

Assessing the Long Term Impacts of an Agricultural Watershed Project: Black Creek 20 Years Later

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Why look back 20 years?

- ? Many of the best management practices (BMPs) developed and tested are used today in watershed projects, EQIP and other conservation projects, and TMDLs
- ? Water quality problems are often considered “solved” when BMPs are implemented. But the solution may only last a short time.
- ? Little research has been published on long term impacts of BMPs and the education projects

The original Black Creek project

- ? Location:
Northeast corner
of Indiana
- ? Chosen in 1972
for political
reasons and
because it is
representative of
the Maumee River
Basin (Lake Erie)



Goals of original project (1973-84)

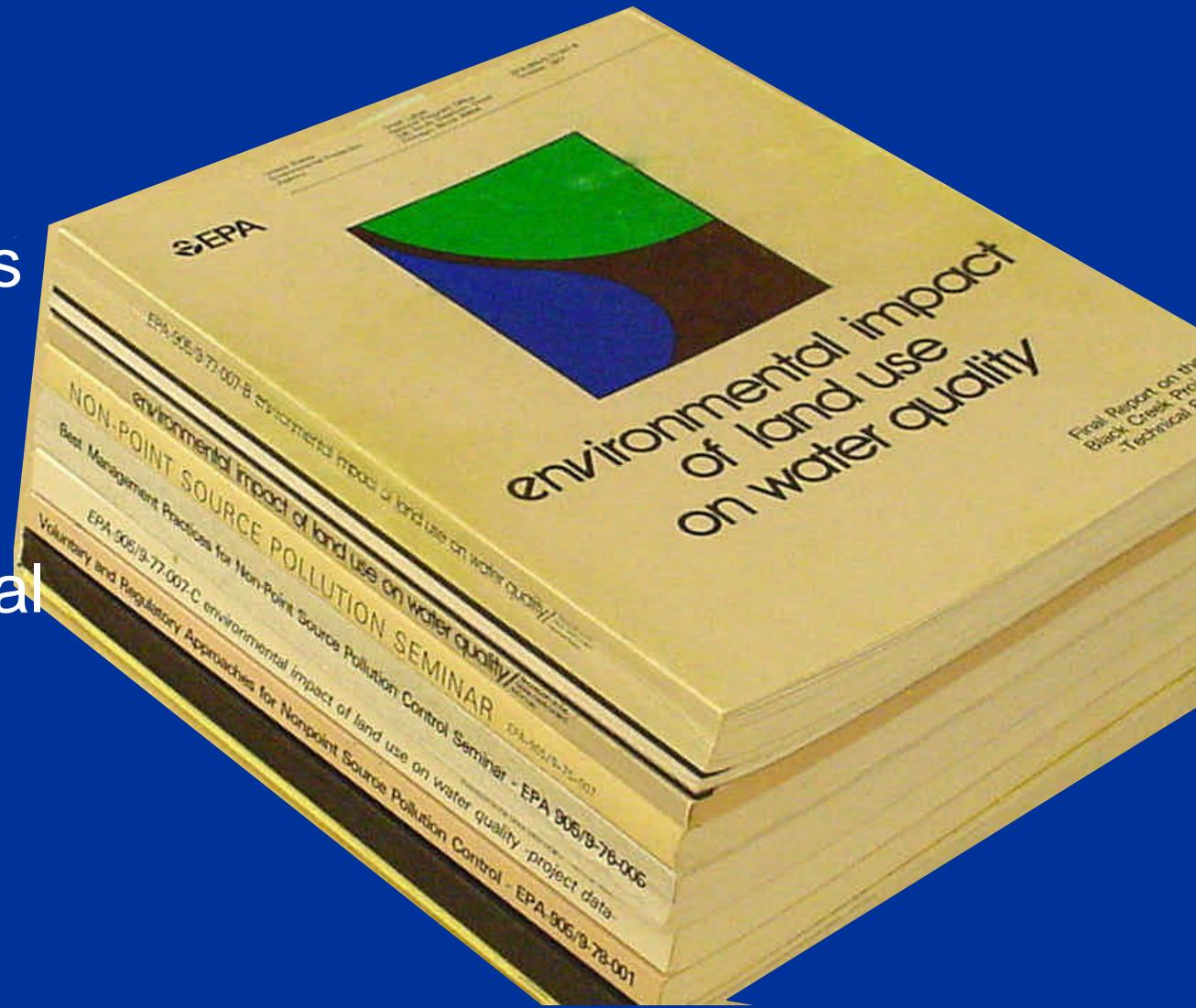
- ? Investigate the relationship between agricultural practices and water quality
- ? Evaluate to what degree the latest soil and water conservation techniques, if applied basin-wide, would improve the quality of water in the Maumee River and Lake Erie
 - ✍ Focus was on **phosphorus** and **sediment**

