

Introduction to Goal Development

- Definition of a “Goal” for a river
- How a Goal fits into an Instream Flow Study
- Examples: Goal, Objectives, Indicators
- Questions?



Definitions:

- **Goal:** a vision of a healthy environment for the Lower San Antonio that reflects local values
- **Objectives:** specific means to accomplish goal
- **Indicators:** measures that show progress in meeting objectives



How a Goal Fits in the Process

Goal Development Consistent with Sound Ecological Environment

Collect Baseline Information and Evaluate



Collaborate with Public and Stakeholders through Meetings and Workgroups



Study Design



Multidisciplinary Data Collection and Evaluation



Data Integration to Generate Flow Recommendations



Study Report



Example of Goal, Objectives, and Indicators:

- **Goal:** maintaining the current health and productivity of the river, including maintaining riparian areas,
- **Objectives:** provide adequate overbank flows to maintain bottomland hardwood areas
- **Indicators:** measures collected in bottomland hardwood areas
 - Soil moisture throughout the year
 - How often they receive flow from the river
 - Amount of sediment and nutrients from river

Example: Murray-Darling Basin

- Goal: "a healthy, working river – one that assures us of continued prosperity, clean water and a flourishing environment."

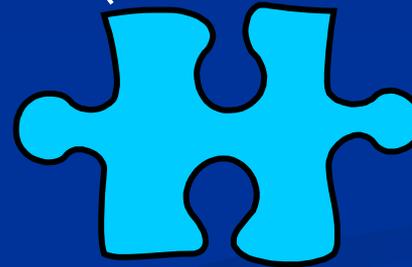


Goal: a healthy, working river

■ Objectives:

1. Reinstate ecologically significant elements of the flow regime

Hydrology &
Hydraulics



Goal: a healthy, working river

■ Objectives:

2. Overcome barriers to migration of native fish species

Hydrology &
Hydraulics

Biology

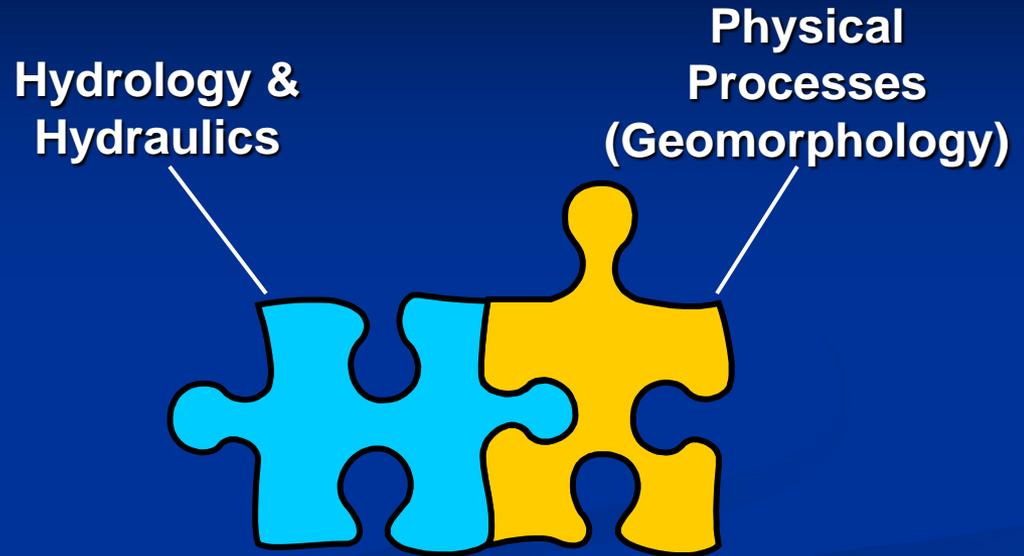
Connectivity



Goal: a healthy, working river

■ Objectives:

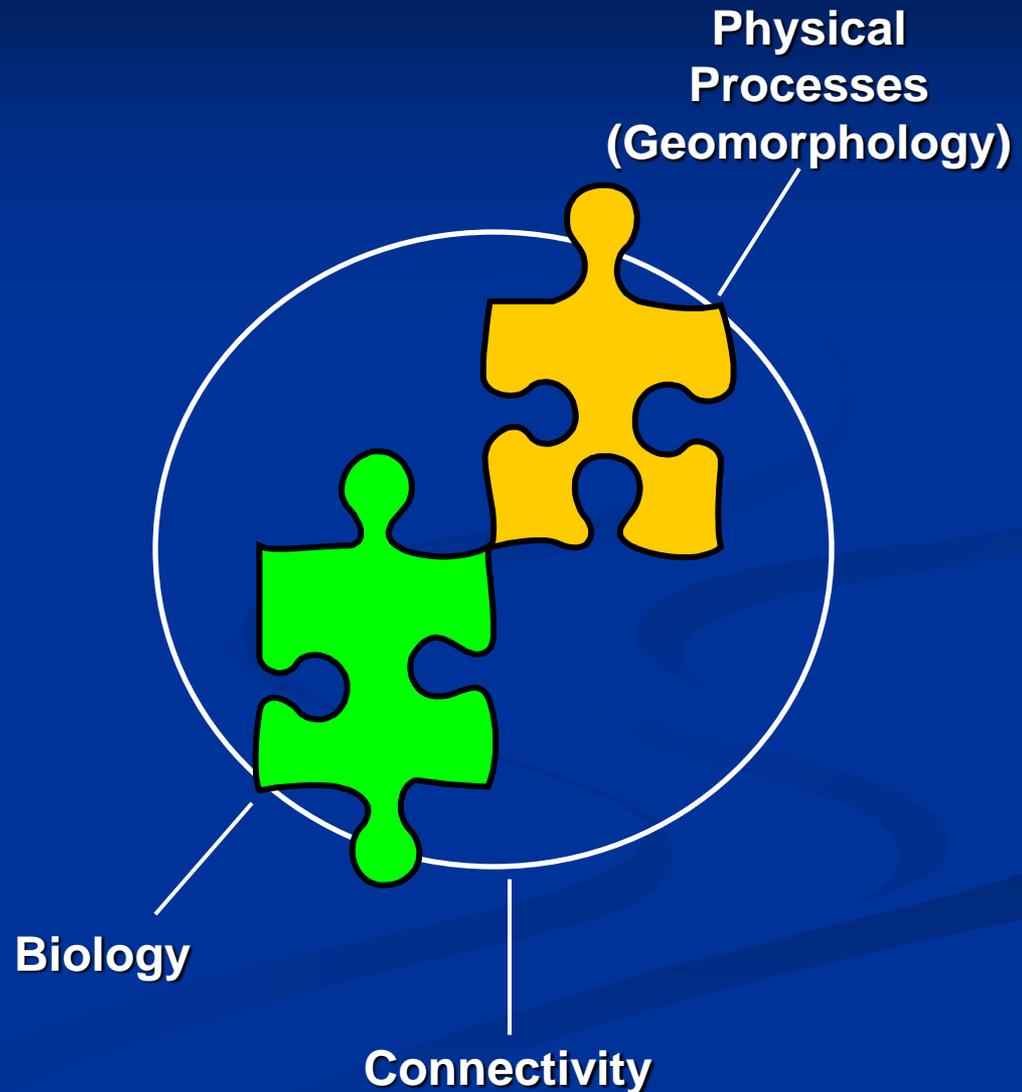
3. Maintain current levels of channel stability



Goal: a healthy, working river

■ Objectives:

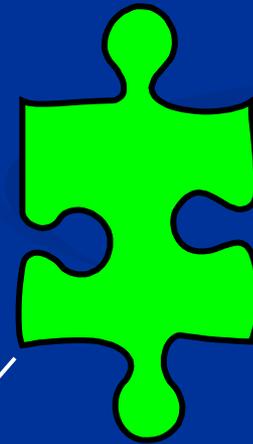
4. Protect and restore key habitat features in the river and riparian zone



Goal: a healthy, working river

■ Objectives:

