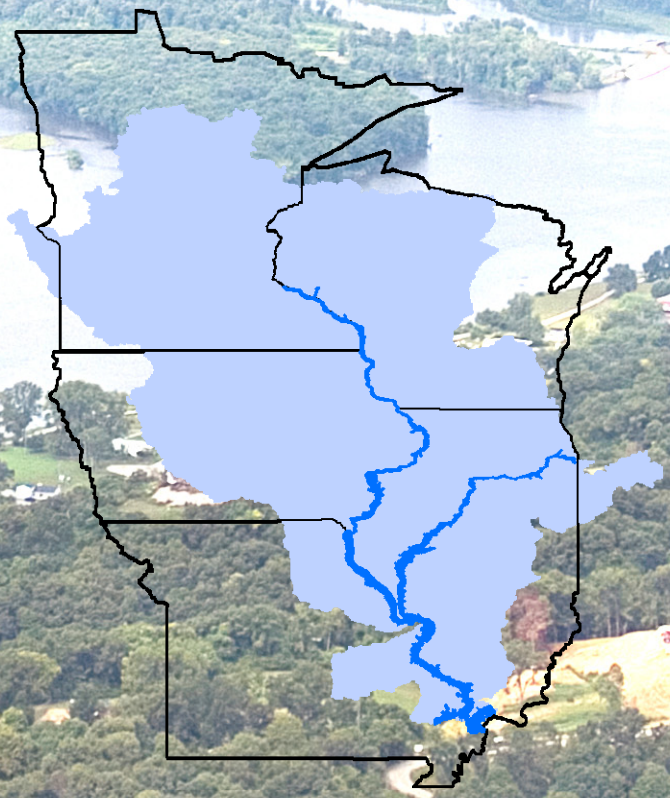
Upper Mississippi River

Systemic Forest Stewardship Plan

Executive Summary



US Army Corps of Engineers ®

St. Paul District
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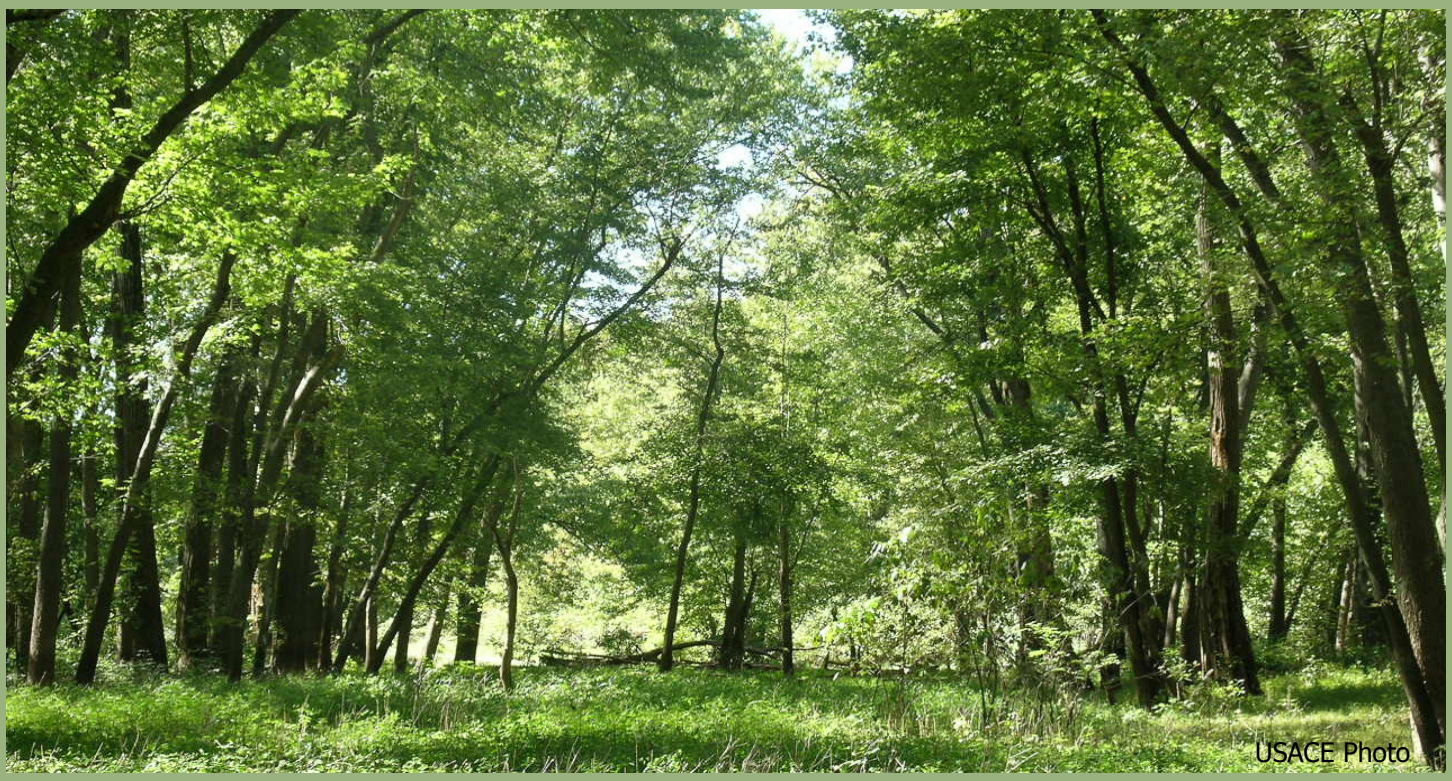
Our Mississippi
PARTNERING TO KEEP AMERICA'S RIVER GREAT

