



College of  
Agriculture  
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# The Missouri Watershed Initiative

## An Objective Approach To Watershed Planning

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OUTREACH & EXTENSION  
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### Process:

- Formally integrates issue-directed inter-disciplinary research, outreach/extension and local level decision-makers, local communities so answers can be developed for water quality problems regarding watershed land use and management.
- Provides science-based information to local decision makers so they can effectively address water quality issues.
- Enables Missourians to work together to develop sustainable solutions to water quality issues at the local level

### Purpose:

- Create a sustainable partnership for local decision making regarding water quality and water quality goals.
- Use our state's abundant natural resources in a community setting to achieve "resource-based" community economic development.

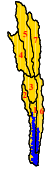
### Long Branch Watershed:

Similar to many reservoirs in the glacial plains of North Missouri – moderately fertile with high levels of non-volatile suspended solids

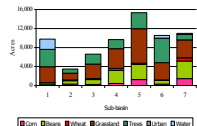


Long Branch Watershed Sub-basins

Sub-basin	Acres
1	9,819
2	3,481
3	4,532
4	9,662
5	15,286
6	10,567
7	10,954
<b>Total</b>	<b>66,291</b>



Long Branch Watershed Land Use, by Sub-basin



Long Branch Watershed:  
66,300 acres  
68% agricultural  
27% forest  
4% water  
1% urban

### Initiative Process Components:

- Community representation
- Issues reflect local concerns
- Objective assessment - partition contaminants
- Peer-reviewed research - professional, WIAC
- Local communities assist with interpretation and implementation of findings
- Process is monitored and evaluated

### Community Representation:

City of Macon –Public Utilities, WIAC (Watershed Initiative Advisory Council), Landowners and Citizens in the Long Branch Watershed, Missouri Departments of Agriculture, Conservation and Natural Resources, Mark Twain Water Quality Initiative, USDA Farm Service Agency, USDA Natural Resources Conservation Service, US Army Corps of Engineers, Adair/Macon County Health Department, Macon Public Schools (A+ program).



Members of the local steering committee at work.

### Water Quality Concerns:

- Seasonally stratified lake
- Generally high levels of turbidity, nutrients, manganese and iron.
- Pesticides identified: atrazine, alachlor, cyanazine, metoachlor, metribuzin, simazine, treflan.
- Sedimentation.
- Fecal coliform.
- Taste and odor.

### Assessment Process:

- To characterize the physical, biological, social and economic dimensions of the watershed and its residents/stakeholders.
- Evaluate known information and data and gather other needed data and information to provide a complete description of the watershed and the water-, plant-, soil-, air-, animal- and human resources.
- 13 Assessment studies

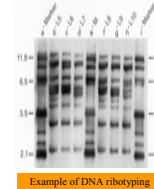
### Action Planning Process:

- Water Management** - Promote public awareness
- Environmental & Economic Impacts from Agricultural Practices** - Encourage responsible land use through educational endeavor emphasizing the improvement of water quality
- Water Quality** - Stabilize the Long Branch Lake shoreline
- Water Conservation & Management** - Fund and build impoundment above the lake
- Disseminate information

### E. coli Source Tracking:

- Rep-PCR has been used to determine conclusively the source of Fecal Coliform.
- Through a comparison of the DNA of the pollutant with a known source, inferences can be made about its source.
- At 2 of 6 sites sampled, *E. coli* were greater than the state level of 200 the state level of 200 pp/100 ml.

Total count	Source identified
2800	Human, horse, cow
2000	Cow, human, horse, sewage
4500	Cattle, goose, human, sewage
920	Sewage
138	Sewage, human
200	Cattle, horse, human
890	Sewage, human, chicken



Example of DNA ribotyping

### Research/Demonstration Projects: -Grass Barriers

- To reduce sediment loading into Long Branch Lake an outreach and demonstration project has been initiated to show the effect of grass barriers.



Silt deposition behind grass barrier

- With a variety of methods, 4 sites have been installed in the watershed.
- Sites are being monitored to determine the effectiveness of strips.
- Grass barriers are narrow strips of stiff stemmed grass that are planted parallel and on the contour to reduce the amount of sediment run-off.

### -Alternative Watering

- Livestock watering from creeks can lead to degradation of stream banks and water quality.
- Through a comparative study with three cow-calf herds with different water sources, the value of alternative watering sources will be demonstrated.
- Livestock have been fitted with GPS receivers to determine if providing an alternative watering source will reduce the amount of time spent in creeks.



### Watershed Planning

- A watershed management plan was developed by the Long Branch Watershed Committee. The plan resulted in the following actions:
  - 3,170 acres were enrolled in the Missouri Conservation Reserve Enhancement Program (MOCREP) - \$4.15 million
  - Macon and Adair Soil and Water Conservation Districts joined together in support of a Missouri Special Area Land Treatment (SALT) Project - \$750,000

### Economic Analyses:

- The Community Policy Analysis Center has calculated a baseline analysis that projected demographic, economic and fiscal conditions through 2010 for Adair and Macon County.
- The Missouri Enhanced Conservation Reserve Program in the watershed showed a small loss of employment and economic activity in the region.
- The results of the SALT project have not yet been modeled.

### Environmental Analysis:

- The Food and Agricultural Policy Research Institute has used the SWAT model to assess the environmental impact of MoCREP by updating the changes in land-use since enrollment of 3,170 acres as of May 2002
- MoCREP led to a reduction of atrazine load by 10 to 37%, depending on sub-basin
- Sediment loss from the fields was reduced by 10 to 27% depending on the sub basin.