5. Prevent the extinction of native species from the riverine system

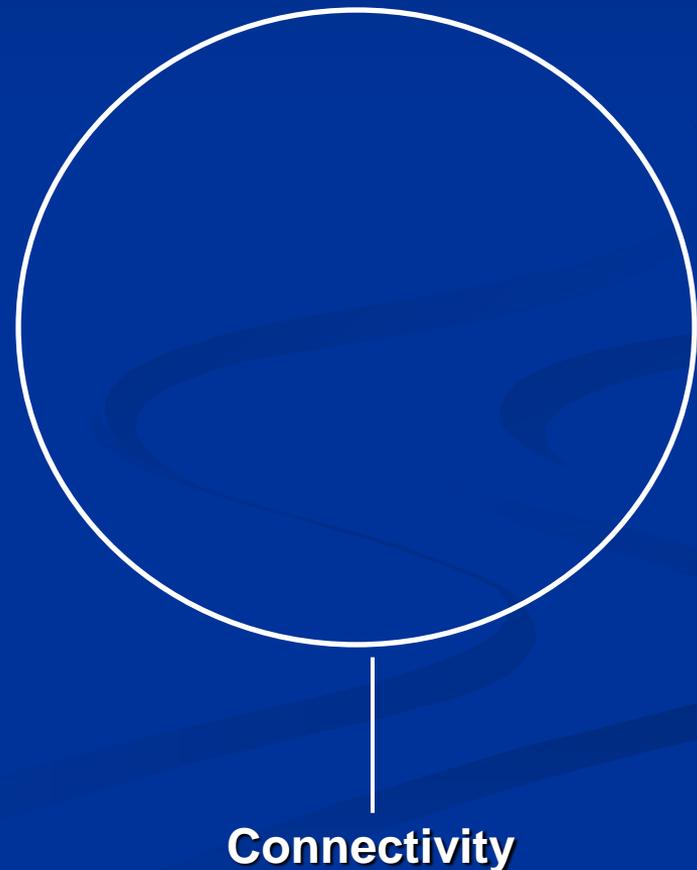


Biology

Goal: a healthy, working river

■ Objectives:

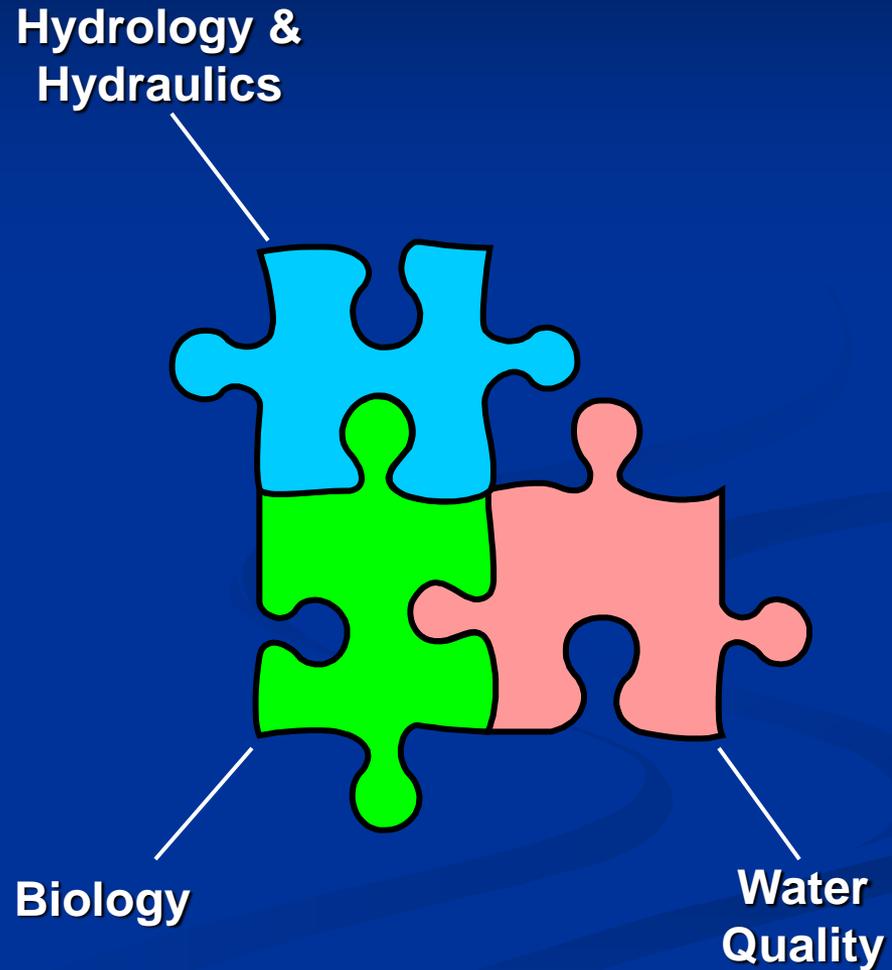
6. Improve connectivity between the river and riparian zone



