

Introduction to Indicator Development

- Review Definitions
- How Indicators fit into an Instream Flow Study
- Examples: Goal, Objectives, Indicators, and Conceptual Model
- Indicators for the Lower Sabine
- Questions?

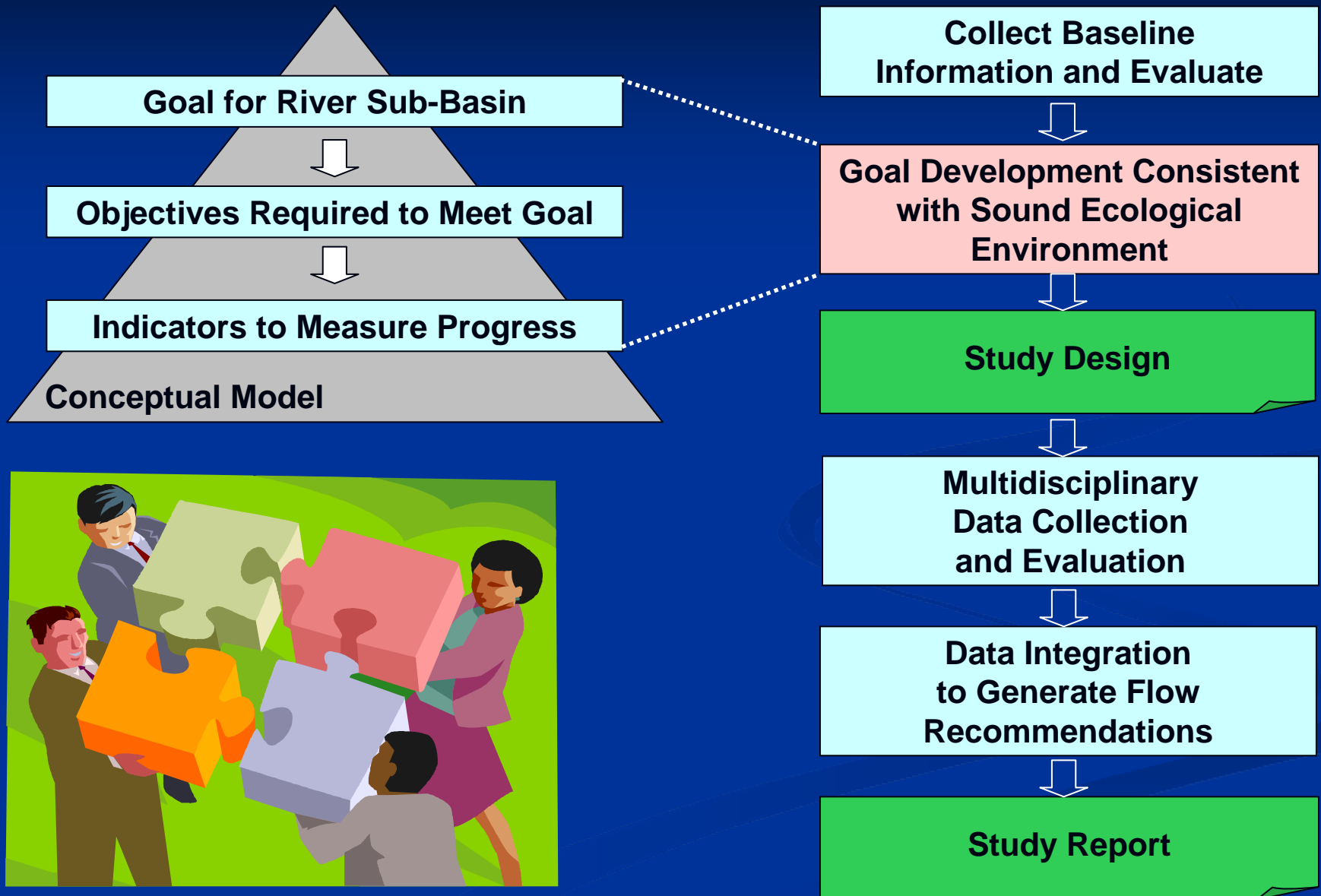


Definitions:

- **Goal:** a vision of a healthy environment for the river system that reflects local values
- **Objectives:** specific means to accomplish goal
- **Indicators:** measures that show progress in meeting objectives
- **Conceptual model:**
a representation of how a system is thought to function



