What Was The Missouri River Public Use Assessment?

811 miles from St. Louis to Gavins Point Dam

- Estimate amount and types of public use along the river
- Describe river users
- Estimate the economic value of the river
After the floods of 1993, 1995 and 1996, new areas and accesses allowed greater access to the Missouri River
- 20 new public lands
- 17 new accesses

Northwest Region - new properties acquired as a result of Army Corps of Engineer purchases

Missouri River management decisions and conflicting opinions
For 13 months in 2004 and 2005, we collected information along 811 miles of the Missouri River

- Interviewed users at accesses, parks, conservation areas, and national wildlife refuges
What Did The Clerks Ask Users?

- Number in party
- Distance traveled
- Activities
- Number of hours spent by activity
- Harvest of fish and wildlife
- Socio-demographic characteristics
- Economic values of the river to users
Where were those clerks?
What the heck are Access point, access groups and bus routes?
111,700 interviews at accesses and areas
88,900 parties

Users will want to select:
- Location
- Time
- Variable

Users may not:
- Have SAS
- Want to wait for SAS to produce the estimates
Solution: Produce ALL the estimates ahead of time

\[
t_{ijkl} = \sum_{p=1}^{P} y_{ijklp},
\]

\[
\hat{t}_{ij} = \frac{N_{ij}}{n_{ij}} \sum_{k=1}^{m_{ijk}} \frac{M_{ijk}}{m_{ijk}} \sum_{l=1}^{m_{ijk}} t_{ijkl}.
\]

\[
S_{ijk}^2 = \frac{\sum_{l=1}^{m_{ijk}} (t_{ijkl} - \hat{t}_{ijk})^2}{m_{ijk} - 1},
\]

\[
S_{t}^2 = \frac{\sum_{k=1}^{n_{ij}} \left( \frac{M_{ijk}}{m_{ijk}} \sum_{l=1}^{m_{ijk}} t_{ijkl} - \frac{\hat{t}_{ij}}{N_{ij}} \right)^2}{n_{ij} - 1}.
\]

1.98 million estimates
Building the database
BUILDING A DATASET BASED ON ACCESSES
**RESULTS FROM REPORT BUILDER**

**Missouri River Public Use Assessment Data Report**

HF Thurnau - all year

Summed Strata: Weekdays, Weekends

<table>
<thead>
<tr>
<th>Loc_Code</th>
<th>Act_Cat</th>
<th>Activity</th>
<th>Estimate</th>
<th>Variance</th>
</tr>
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<tbody>
<tr>
<td>ACC9005</td>
<td>Summation General</td>
<td>ID</td>
<td>7,332.09</td>
<td>270,697.50</td>
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<td>ACC9005</td>
<td>Summation General</td>
<td>Total Hours</td>
<td>38,978.78</td>
<td>53,376,832.22</td>
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<td>ACC9005</td>
<td>Summation General</td>
<td>Number of Parties</td>
<td>3,947.95</td>
<td>66,184.72</td>
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What Did We Learn? The Big Picture

- 2.49 million visits
  - 89.3% to public areas and accesses
  - 8.2% at residences
  - 1.9% on excursion boats
  - 0.5% at clubs
  - 0.1% at tournaments

- 1.1 million parties at public areas and accesses

- 9.2 million hours including
  - 6.5 million at accesses and areas
    - Camping – 33% of hours
    - Fishing – 22% of hours
    - Boating – 11% of hours

\[ \sum x_i \]
Users at accesses and areas engaged in 71 activities

- Sightseeing – 29% of visits
- Fishing - 24% of visits
- Boating – 12% of visits
- Hunting – 5% of visits

49 species of fish were caught

- Catfish most frequently caught fish
- 309,000 catfish caught
- Estimated harvest rate of 22 catfish/100 hrs

Deer hunting – 2.1% of visits

Waterfowl harvest - 33,500
What Did We Learn?
Activities

Total Visits by Activity
What Did We Learn? Socio-Demographics

- **Age**
  - Under 18: 12.5%
  - 18-24 Years Old: 9.8%
  - 25-34 Years Old: 15.1%
  - 35-44 Years Old: 19.7%
  - 45-64 Years Old: 30.6%
  - 65 or Older: 11.9%
- **Male**: 72.2%
- **White**: 93.0%
- **Hunting\Fishing\Trapping Permit**: 49.7%
What is Consumer Surplus?

- Extra “happiness” that a user gets when they pay less than their own maximum price

Or

- The area under the demand curve
Travel Cost Method

\[
\log \left( \frac{T_j}{P_j} \right) = \beta_0 + \beta_{tc} TC_j + \sum_{k=1}^{m} \beta_k SiteType_k + \sum_{k=1}^{m} \beta_{TCk} SiteType_k * TC + \sum_{i=1}^{n} \beta_i Segment_i + \sum_{i=1}^{n} \beta_{TCi} Segment_i * TC_j
\]

\[
CS_i = -1/(\beta_{tc} + \sum_{k=1}^{m} \beta_{TCk} SiteType_k + \sum_{i=1}^{n} \beta_{TCi} Segment_i)
\]
Discrete Choice Method

\[
\Pr \left( \frac{YES_i}{1 - YES_i} \right) = \beta_0 + \beta_{Bid} B_i + \beta_2 x_{1i} + \ldots + \beta_n x_{ni}
\]

\[
WTP = \frac{\beta_0}{\beta_{Bid}} + \frac{\beta_2}{\beta_{Bid}} x_1 + \ldots + \frac{\beta_n}{\beta_{Bid}} x_n = A_0 + A_1 x_1 + \ldots + A_n x_n
\]
$ 20.1 million to $38.7 million total economic benefits over the 13 month assessment

- $18.5 million to $35.7 million annual economic benefits in 2004
- $6.2 million to $12.2 million in Nebraska in 2004
- $12.3 million to $23.6 million in Missouri alone in 2004
$39.1 million annual economic impact in Missouri (using National Survey expenditures)
- 490 full-time equivalent jobs
- $2.9 million state/local taxes generated

$28.9 million annual economic impact in Nebraska
- 370 full-time equivalent jobs
- $2.1 million state/local taxes generated
<table>
<thead>
<tr>
<th></th>
<th>Columbia Bottom CA</th>
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<tbody>
<tr>
<td>Total # of visits</td>
<td>64,260</td>
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<tr>
<td>Total # of hours</td>
<td>65,953</td>
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<tr>
<td></td>
<td>1 hr/visit</td>
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<tr>
<td># of Activities</td>
<td>21</td>
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<tr>
<td>Most Popular Activity</td>
<td>Sightseeing</td>
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<td></td>
<td>68% of all visits</td>
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<tr>
<td># of Fishing Visits</td>
<td>3,892</td>
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<tr>
<td></td>
<td>6% of all visits</td>
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<tr>
<td># of Hunting Visits</td>
<td>2,032</td>
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<tr>
<td></td>
<td>3% of all visits</td>
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<tr>
<td>All Non-consumptive Activities</td>
<td>58,011</td>
</tr>
<tr>
<td></td>
<td>90% of all visits</td>
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</table>
How Are The Results Being Used?

- Completed requests for information from:
  - Missouri River Relief
  - Iowa DNR
  - Water Quality Coordinating Committee
  - Consulting firms

- Used by communities to show the importance of the river

- MRERP
Questions?

Thank you.