Why Long-term Monitoring?

1) Slow change

2) Rare and extreme events (e.g., severe drought & floods)

3) Noisy, but directional change (e.g., climate-change effects)

(Modified from Strayer et al. 1986. Long-term ecological studies. Institute of Ecosystem Studies)
Began 1957 – William C. Starret

28 fixed sites on Illinois waterways

1 hour AC-electrofishing

Look at spatial and temporal changes
Sampling Gear
Common carp have declined in the Illinois River since 1980s.
Catfish have increased since the 1970s
Changes in largemouth bass varied with reaches
Changes of total biomass varied with reaches.
Species richness and groups of fishes responded to different water-quality variables

<table>
<thead>
<tr>
<th>Response Variable</th>
<th>R²</th>
<th>Fecal Coliform</th>
<th>NH4</th>
<th>Ni</th>
<th>Phenolics</th>
<th>Total P</th>
<th>Qmax</th>
<th>Qmin</th>
<th>Secchi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species Richness</td>
<td>0.18</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Algae/Phytoplankton</td>
<td>0.66</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Larger fish/Crayfish/Frogs</td>
<td>0.60</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation Habitat</td>
<td>0.32</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muck Habitat</td>
<td>0.51</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
2010 LTEF Expansion

Ohio, Wabash, Mississippi and Illinois Rivers

Standardized protocol using DC-electrofishing

3 Time Periods (June 15-July 31, Aug 1-Sept 15 and Sept 16-Oct 31)
Expanded LTEF - Main Channel Border

- Random 15 minute transects
- 2 Dippers
- Comparable with Long Term Resource Monitoring Protocols
## Comparing 4 Great Rivers in IL

<table>
<thead>
<tr>
<th>Year</th>
<th>Illinois River</th>
<th>Mississippi River</th>
<th>Ohio River</th>
<th>Wabash River</th>
</tr>
</thead>
</table>
| 2010 | - 10,896 fish (67 species)  
- 2,553 lbs | - 8,479 fish (62 species)  
- 4,973 lbs | - 11,431 fish (51 species)  
- 898 lbs | - 6,368 fish (64 species)  
- 3,663 lbs |
| 2011 | - 7,907 fish (62 species)  
- 2,426 lbs | - 8,269 fish (67 species)  
- 7,157 lbs | - 16,578 fish (53 species)  
- 1,193 lbs | - 8,925 fish (61 species)  
- 3,512 lbs |
Silver Carp Biomass

- **Wabash River**
  - 2010: 10.8% at 23.9 lbs/hour
  - 2011: 14.9% at 31.7 lbs/hour

- **Ohio River**
  - 2010: 15.2% at 11.3 lbs/hour
  - 2011: 16.1% at 12.8 lbs/hour

- **Illinois River**
  - 2010: 13.9% at 14.3 lbs/hour
  - 2011: 24.3% at 19.5 lbs/hour

- **Mississippi River**
  - 2010: 13.1% at 10.6 lbs/hour
  - 2011: 6.3% at 14.6 lbs./hour
Species composition weighted by abundance differed between rivers. Rivers support distinct fish communities.
Acknowledgements

- The Illinois Natural History Survey
- The Illinois Department of Natural Resources
- Mike McClelland and Les Frankland
- Illinois River Biological Station
- National Great Rivers Research & Education Center
- Federal Aid in Sportfish Restoration (USFWS)