How Indicators Fit in the Process



Example: Murray-Darling Basin

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

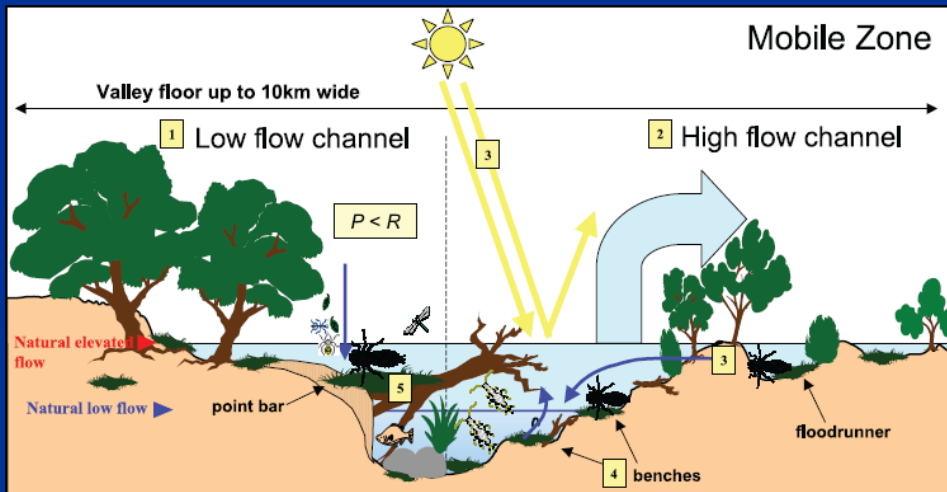
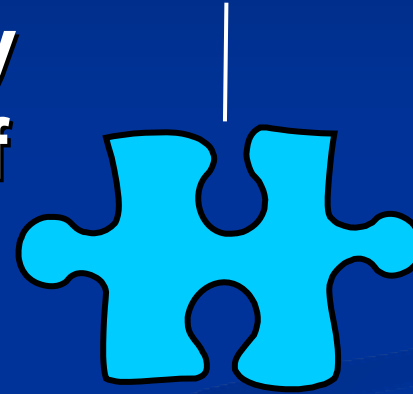


Goal: a healthy, working river

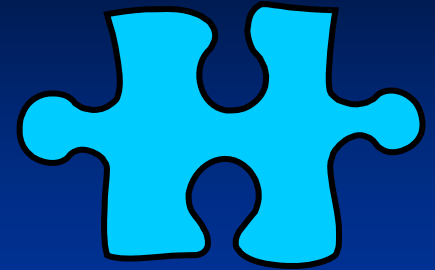
■ Objectives:

1. Reinststate ecologically significant elements of the flow regime

Hydrology &
Hydraulics



Reinstate ecologically significant elements of the flow regime



■ Indicators:

High Flow: Number of 1 in 10 year floods

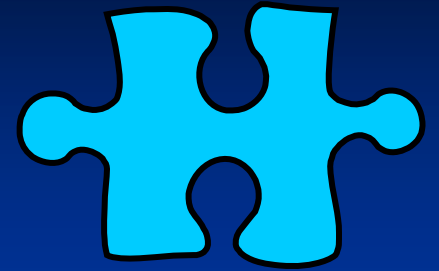
Low/zero flow: Number of low flow events

Variability: Seasonal amplitude

Seasonality: Seasonal period index

Flow volume: Median annual flow volume
Mean annual flow volume

Reinstate ecologically significant elements of the flow regime

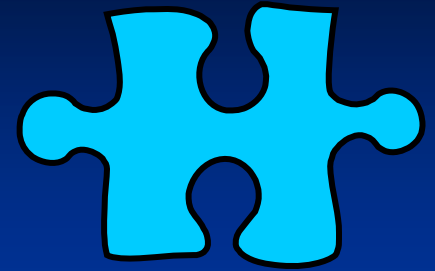


■ Indicators:

High Flow:

Number of 1 in 10 year floods

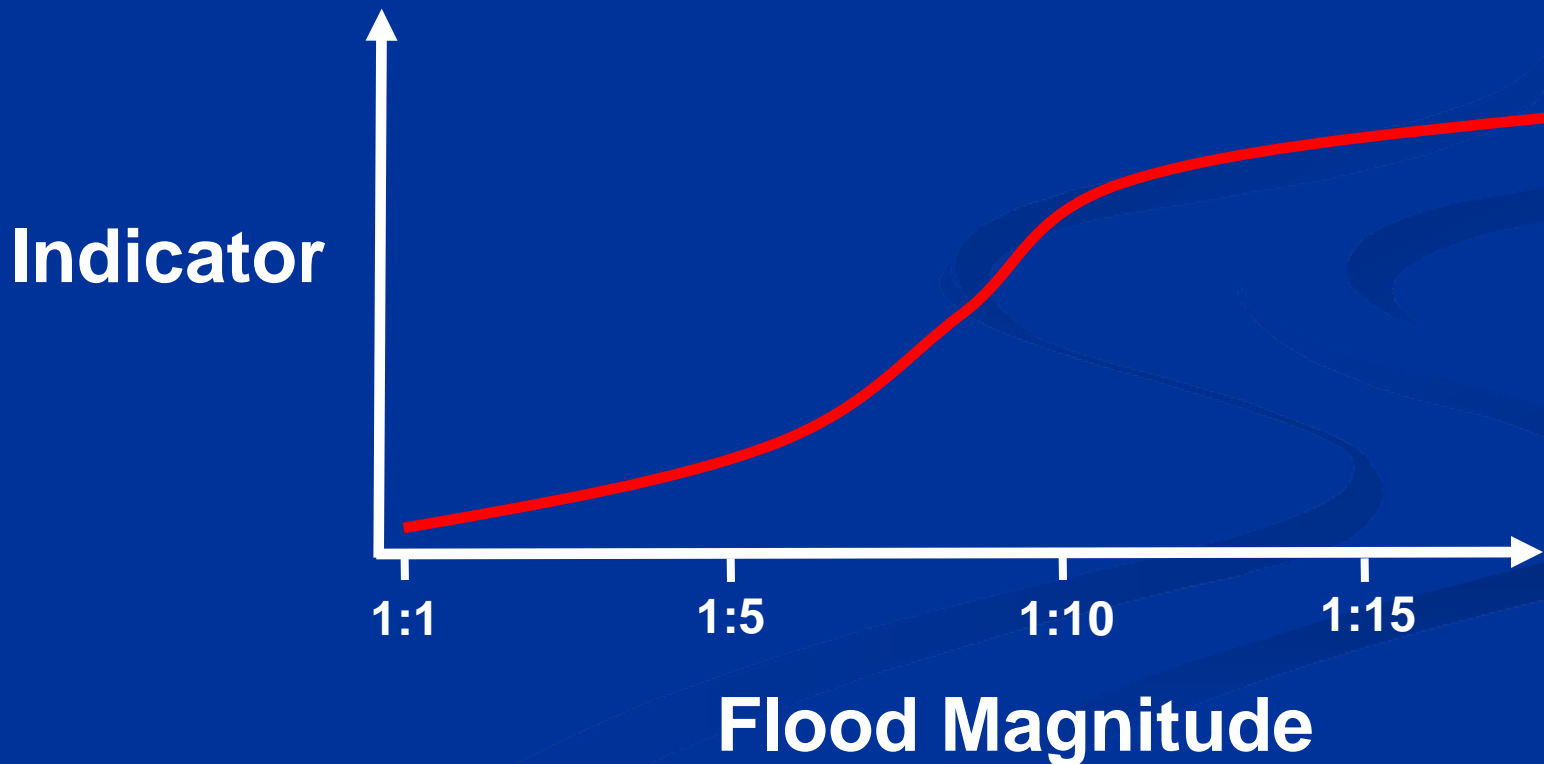
Reinstate ecologically significant elements of the flow regime



■ Indicators:

High Flow:

Number of 1 in ~~10~~[?] year floods



Lower Sabine River

- **Statewide Goal:** “A resilient, functioning ecosystem characterized by intact, natural processes and a balanced, integrated, and adaptive community of organisms comparable to that of the natural habitat of the region.”
- **Specific Goal:** “Our goal is a healthy, functioning Lower Sabine River Basin that has:
 - high quality water,
 - sufficient flow, and
 - a sustainable ecosystem,to assure a dynamic balance between human needs and the environment ”