August 2012

Introduction

The Mississippi River is the largest riverine ecosystem in North America and third largest in the world. The Upper Mississippi River (UMR) floodplain ecosystem supports more than 300 species of birds, 57 species of mammals, 45 species of amphibians and reptiles, 150 species of fish, and nearly 50 species of mussels. It is the backbone of the Mississippi Flyway, which is used by more than 40 percent of North America's migratory waterfowl. The Upper Mississippi River also has a record of human history spanning over 12,000 years and is increasingly being documented as one of the most archeologically and historically significant regions in the country. The river has played a significant role in the development of the modern Midwestern economy and culture, and it continues to provide many benefits to the States and local communities along the river corridor.


USACE Photo

The UMR Systemic Forest Stewardship Plan was developed to provide a guide for the sustainable management of Upper Mississippi River System (UMRS) forests, including opportunities for their restoration, and to ensure that the UMRS maintains its recognition as a nationally treasured ecological resource. The Plan accomplishes this by describing the current understanding of the state of the resource and its ecological stressors; providing guidance for forest restoration activities; establishing goals and objectives; identifying opportunities and data needs; establishing a monitoring strategy through an adaptive management framework; and developing additional recommendations that will ensure the long-term sustainability of this key component of the UMRS ecosystem.

Development of the Plan largely followed from agency and stakeholder recognition of the need for a framework of coordinated management at a system level to advance the overarching ecosystem goal of conserving, restoring, and maintaining the ecological structure and function of the UMRS. The coordinated effort was guided by a Product Delivery Team (PDT) consisting of members from the three UMRS Corps of Engineers Districts, five UMRS States, multiple Federal Agencies, non-governmental organizations, and additional stakeholders. The Plan establishes a foundation for the Corps and these partner agencies and stakeholders to more effectively collaborate on and implement environmental stewardship activities in UMRS forests.

