Introduction
The Upper Mississippi River Systemic Forest Management 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 developing a better understanding of the state of the resource and its ecological stressors; providing guidance for forest restoration activities; establishing comprehensive strategies and tactics; and providing directions and recommendations that will serve the long-term sustainability of this key component of the UMRS ecosystem.

Development of the Plan
The Plan, developed under the guidance of the Upper Mississippi River Conservation Committee (UMRCC), was the result of extensive efforts by a wide variety of interested parties to begin the process of making the UMRS a more productive, sustainable ecosystem. The Plan was developed through an organized effort 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 other stakeholders.

Desired Future Condition
Corps-managed lands have become critical for the ecological sustainability of UMRS floodplain forests and associated terrestrial and aquatic ecosystems. The Corps forest 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 forest 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 sufficient diversity of tree species, size, and age classes to provide a wide array of habitat structure and function (Urich et al. 2002).

Adaptive Management
Partners have agreed to include the following adaptive management framework in forest management and restoration activities as a variety of uncertainties exist regarding the long-term trajectory of the forest resource. Restoring floodplain forest structures is an experimental design or technique and effective monitoring strategies that will inform future management decisions (Barko et al. 2006; USACE 2004)

Designated Project Area
The Systemic Forest Management Plan project area is designated as the Upper Mississippi River System (UMRS) 500-year floodplain, regardless of ownership. The lateral limit of the UMRS floodplain ecosystem is generally the river valleys from bluff to bluff, or to elevated terraces.

The UMRS itself is a subset of the larger Mississippi River system, and includes floodplain forest 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 Kickapoo Rivers.

The UMRS floodplain ecosystem covers 2.6 million acres of land and water that consists of a mosaic of bottomland forests, grasslands, islands, backwaters, side channels and wetlands.

Floodplain Forest Ecosystem Services
- Water Quality – Improvement to ground and surface water by promoting infiltration, recharge, decontamination, and nutrient cycling; natural flood and erosion/sediment control by arresting erosion from floodplains, reducing flood velocities, and peak flows, 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 wildlife products, wind breaks, and soil sequestration.
- Education/Research – Opportunities for environmental education and the scientific study of physical, biological and cultural resources.
- Cultural/Recreational Resources – Productive uses and non-consumptive uses, open space and aesthetic values.

Floodplain Forest Restoration Tools
- Harvesting methods – Selective cut, shelterwood
- Site preparation
- Forest establishment – Intensified regeneration
- Tree plantings – Contaminated and Rim® seedlings
- Bare root seedlings
- Direct seeding
- Timber stand improvement (TSI)
- Prescribed burning
- Electrical stimulation
- Water level management

Future UMRS Floodplain Forests
Some of the changes we might expect to see over the next 50 years, without active forest management, are outlined below (Urich et al. 2002)
- A reduction in pioneer species such as cottonwood and willow
- More open forest canopies as trees die and canopy gaps are invaded by herba-
cose vegetation and/or grasses (e.g., reed canary grass)
- Continued loss of forest in the lower parts of navigation pools due to island ero-
sion
- 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 to
- Fewer willow stands
- Conversion of forest from other vegetation types in mid-pools due to elevated water tables
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- Fewer willow stands

Desired Stand Conditions for UMRS Forests

| Characteristics | Stand Structure | Actionable Management
|----------------|----------------|------------------------|
| Desired UMRS stand structure | 46.001 | Infiltration, recharge, detoxification, and nutrient cycling; natural flood and erosion/sediment control by arresting erosion from floodplains, reducing flood velocities, and peak flows, and reducing sediment loads.
| Infiltration, recharge, detoxification, and nutrient cycling; natural flood and erosion/sediment control by arresting erosion from floodplains, reducing flood velocities, and peak flows, and reducing sediment loads. | > 160 ft | Support for the restoration and maintenance of floodplain forest ecosystems and sustainable habitat for wildlife. |
| Natural diversity of tree species, ages, canopy heights, and understory vegetation. | < 2 large trees / acre | Support for the restoration and maintenance of floodplain forest ecosystems and sustainable habitat for wildlife. |
| Conversion of forest to other vegetation types in mid-pools due to elevated water tables. | > 10% | Support for the restoration and maintenance of floodplain forest ecosystems and sustainable habitat for wildlife. |
| Fewer mast trees as species composition in intact forests continues to shift to fewer silver maple and other more shade-tolerant trees. | < 2 species or more | Support for the restoration and maintenance of floodplain forest ecosystems and sustainable habitat for wildlife. |

Recommemded Priority Actions
- Development of a system-wide hydrogeomorphic model (HGM) – HGM can provide a solid science-based approach to identifying ecosystem restoration opportunities and providing recommendations for sustainable management of large river floodplain systems such as the UMRS. The HGM approach includes three stages: (1) determining historical conditions and ecological processes of an area; (2) determining ecosystem alterations by comparing historic versus current landscapes; and (3) identifying options and approaches to restore specific habitats and ecological conditions (Hollmen 2007).
- Floodplain forest restoration – Includes extensive baseline vegetation inventories and fine-scale elevation and topography models
- Identification and prioritization of “on-the-ground” forest restoration projects
- Coordinate system-wide data management

References