mineral material that accumulates by disintegration of bedrock in place

Riser – a component of terraces and flood-plain steps consisting of the steep side slope; the escarpment

Riverfront – a vegetative community in the floodplain immediately adjacent and generally parallel to a river or stream channel

River hills – a geographic area characterized by thick, dissected loess deposits, formed immediately adjacent to the edges of the Missouri and Mississippi River floodplains

Sandy – a coarse-sized soil containing a large mixture of sand and gravels and a somewhat smaller proportion of silts and clays with excessive drainage

Sandstone – a sedimentary rock containing dominantly sand-size particles

Savanna – grasslands interspersed with open-grown scattered trees, groupings of trees, and shrubs

Shale – a sedimentary rock formed from clay, silty clay, or silty clay loam deposits and having the tendency to split into thin layers

Shallow – a site with bedrock within 20 inches of the surface

Shoulder – the slope profile position that forms the convex surface near the top of a hill slope; it comprises the transition zone from summit to backslope

Sinkhole – a closed, circular or elliptical depression, commonly funnel-shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock or by collapse of underlying caves within bedrock

Summit – the top or highest area of a hillslope

Swale –shallow, closed depressions irregularly spaced across a floodplain or terrace with an irregularly undulating surface.

Swamp – an area of low, saturated ground, intermittently or permanently covered with water, and predominantly vegetated by shrubs and trees.

Talus – rock fragments of any size or shape (usually coarse and angular) derived from and lying at the base of a cliff or very steep rock slope.

Terrace – a step-like surface, bordering a valley floor that represents the former position of a flood plain

Till – dominantly unsorted and unstratified soil material deposited directly by a glacier

Upland – a general term for the higher ground of a region, in contrast with a low-lying, adjacent land such as a valley or floodplain

Wet – a somewhat poorly, poorly or very poorly drained site that has an oversupply of moisture during the growing season

Woodland – a highly variable vegetative community with a canopy of trees ranging from 30 to 100 percent closure with a sparse midstory and a dense ground flora of grasses, sedges and forbs

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