Research from original project

- ? **Sociological Analysis:** Landowners were surveyed to discover why they elected to participate or not to participate in the watershed effort. Included Amish and non-Amish.
- ? **Water Quality Analysis:**
 - ✍ Chemical and sediment samples were collected using automated samplers. Some microbiological studies
 - ✍ Fish sampling and stream habitat structure
- ? **Computer Modeling:** A new model, ANSWERS, was developed and used as part of the project

Research was well documented

? More than 130 presentations and papers were prepared, most in official EPA documents



Project documentation material is being scanned for wider dissemination

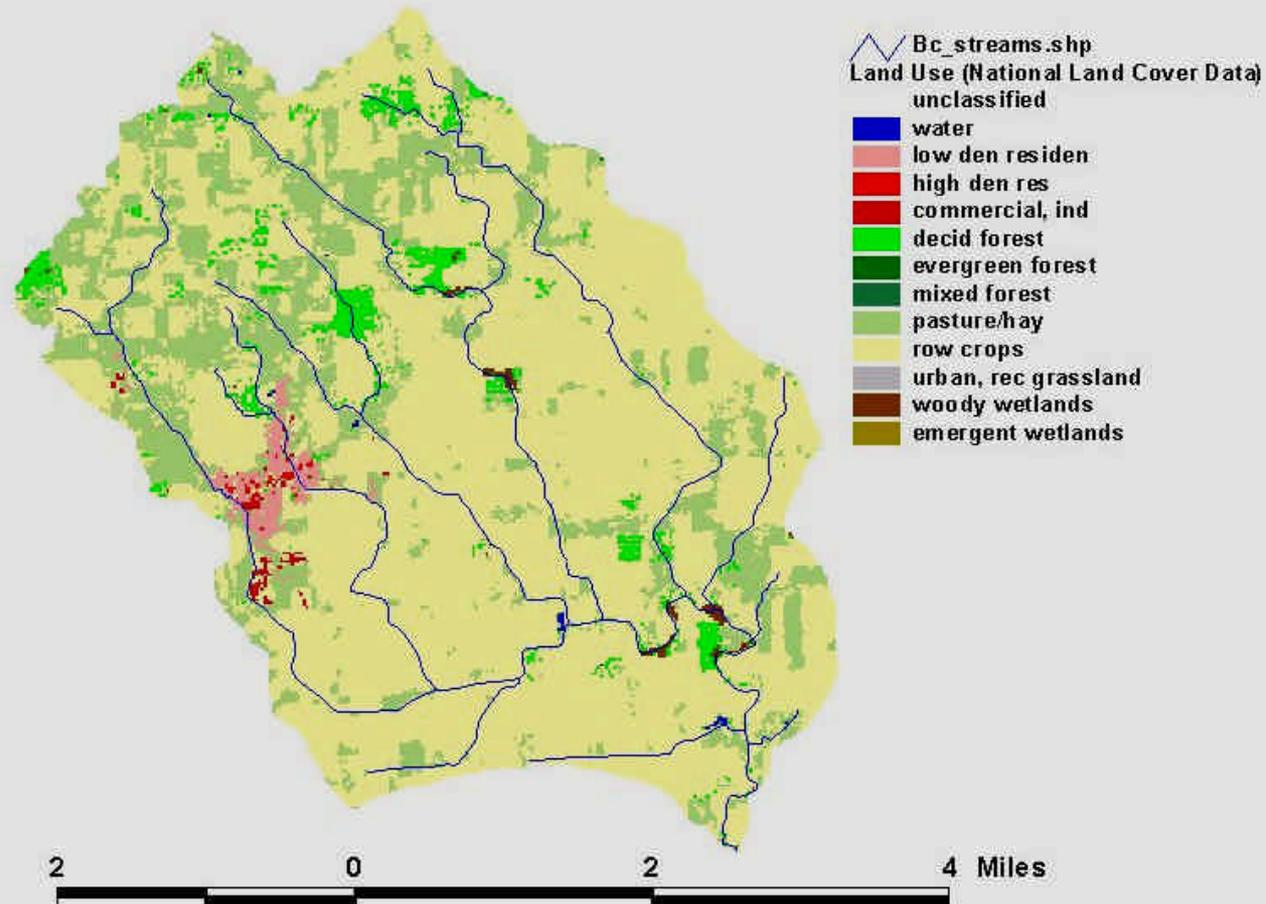
? Materials will be available on the Web or CD