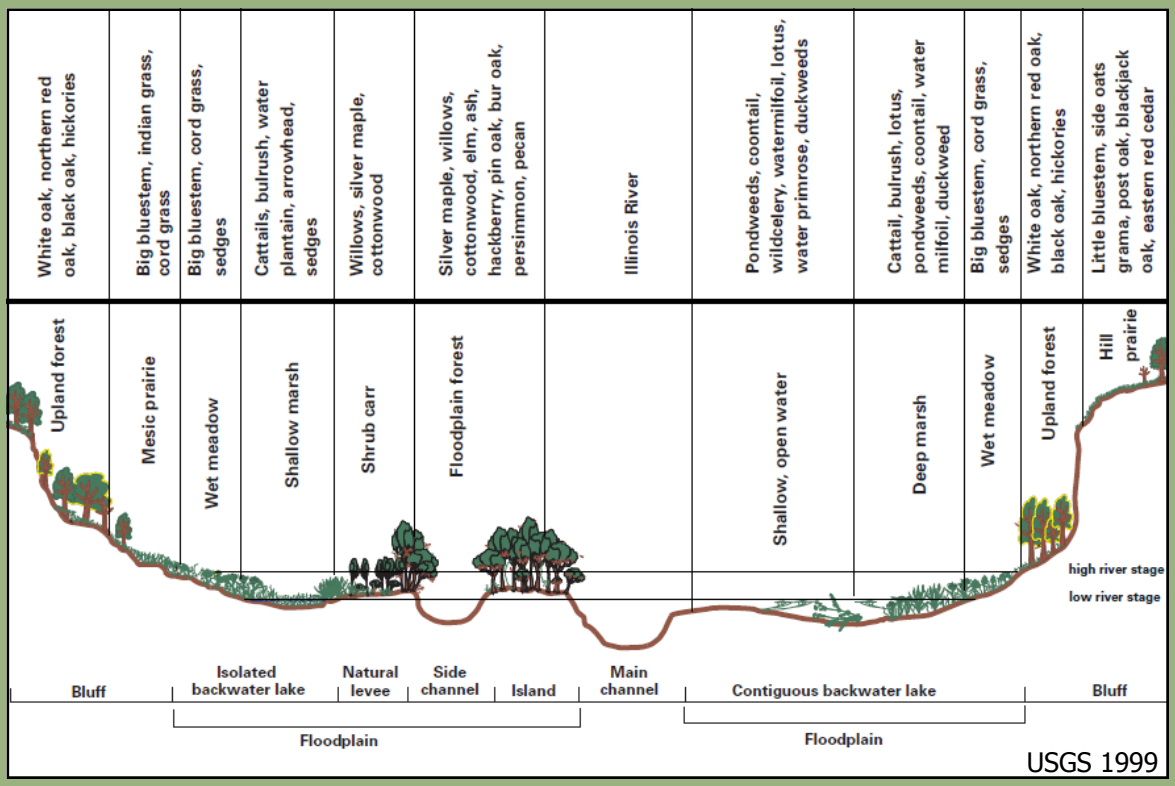
Designated Project Area

The Systemic Forest Stewardship Plan project area is designated as the Upper Mississippi River System (UMRS) 500-year floodplain, regardless of ownership. The UMRS itself is a subset of the larger Mississippi River system, and includes the Mississippi River from Minneapolis–St. Paul, Minnesota, to its confluence with the Ohio River; the Illinois River from Chicago to Grafton, Illinois; and navigable sections of the Minnesota, St. Croix, Black and Kaskaskia Rivers. The lateral extent of the 2.6 million acre UMRS floodplain ecosystem generally encompasses the river valley lands from bluff to bluff, and consists of a mosaic of land and water that contains bottomland forests, grasslands, islands, backwaters, side channels and wetlands.

NLCD 2006

Resource Trends

Modern UMRS forests represent only a small portion of pre-settlement floodplain forests in some reaches. The development of the UMRS floodplain for agriculture, combined with extensive logging for fuel wood and lumber, resulted in widespread conversion of forest and prairie habitats. Today, contiguous forest cover is primarily confined to a relatively narrow strip on the riverward side of agricultural levees, although large portions of forest remain relatively intact in some protected refuge areas. In many river reaches, most natural floodplain communities have been replaced by agriculture. Species composition of the remaining forest has also become less diverse, due in part to altered hydrology, a loss of the seasonal "flood pulse," and the effects of periodic severe flooding, particularly the flood of 1993. This change is especially evident in the decline of mast producing species such as oaks and hickories, and corresponding increase in dominance by silver maple in many floodplain forest communities. Diseases, insects and invasive plant species also continue to have negative impacts throughout the UMRS.