Goal: a healthy, working river

■ Objectives:

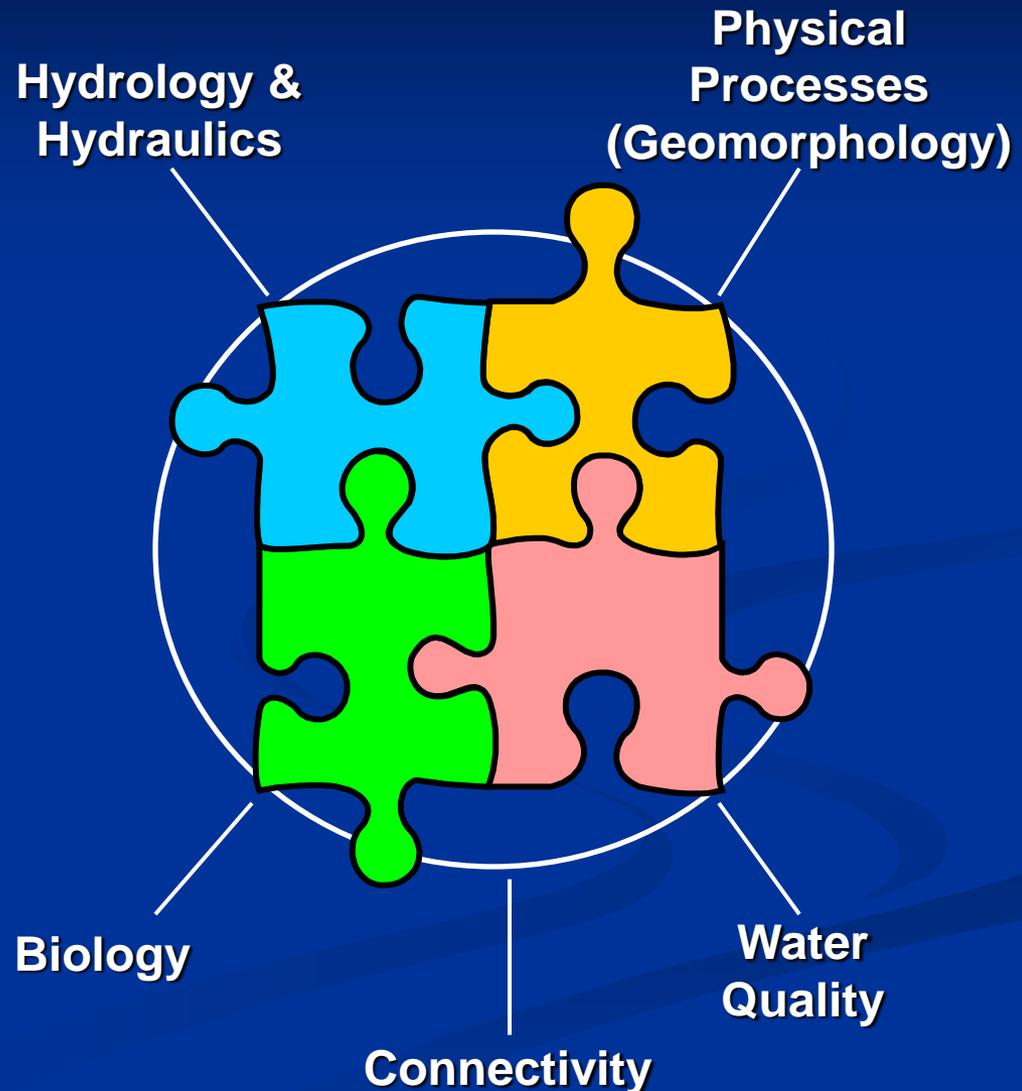
7. Manage flow-related water quality to sustain ecological processes and productive capacity