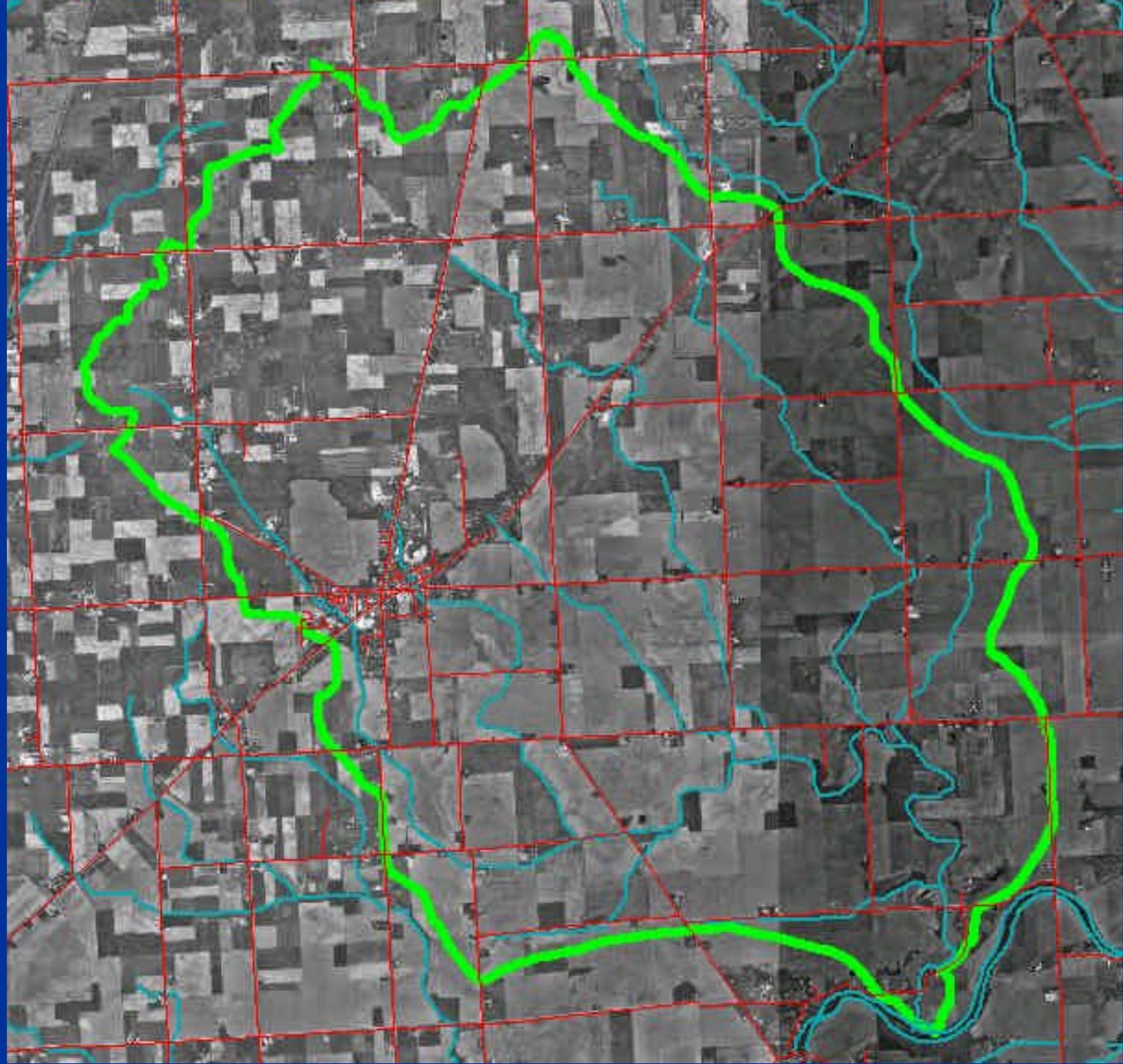


Watershed land use is basically the same as 20 years ago