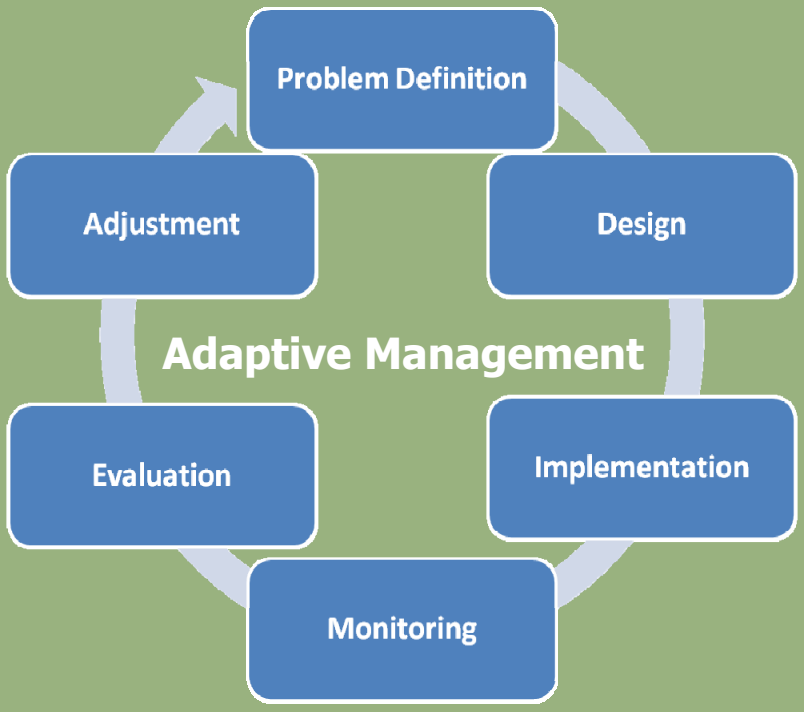


USGS 1999

Future Trends in UMRS Floodplain Forests

Some of the changes we might expect to see over the next 50 years, **without** active forest management, are outlined below:

- A reduction in pioneer species such as cottonwood and willow
- More open forest canopies as trees die and canopy gaps are invaded by herbaceous vegetation and/or grasses (e.g., reed canary grass)
- Continued loss of forest in the lower parts of navigation pools due to island erosion
- Conversion of forest to other vegetation types in mid-pools due to elevated water tables
- Fewer mast trees as species composition in intact forests continues to shift towards silver maple and other more shade and water tolerant trees



Adaptive Management

Partners have agreed to include the incorporation of an adaptive management framework in forest management and restoration activities as a variety of uncertainties exist regarding the long-term trajectory of the forest resource. Restoration projects can then become learning opportunities by utilizing an experimental design or technique and effective monitoring strategies that in turn inform future management decisions.

UMRS Floodplain Forest Ecosystem Services

Water Quality – Improvement to ground and surface water by promoting infiltration, recharge, detoxification, and nutrient cycling; natural flood and erosion/scour control by absorbing energy from floodwaters, reducing flood velocities and peaks, and reducing sediment loads.

Living Resources – Provision of fish and wildlife habitat, organic matter production, natural genetic diversity, pollination, protection of rare and endangered species, and creation of corridors for migration.

Land Based Resources– Establishment and enhancement of forests, harvests of natural products, wind breaks, and carbon sequestration.

Education/Research – Opportunities for environmental education and the scientific study of physical, biological and cultural resources.

Cultural/Recreational Resources – Consumptive and non-consumptive uses, open space, and aesthetic values.

Desired Future Condition

Among the public lands in the UMRS floodplain, Corps-managed lands have become critical for the ecological sustainability of floodplain forests and associated terrestrial and aquatic ecosystems. The Corps forestry program will provide high-quality, sustainable bottomland forest on Corps lands along the UMRS, including a natural diversity of tree species, ages, canopy heights, and understory vegetation. The "ideal" floodplain forest will support floodplain ecosystem functions and sustainable habitat for wildlife. Therefore, the vision is to maintain a healthy, nearly contiguous forest that spreads across wide stretches of the floodplain and contains a sufficient diversity of tree species, size and age classes to provide a wide array of habitat structure and food (mast) resources.

Photo by L. Guyon

USACE Photo

Photo by L. Guyon

System-Wide Goals

The UMR Systemic Forest Stewardship Plan is based upon a set of ecologically and socially desired future UMRS ecosystem conditions, summarized in the following vision statement endorsed by the Navigation Environmental Coordinating Committee (NECC) and in the overarching ecosystem goal developed by the Navigation and Ecosystem Sustainability Program (NESP) Science Panel:

Vision Statement – To seek long-term sustainability of the economic uses and ecological integrity of the Upper Mississippi River System

Overarching Ecosystem Goal – To conserve, restore, and maintain the ecological structure and function of the Upper Mississippi River System to achieve the vision.

The following ***system-wide goals*** were developed for inclusion in the UMR Systemic Forest Stewardship Plan:

- A functional, sustainable floodplain ecosystem that includes a mosaic of native vegetation communities sufficient to support important wildlife habitat
- Restore and maintain forest diversity, health, and sustainability on Federal lands
- Provide support for the restoration and maintenance of forest diversity, health and sustainability on non-Federal lands
- Science-based decision-making: adaptive management

Floodplain Forest Restoration Tools

- Timber stand improvement (TSI)
- Harvesting methods
  - group selection, Shelterwood, & seed tree
- Site preparation
- Forest establishment
  - Natural regeneration
  - Tree plantings
    - containerized saplings, bare root seedlings, & direct seeding
- Prescribed burning
- Elevation modification
- Water level management