Lower Sabine River

■ **Statewide Objectives:**

“Evaluate intact natural processes:

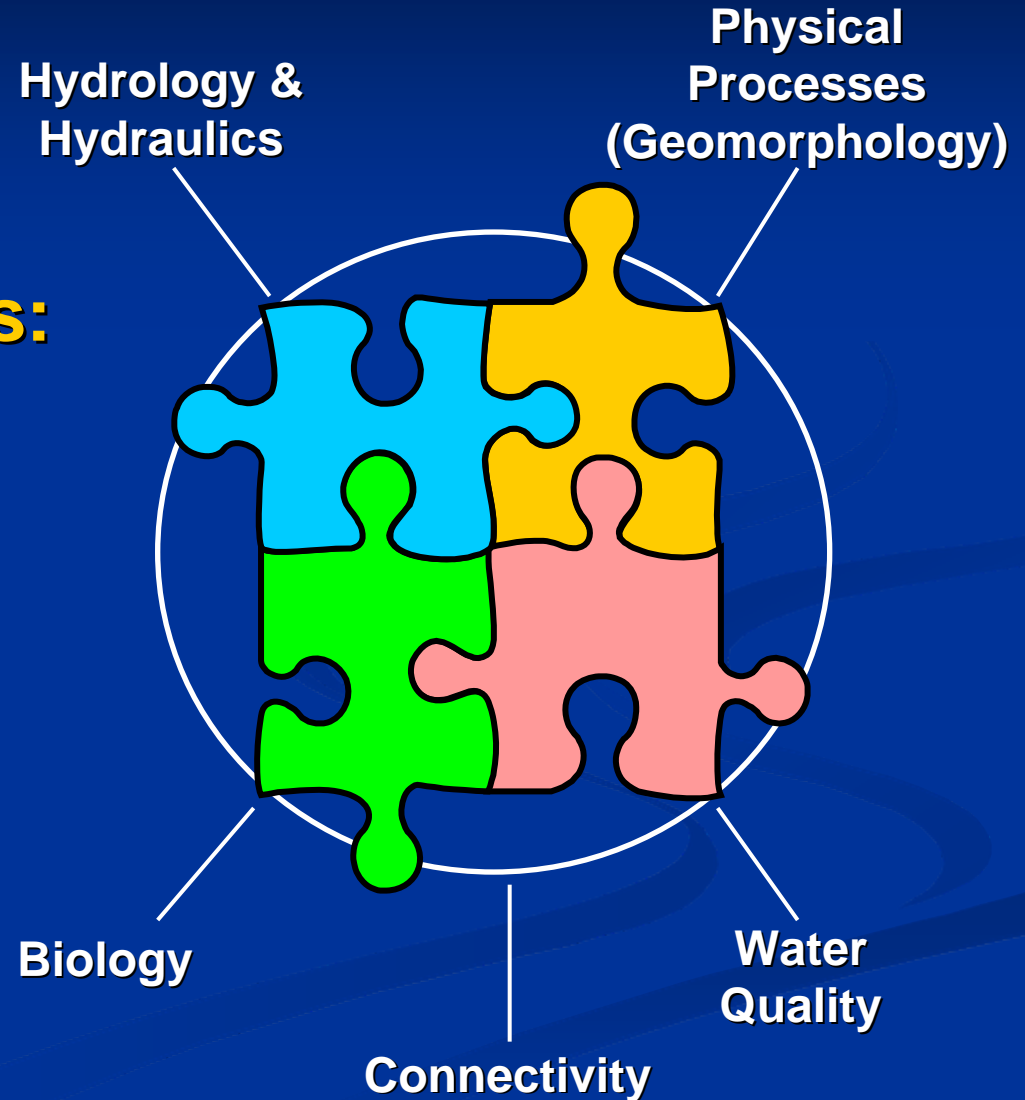
- **Characterize system hydrology and hydraulics**
- **Examine status of geomorphic processes within the system**
- **Characterize system water quality**
- **Define connectivity issues within the system**

Evaluate biological communities

- **Examine the integrity of the biological community**
- **Examine biodiversity within the system**
- **Define the influence and relationship of other riverine components relative to biology of system.”**

