Using the Illinois River Floodplain to Reduce flood Damage and Naturalize Hydrology

by
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Hydrology of the Illinois River

**Natural Factors**
- Precipitation Fluctuations
- Watershed Characteristics

**Human Induced Factors**
- Land-Use Practices
- Hydraulic Modifications
  - Lock & Dams
  - Levees
- Water Diversions
Average Precipitation and Average Streamflow

Illinois River at Peoria-Kingston Mines

- Precipitation
- Streamflow (minus the Lake Michigan diversion)

Illinois State Water
Profile of the Illinois River
7-Day Low Flows

Illinois State Water Survey
Average Annual Hydrographs

Illinois River at Havana
Illinois River at Havana

STAGE (feet msl)

DATE

7/2 7/16 7/30 8/13 8/27 9/10 9/24 10/8 10/22 11/5 11/19 12/3 12/17 12/31

1897
1940
Illinois State Water Survey
Illinois River Basin Restoration
Comprehensive Plan – USACOE & IDNR

**Vision:** A naturally diverse and productive Illinois River Basin that is sustainable by natural ecological processes and managed to provide for compatible social and economic activities.

System Limiting Factors (Issues, Problems) and Goals

3. Loss of Floodplain, Riparian, and Aquatic Habitats, and Functions
   - **Goal 3:** Improve floodplain, riparian, and aquatic habitats and functions.

5. Altered Hydrology and Water Levels
   - **Goal 5:** Naturalize Illinois River and tributary hydrologic regimes and conditions to restore aquatic and riparian habitats.
Lower Illinois River and its Floodplain
Levee and Drainage Districts
Impact of Levees during the 1993 Flood on the Illinois River
Mississippi River Stages for July 1 through July 31, 1993 for Quincy, IL

- South Indian Graves levee failed, July 12
- North section of Sny Island levee failed, July 25
- Hunt and Lima Lake levee failed, July 13

River Mile 327.9 datum 139.87 m (NGVD 1929) flood stage 5.2 m
7-Reach Lower Illinois River UNET Model
Simulated Hydrographs with and without Levee Breaching (50-year design)

At Thompson

Levee Breaching at Thompson Lake District

At Havana

Levee Breaching at Thompson Lake District

Only
Water surface elevation profiles with and without levee breach at 
Thompson Lake Levee District

No Levee Failure
2-ft Deep Opening
4-ft Deep Opening
6-ft Deep Opening

Havana
Thompson Lake LDD
Impact of Levees on Flood Peaks

Stage Hydrograph at RM124.9 (1948)

- **Existing Condition**
- **Assumed no-levee Condition**
Impact of Levees on Flood Peaks

Stage Hydrograph at RM124.9 (1973)

- Date:
  - 0-Jan
  - 19-Feb
  - 9-Apr
  - 29-May
  - 18-Jul
  - 6-Sep
  - 26-Oct
  - 15-Dec
  - 3-Feb

- Stage (feet):
  - 425.00
  - 430.00
  - 435.00
  - 440.00
  - 445.00
  - 450.00

Legend:
- Existing Condition
- Assumed no-levee Condition

Condition: Assume no-levee
Impact of Levees on Flood Peaks

Stage Hydrograph at RM124.9 (1988)

Impact of Levees on Flood Peaks

Stage Hydrograph at RM124.9 (1988)
In Conclusion

- Sound Policy and Management should be Based on Sound Science.
  - Accurate and Reliable Data
  - Calibrated and Verified Models
  - Stakeholders Participation throughout the Whole Process
    - Reduces Mistrust and Potential Conflicts
- The Illinois State Water Survey is always available to cooperate and work on scientific issues related to the management of our water resources.
Average Annual Hydrographs

Illinois River at Copperas Creek

STAGE (feet msl)

DATE

1/1 2/1 3/1 4/1 5/1 6/1 7/1 8/1 9/1 10/1 11/1 12/1

1878-1888
1889-1899
1900-1939
1940-1998
Average Annual Hydrographs

Illinois River at Beardstown
Outline

- Background on the Illinois River
  - Hydrology of the Illinois River
    - Natural Factors
    - Human Induced Factors
  - Water Quality Trends
  - Restoration initiatives
    - Issues & Goals
    - CREP
    - Illinois River Ecosystem Restoration
Average Annual Flows

Peoria
Kingston Mines
Havana

Illinois State Water Survey
High Flows

Illinois State Water Survey

1-Day High Flow (cfs)