Forester scaling logs for a timber sale. USACE Photo

Moving trees by boat to island planting site. USACE Photo

Planting bare root seedlings in an open area. USACE Photo

Typical container tree planting. USACE Photo

Desired Stand Conditions for UMRS Forests

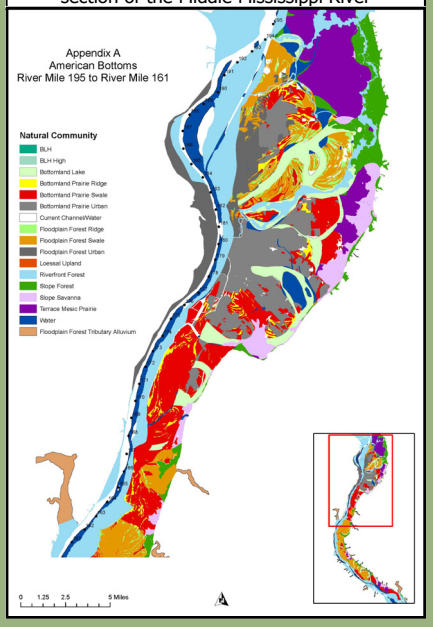
Forest Variables	Desired UMRS Stand Structure	Conditions that may warrant active mgmt
Overstory canopy cover	70 – 80%	> 80%
Overstory Species	2 or more species	Large blocks of single species
Basal area	90-160 ft^2 per acre	> 200 ft^2 per acre
Tree stocking	50% – 90%	< 50% or > 90%
Emergent trees	> 2 per acre	< 1 per acre
Understory cover	> 10 %	< 10%
Regeneration	> 10% of area	< 10% of area
Coarse woody debris	Present	Not Present
Small cavities	≥ 2 visible holes per acre	< 2 visible holes per acre
Den trees/large cavities	≥ 1 visible hole per 10 acres	< 1 visible holes per 10 acres
Standing dead trees	≥ 2 large trees per acre	< 2 large trees per acre
Invasive (herbaceous)	< 10%	> 10% of herbaceous layer
Invasive (woody)	< 10%	> 10% of any canopy layer

Recommended Priority Actions

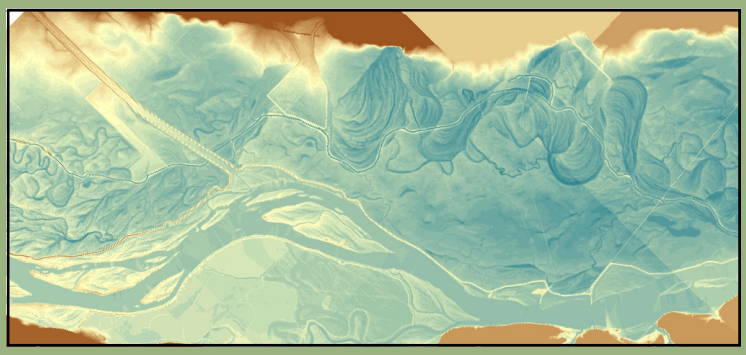
Development of a system-wide hydrogeomorphic model (HGM)

Hydrogeomorphic modeling can provide a science-based approach to identifying ecosystem restoration options and providing recommendations for sustainable management of large river floodplain systems such as the UMRS. The HGM approach allows managers to determine historical conditions and ecological processes of an area, determine ecosystem alterations by comparing historic and current landscapes, and identify options and approaches to restore specific habitats and ecological conditions (Heitmeyer 2008).

Potential presettlement natural communities in a section of the Middle Mississippi River



HGM product for a small section of the Middle Mississippi River. Source: M. Heitmeyer



Small portion of Mississippi River floodplain depicted by LIDAR. Source: USACE

Data acquisition

Data needs include extensive baseline vegetation inventories and fine-scale elevation contours (e.g., LIDAR).

Identification and prioritization of "on-the-ground" forest restoration projects

For example, the Reno Bottoms Forest Restoration Project, located in upper Pool 9, is focused on restoring forest species and age class diversity on up to 1,100 acres negatively impacted by tree mortality, altered hydrology, and invasion by reed canary grass.

Reed canary grass invading the floodplain forest at Reno Bottoms. Photo by L. Guyon

Coordinated system-wide data management

There is a demonstrated need for coordinated database management and data archiving related to a variety of management and restorations efforts throughout the UMRS.

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For additional copies of the complete Upper Mississippi River Systemic Forest Stewardship Plan please visit www.OurMississippi.org.

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