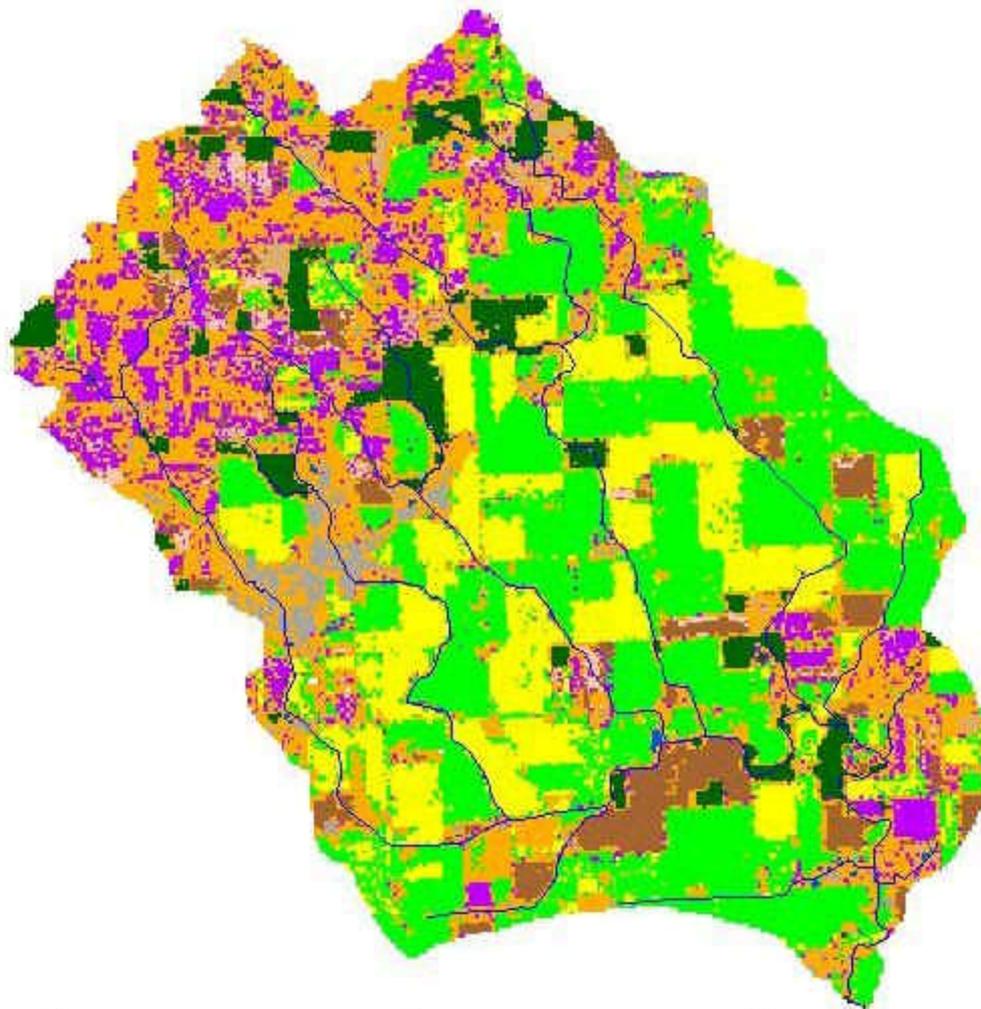
? Mostly row crop agriculture; some pasture in northwest part (mainly Amish farmers)

