Missouri River Ecosystem Restoration Plan and Environmental Impact Statement
A Component of the Missouri River Recovery Program

Development of the Natural Resource Baseline Assessment
NCER
August 2, 2011
Objective

Share Missouri River Ecosystem Restoration Plan Natural Resources Baseline Assessment:

- Process
- Provisional results
- Technical expert input/participation
- Opportunities
Missouri River Ecosystem Restoration Plan and EIS

Missouri River Basin

One River • One Vision
The Missouri River Ecosystem Restoration Plan (MRERP) is authorized by the 2007 Water Resources Development Act (WRDA):

The Secretary of the Army, in consultation with the Missouri River Recovery Implementation Committee, shall conduct a study of the Missouri River and its tributaries to determine actions required

- To mitigate losses of aquatic and terrestrial habitat;
- To recover federally listed species; and
- To restore the ecosystem to prevent further declines among other native species.
Collaboration and Transparency

- US Army Corps of Engineers and US Fish & Wildlife Service
- Cooperating Agencies
- Tribes
- Missouri River Recovery Implementation Committee (MRRIC)
Technical Teams

Assembled to provide information for Focal Natural Resource baseline assessment over 15 months:

- 11 days of meetings
- 86 hours of conference calls
- Contribute
  - Content
  - Information
  - Reviews
Technical Teams: Cumulative Knowledge

- 56 Technical Experts
  - 30 river ecosystems and species experts
  - 29 floodplain ecosystem and species experts
- Multi-discipline
- Multi-agency and academia
Cumulative Knowledge

• Collectively Technical Teams have
  – 663 years of specialized experience
  – 457 years of experience with the Missouri River ecosystem

• On average Technical Team members have
  – 20 years experience in area of expertise
  – 14 years experience specifically with the Missouri River
### Planning Roadmap

**Initiate Planning**
1) Develop Partnerships and Prepare for the Study  
2) Establish Study Rationale and Focus

**Study the Affected Environment**
3) Assess Resource Conditions (Inventory)  
4) Evaluate Future Issues and Situation (Forecast)

**Consider Alternatives**
5) Formulate Restoration and Adaptive Management Alternatives  
6) Compare Impacts of Alternatives  
7) Consider Preferred Alternative

**Select the Plan**
8) Develop Draft MRERP-EIS  
9) Develop Final MRERP-EIS  
10) Develop Record of Decision
Focal Natural Resource Baseline Assessment

Purpose: To evaluate the existing condition of natural resources in the study area and provide a scientific foundation for establishment of goals, objectives and alternatives development.

Key Components:
- Focal Natural Resources
- Key Ecological Attributes
- Indicators
- Ecological Condition Gradient
- Current Condition Ratings/Scorecard
Focal Natural Resources

Ecological systems and specific species that characterize the natural resources and ecological diversity of the Missouri River system

**Ecosystem FNRs**
- Rocky Mountain Foothills
- Upper Great Plains
- Middle Great Plains
- Lower Great Plains
- Central Lowlands

**Species FNRs**
- Pallid Sturgeon
- Least Tern
- Piping Plover
Species Focal Natural Resources

Pallid Sturgeon

Least Tern

Piping Plover
Key Ecological Attributes

The critical biological or physical attributes that are required for long-term viability and sustainability of a Focal Natural Resource.
**MRERP Draft Key Ecological Attributes**

**Hydrology**
- River Flows

**Connectivity**
- River-Floodplain Connectivity
- Floodplain Habitat Size and Connectivity
- River Habitat Size and Connectivity

**Geomorphology**
- Sediment
- River Habitat Quality
- Floodplain Soil and Habitat Quality
- River-Floodplain Habitat Turnover

**Fire**
- Fire

**Hydrochemistry**
- River Water Chemistry
- River Water Temperature

**Biota**
- River Food Web
- Native River and Floodplain Vegetation
- Native Floodplain Wildlife
- Native River Wildlife

**Pallid, Tern and Plover Key Ecological Attributes:**
- Population Size
- Reproductive Success
- Survivorship
- Food Availability
- Organismal Condition
- Growth
Missouri River Ecosystem Restoration Plan and EIS

Ecosystem KEA Direct Relationships

KEY ECOLOGICAL ATTRIBUTES & GROUPINGS

HYDROLOGY
- 01 River Flows
- 02 River Water Chemistry
- 03 River Water Temperature

HYDROCHEMISTRY

GEOMORPHOLOGY
- 04 River Sediment
- 05 River-Floodplain Habitat Turnover
- 06 River Habitat Quality
- 07 Floodplain Habitat Quality

BIOTA
- 08 River Food Web
- 09 Native River Wildlife
- 10 Native Floodplain Wildlife
- 11 Native River & Floodplain Veg.