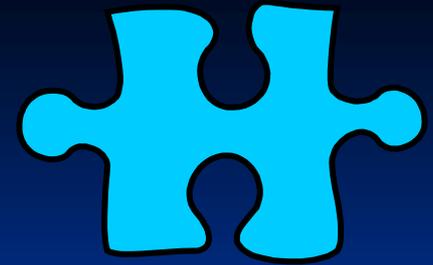
Example: Murray-Darling Basin

■ Indicators:

- Hydrology
- Biology
- Geomorphology
- Water Quality



Indicators: Hydrology



High Flow: Number of 1 in 10 year floods

Low/zero flow: Number of low flow events

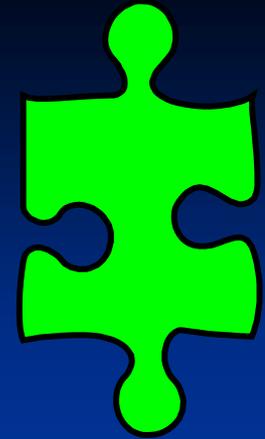
Variability: Seasonal amplitude

Seasonality: Seasonal period index

Flow volume: Median annual flow volume
Mean annual flow volume

Indicators:

Biology



Macroinvertebrate:

Richness

Pollution sensitivity score

Fish:

Total species richness

Proportion native species

Proportion megacarnivores

Riparian:

Waterbird breeding

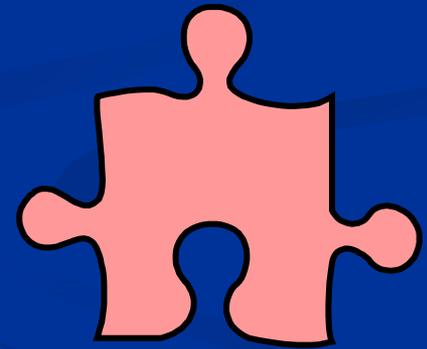
Healthy vegetation area

Indicators: Physical Processes



Channel Stability: Maintain current level of channel erosion

Indicators: Water Quality



Total phosphorous:

Upland rivers: < 20 µg/L

Lowland rivers: < 50 µg/L

Example: Upper Mississippi River

- Goal: “... to conserve, restore, and maintain the ecological structure and function of the Upper Mississippi River System ...”

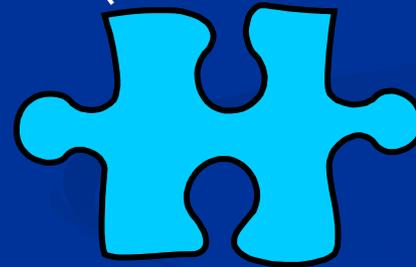


Goal: “... to conserve, restore, and maintain the ecological structure and function of the Upper Mississippi River System ...”

■ Objectives:

1. a more natural hydrologic regime;

Hydrology &
Hydraulics



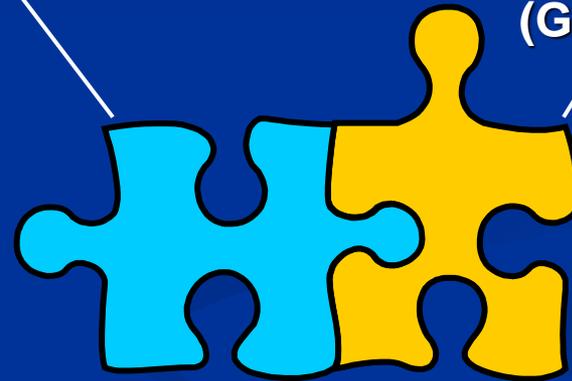
Goal: “... to conserve, restore, and maintain the ecological structure and function of the Upper Mississippi River System ...”