Land Use (from National Land Cover Data, based on satellite images from early 1990s)





Crop Land (from NASS, year 2000)



-  Streams in Black Creek
- 2000 Crop Land (from NASS)
- no data
-  corn
-  soybeans
-  winter wheat
-  other small grains, hay
-  double-crop WW SB
-  other crops
-  popcom
-  all other crops
- unclassified
-  fallow or idle cropland
-  pasture, grassland, nonag
-  woods
- clouds
-  urban
-  water
-  buildings, homes, subs
-  wetlands
- No Data



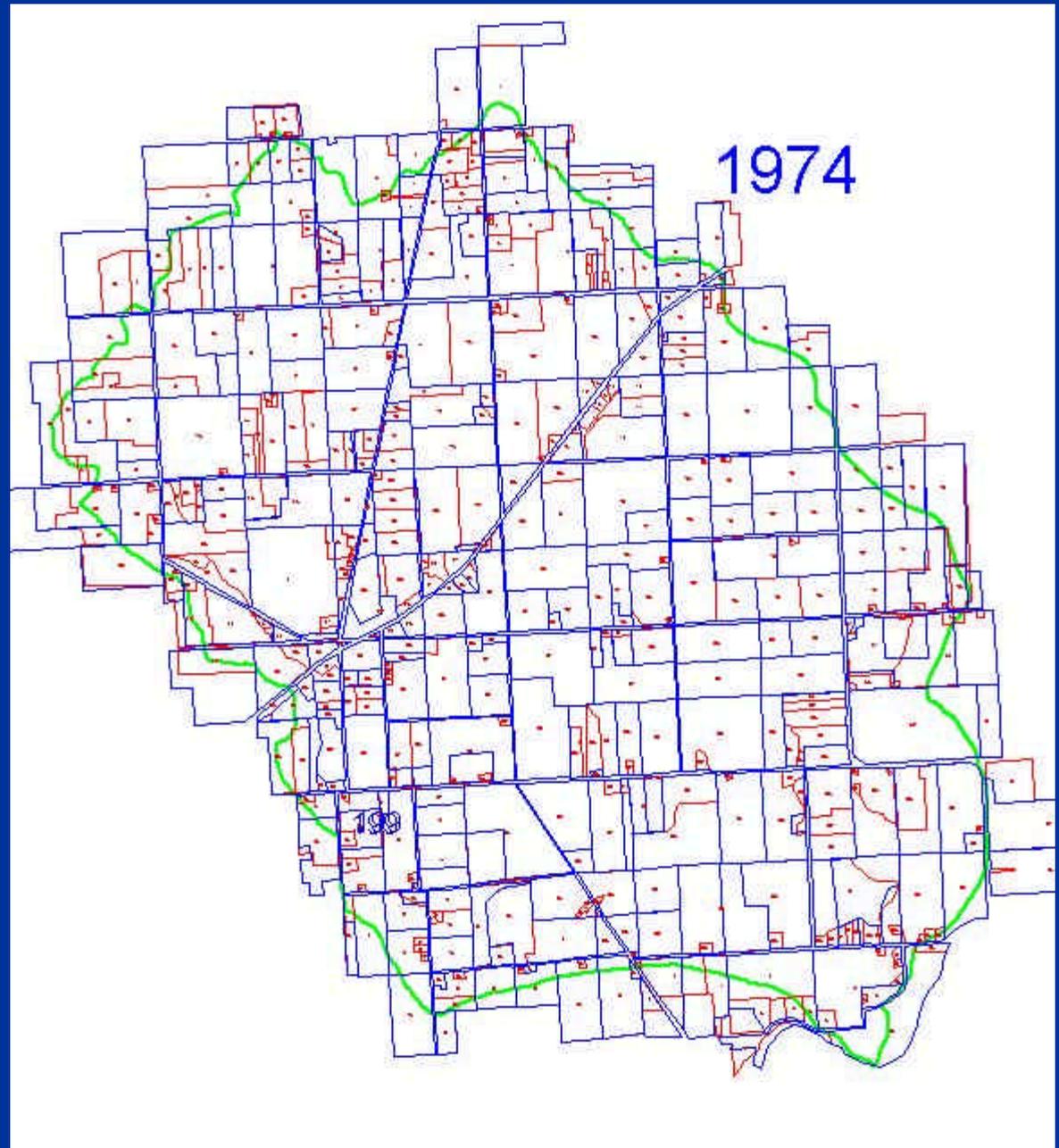
Goals of current project (2001-2004)