CONNECTIVITY
- 12 River-Floodplain Connectivity
- 13 River Habitat Size & Connectivity
- 14 Floodplain Habitat Size & Connectivity

FIRE
- 15 Fire

One River - One Vision
Indicators

Ecological or biological information that provides a quantitative and/or qualitative assessment of the condition or status of the significant features of a KEA.
Indicators

Ecological or biological information that provides a quantitative and/or qualitative assessment of the condition or status of the significant features

- River Flows
  - Low Flows
  - Extreme Low Flows
  - High Flow Pulses
  - Flood Flows
## Rating Tiers for Key Ecological Attributes

<table>
<thead>
<tr>
<th>Tier 1</th>
<th>Tier 2</th>
<th>Tier 3</th>
<th>Tier 4</th>
<th>Tier 5</th>
<th>Tier 6</th>
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<td>Minor departure from range of natural variation</td>
<td>Moderate departure from range of natural variation</td>
<td>Major departure from range of natural variation</td>
<td>Severe departure from range of natural variation</td>
<td>Extreme to complete departure from range of natural variation</td>
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Missouri River Ecosystem Restoration Plan and EIS

Sediment Current Condition Rating

Suspended sediment load + Suspended sediment size composition + Substrate sediment size composition

[Map showing different ecosystem regions with tier ratings marked as X]
Missouri River Ecosystem Restoration Plan and EIS

Rocky Mountain Foothills

Tier 1  Tier 2  Tier 3  Tier 4  Tier 5  Tier 6

KEY ECOLOGICAL ATTRIBUTES & GROUPINGS

HYDROLOGY

01 River Flows

02 River Water Chemistry

03 River Water Temperature

04 River Sediment

05 River-Floodplain Habitat Turnover

06 River Habitat Quality

HYDROCHEMISTRY

07 Floodplain Habitat Quality

GEOMORPHOLOGY

08 River Food Web

09 Native River Wildlife

10 Native Floodplain Wildlife

BIOTA

11 Native River & Floodplain Veg.

CONNECTIVITY

12 River-Floodplain Connectivity

13 River Habitat Size & Connectivity

14 Floodplain Habitat Size & Connectivity

15 Fire
Missouri River Ecosystem Restoration Plan and EIS

Central Lowlands

Tier 1  Tier 2  Tier 3  Tier 4  Tier 5  Tier 6

Key Ecological Attributes & Groupings

Hydrology
- River Flows
- River Water Chemistry
- River Water Temperature
- River-Sediment
- River-Floodplain Habitat Turnover
- River Habitat Quality
- Floodplain Habitat Quality
- Native Floodplain Wildlife
- Native River & Floodplain Vegetation

Hydrochemistry

Geomorphology

Biota

Connectivity
- River-Floodplain Connectivity
- River Habitat Size & Connectivity
- Floodplain Habitat Size & Connectivity

Fire
## Summary

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<th>Indicator</th>
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Missouri River Ecosystem Restoration Plan and EIS

Missouri River Flood - 2011

May 11, 2011

July 17, 2011
Opportunities, Questions & Decisions?

To contact me after my presentation – text
7A4 to INTRO (46876)

or email
Wayne_NelsonStastny@fws.gov
Additional Slides
(all current as of July 13, 2011)
Missouri River Ecosystem Restoration Plan and EIS

Locations and Agencies of Technical Team Members

**Fort Collins, CO**
- Michael Scott, USGS

**Des Moines, IA**
- Doug Chafa, IA DNR
- Karen Kinkead, IA DNR

**Iowa City, IA**
- Keith Schilling, IA DNR
- Vince Evelsizer, IA DNR
- Deborah Quade, IA DNR
- E Arthur Bettis, USFWS/U of IA

**Onawa, IA**
- Van Sterner, IA DNR

**Emporia, KS**
- David Kraft, USDA-NRCS

**Kansas City, KS**
- Walt Foster, USEPA
- Steve Schaff, USEPA
- Gary Welker, USEPA

**Manhattan, KS**
- Dave Bruton, KS FS

**Duluth, MN**
- Dave Bolgrien, USEPA

**Columbia, MO**
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- Clayton Ridenour, USFWS

**Jefferson City, MO**
- Mike Smith, MO DC
- Ken McCarty, MO DNR
- Emily Tracy-Smith, MO DNR

**Kansas City, MO**
- Joe Bonneau, USACE
- Mike Chapman, USACE
- Todd Gemeinhardt, USACE
- Heather Hill, USACE
- Allen Tool, USACE