■ Objectives:

1. a more natural hydrologic regime;
2. processes that shape a diverse and dynamic river channel;

Hydrology &
Hydraulics

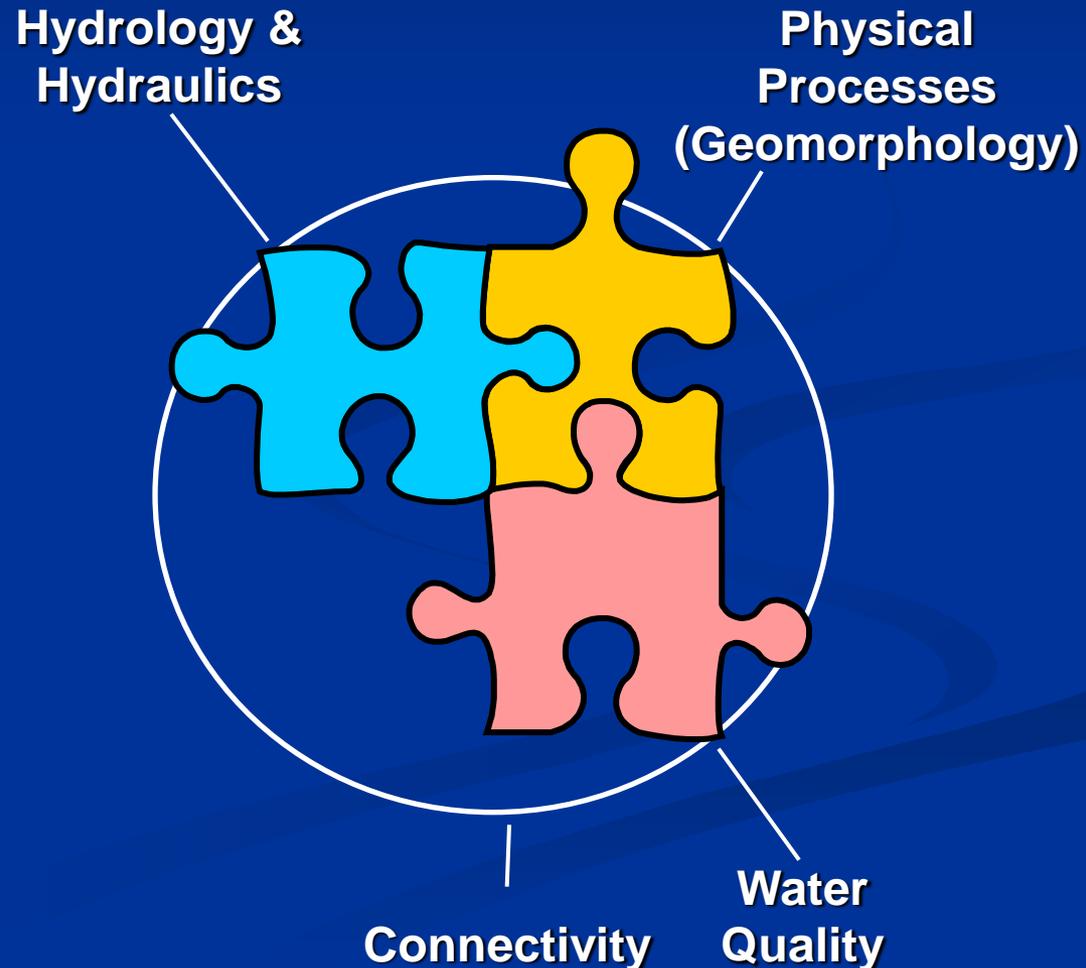
Physical
Processes
(Geomorphology)



Goal: “... to conserve, restore, and maintain the ecological structure and function of the Upper Mississippi River System ...”

■ Objectives:

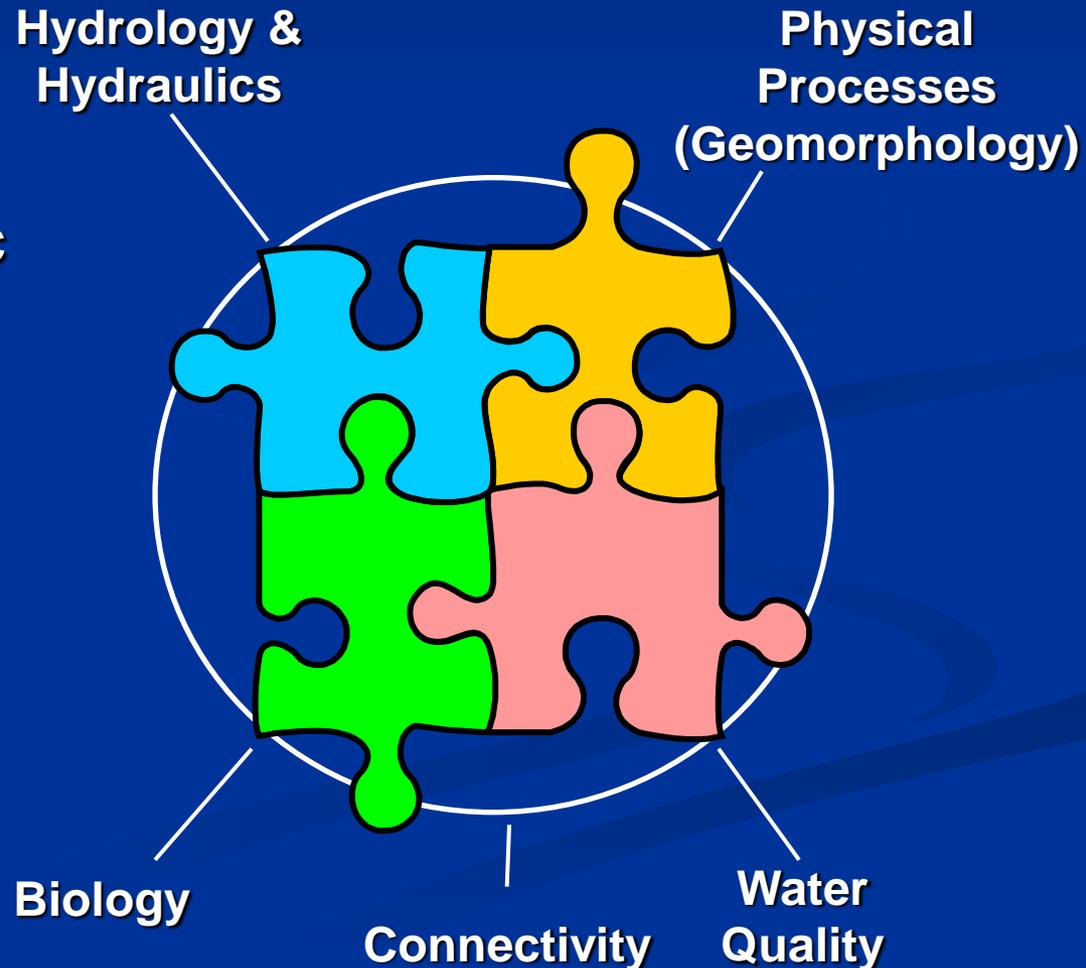
3. processes that input, transport, assimilate, and output materials within UMR basin river-floodplains: water quality, sediments, and nutrients;



Goal: “... to conserve, restore, and maintain the ecological structure and function of the Upper Mississippi River System ...”

■ Objectives:

4. a diverse and dynamic pattern of habitats to support native biota, and;
5. viable populations of native species and diverse plant and animal communities.



Objective 1: A more natural hydrologic regime

Indicators:

- Short term fluctuations (hourly to daily) in water levels
- Summer low flows (frequency, magnitude, and duration)
- Winter flows (frequency, magnitude, and duration)

Objective 2: Processes that shape a diverse and dynamic river channel

Indicators:

- Flows in secondary channels and backwaters
- Seasonally flooded landscape area
- Formation of natural channel features

Objective 3: Processes that input, transport, assimilate, and output materials within river-floodplains: water quality, sediments, and nutrients

Indicators:

- Mean annual export of nitrogen at Cairo, Illinois
- Denitrification rates within the river corridor
- Sediment and nutrient delivery from tributaries

Objective 4: A diverse and dynamic pattern of habitats to support native biota

Indicators:

- Diversity, patch size, connectivity, [other measures?] of major floodplain habitat types
- Diversity of depths and current velocities in aquatic areas
- Area connected to river channel during a 10 year flood

Objective 5: Viable populations of native species and diverse plant and animal communities

Indicators:

- Number of years that skipjack herring and other migratory species reach Minneapolis, Minnesota, and Joliet, Illinois
- Number of locations that support viable populations of ebony shell mussel
- Diversity of the floodplain forest tree community

Questions?