1. Evaluate the long-term impacts of the original project on
 - ? the attitudes of farmers,
 - ? the utilization of BMPs, and
 - ? the condition and maintenance of BMPs
- ? *Survey landowners and farmers (if ground is rented) to find out both attitudes and practices, using many of the same questions as original survey*
- ? *Physically inspect BMPs installed during the original project and evaluate their current condition*

Digitized ownership maps – 2000 and 1974

? 489 parcels in 2000

? 275 parcels in 1974



Survey of farmers and landowners

? Survey will cover

 Current farming practices

 Maintenance of past BMPs

 Installation of BMPs since project finished

 Attitudes towards conservation practices

Best Management Practice (BMP) Evaluation



Evaluating Current Condition of BMPs

- ? No standard method appears to exist to evaluate the condition of an existing BMP
- ? Graduate student Kelsi Bracmort developed a series of evaluation forms
 - ✍️ Expert panel evaluated practices
 - ✍️ Students used evaluation form to evaluate same practices
 - ✍️ Results compared to experts and to each other



Methods will be used on structural BMPs in Black Creek Watershed



Cultural BMPs – “Field borders”



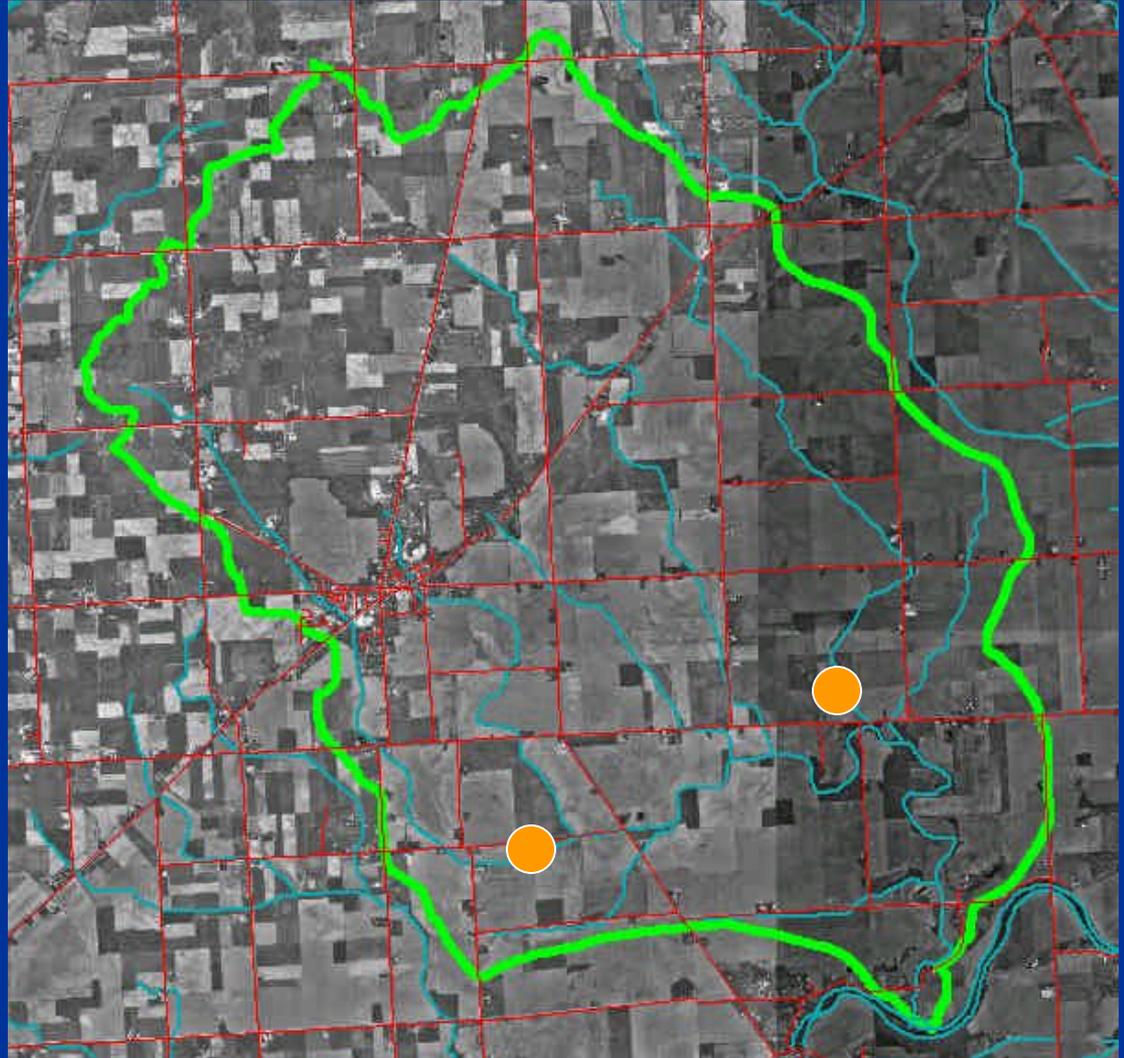
Goals of current project (2001-2004)

2. Quantify the long-term ecological impacts of the project on the type and distribution of aquatic species and the chemistry of the receiving waters

 Fish communities are being evaluated as a long-term indicator of water quality. Biological integrity will be compared to other sites and to values 20 years ago.

Water quality sampling sites

- ? Two sites with the best data from original project are being re-instrumented.