Lower Sabine River

- **Specific Objectives:**



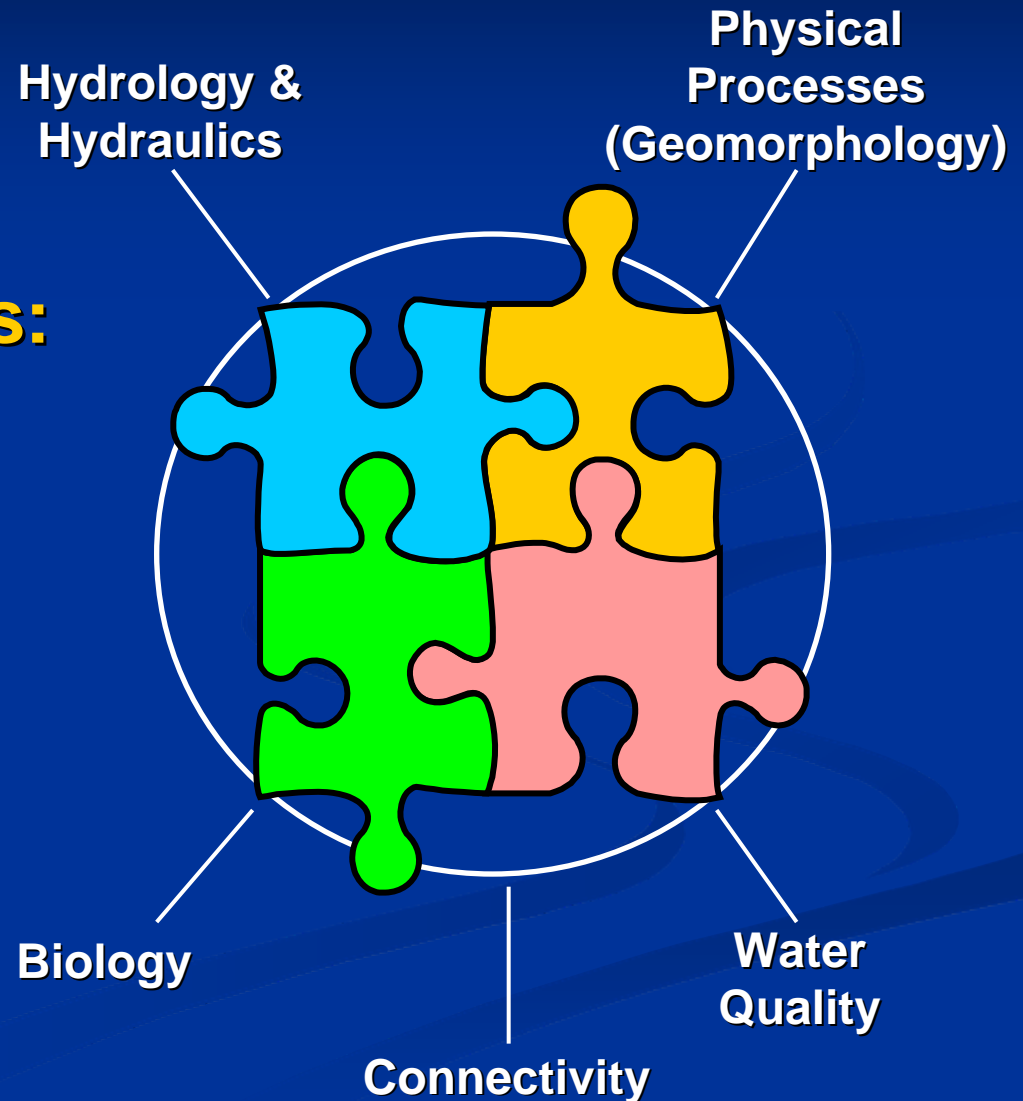
Lower Sabine River

- **Goal: ... healthy, functioning Lower Sabine River Basin ...**
- **Objectives: Maintain/improve hydrologic connectivity needed to sustain floodplain and wetlands area**
- **Indicators: measures collected in riparian areas**
 - **How often they receive flow from the river**
 - **Soil moisture throughout the year**
 - **Amount of sediment and nutrients from river**

Lower Sabine River

- **Specific Objectives:**

Other ?



Lower Sabine River

Statewide Goal:

- “a Sound Ecological Environment”

Specific Objectives: Other

- Consider/study impacts of floodplain development in riparian zone

Questions?