**Lee’s Summit, MO**
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**Rolla, MO**
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- Dale Blevins, USGS

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- Jon Siddoway, USDA-NRCS

**Helena, MT**
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- Travis Horton, MT FWP

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- Patrick Isakson, ND GF
- Bruce Kreft, ND GF
- Nell McPhillips, USBR

**Jamestown, ND**
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- Michael Anteau, USGS

**Lincoln, NE**
- Frank Albrecht, NE GPC
- Mike Fritz, NE GPC
- Joel Jorgenson, NE GPC
- Ted LaGrange, NE GPC
- Brandi Flyr, NE DNR
- Richard Wilson, USGS
- Mark Pegg, Cont./U NE-Lincoln

**Omaha, NE**
- Dan Pridal, USACE
- Paul Boyd, USACE
- John Garrison, USACE
- Luke Wallace, USACE

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**Pierre, SD**
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- Rob Klumb, USFWS
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- Dave Ode, SD GF&P
- Doug Backlund, SD GF&P
- Dane Shuman, USFWS

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- Dan Licht, NPS

**Vermillion, SD**
- Dan Soluk, Cont./ USD
- Mark Dixon, Cont./ USD

**Yankton, SD**
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- Greg Pavelka, USACE
- Tim Welker, USACE

**Fort Worth, TX**
- William Hohman, USDA-NRCS

**Blacksburg, VA**
- Dan Catlin, USACE/VA Tech
- Aaron Delonay, USGS
Hydrology

River Flows

• The magnitude, frequency, timing, duration, and rates of change of high- and low-flow events in the Missouri River
Connectivity

River–Floodplain Connectivity

• The ability of the river to inundate its floodplain, backwaters, side channels and shallow water areas, including the extent of floodplain inundation

River Habitat Size & Connectivity

• The size and extent of specific habitat types, and the longitudinal connectivity between different parts of the mainstem, or between the mainstem and its tributaries.

Floodplain Habitat Connectivity

• The size and spatial patterning of specific floodplain habitat types, and the longitudinal and lateral connectivity between these floodplain habitat types.
Geomorphology

River Habitat Quality and Floodplain Habitat Quality

- The diversity of landforms serving as habitat for organisms living in the river or floodplain

River and Floodplain Habitat Turnover

- The dynamic shifts in habitat availability and habitat type brought about by erosion, accretion, and other geomorphic changes in the river channel.

Sediment

- The mass of sediment eroded, transported, and redeposited by river water.
Fire

• The process of fire in the floodplain ecosystem. Refers to the frequency, season, area, and intensity of fire.
Hydrochemistry

River Water Chemistry

• The chemical properties of the Missouri River water important to its natural ecological character. Includes dissolved and suspended components of water; primarily includes nutrients, dissolved oxygen, turbidity, and pollutants.

River Water Temperature

• The water temperature conditions in the Missouri River; includes extreme high and low temperature conditions.
Biota

River Food Web

- The trophic dynamics of organismal energy production and consumption. Includes all levels of biological energy transfer and storage, including biomass from photosynthetic organisms at the lowest trophic levels (primary production), organisms that feed on particulate organic matter (secondary production), and organisms that consume other organisms (consumers).
Biota (continued)

Native Floodplain Wildlife and Native River Wildlife

- The animals living in the river channel and its backwaters or the animals dependent on naturally functioning floodplain ecosystems. Includes abundance, composition, and diversity of animals.

Native River and Floodplain Vegetation

- The plant species dependent on naturally functioning floodplain ecosystems. Includes the spatial extent, abundance, size, and age classes of native flora community types and their constituent species, found within aquatic and terrestrial environments.
Key Ecological Attributes for Species FNRs: (Pallid Sturgeon, Least Tern, and Piping Plover)

- **Definition**
  - **Population size**: number of individuals present at a given time and place
  - **Reproductive success**: ability of an organism to produce offspring
  - **Survivorship**: the likelihood that an individual will escape predation, starvation, disease, and disasters to live to a certain age
  - **Food availability, organismal condition, and growth**: the abundance of suitable food items and the ability of an organism to find food successfully; the general health of an organism
Missouri River Ecosystem Restoration Plan and EIS

Lower Great Plains

Tier 1  Tier 2  Tier 3  Tier 4  Tier 5  Tier 6

KEY ECOLOGICAL ATTRIBUTES & GROUPINGS

HYDROLOGY
- 01 River Flows

HYDROCHEMISTRY
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- 14 Floodplain Habitat Size & Connectivity

FIRE
- 15 Fire