- ? Fish sampling will be done at 25 sites



Goals of current project (2001-2004)

3. Test and improve existing computer simulation models to assess their capability and effectiveness in simulating and promoting past and current water quality BMPs

✍ One conclusion of original project was that obtaining data was too expensive, and that hydrologic/water quality modeling was necessary. The ANSWERS model was developed to fulfill the needs.

✍ Other models to be used: SWAT, WEPP, DRAINMOD, NAPRA (GLEAMS)

Goals of current project (2001-2004)

4. Use the results to make and disseminate recommendations about effective management practices for future water quality projects and TMDL implementation

 Particularly relevant for TMDLs and other watershed management projects

 If research finds that there is little long-term impact of a multi-million dollar project, TMDLs based on one-time BMPs may not solve the problem.

Implications of long-term impacts

- ? New emphasis is being placed on accountability or evaluation of impacts – but will long-term impacts be considered?
- ? **Section 319, EQIP**, and other programs that provide cost-share funds for installation of practices will continue or expand.
- ? New **Conservation Security Program** will provide continued payments to “reward good stewardship”, recognizing ongoing costs of conservation practices and maintenance

Conclusion: Implications of long-term impacts

- ? If significant lasting benefits can be demonstrated, this will help “sell” water quality protection efforts to today’s farmers and policy makers
- ? If not, current approaches to water quality protection in rural areas may need to be reconsidered.