Using ArcGIS to Inventory Biological Surveys of the Tennessee Coalfield

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Knoxville Field Office

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SMCRA and KFO

- The Surface Mining Control and Reclamation Act of 1977 (SMCRA) established a nationwide program to protect society and the environment from adverse effects of surface coal mining operations
- The Knoxville Field Office (KFO) is tasked with the review, approval, and inspection of surface coal mining operations under SMCRA

Overview of Biological Surveys

- Types
  - Fish, Mussels, Macro-Invertebrates, and Bats

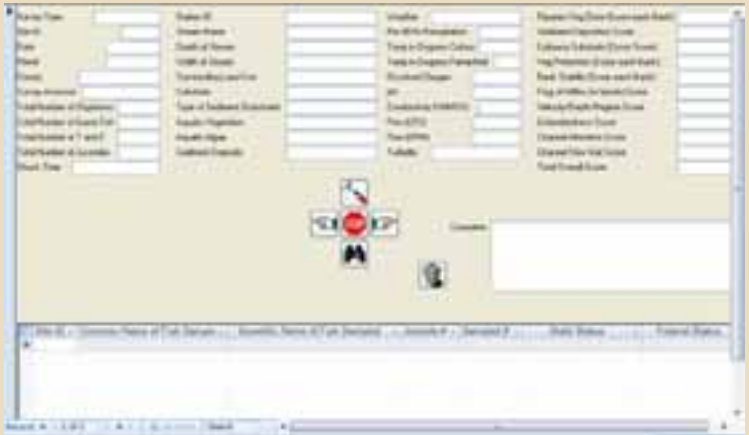
- Uses
  - Help control environmental impacts due to surface coal mining operations
  - Determine pre-mine conditions of a watershed during the permit review process
  - Identify post-mining (mining and reclamation are complete) results from the approved permit
  - Identify any threatened or endangered species that could be affected by surface coal mining operations

Purpose and Development of Inventory

- Purpose
  - Migrate from paper biological surveys into a way to store the surveys electronically and have the ability to display the surveys geographically
- Development
  - Develop a Microsoft SQL Server database to store all biological surveys
  - Develop an ARCSDE geodatabase to store geographic locations of each biological survey

Geospatial Locating and Data Entry

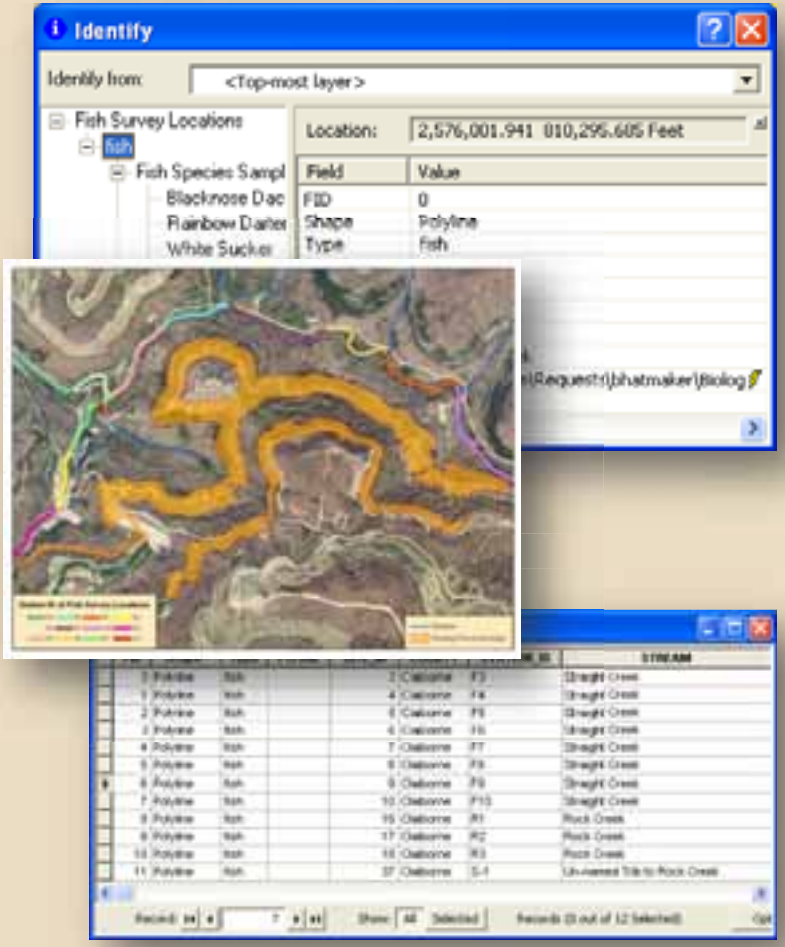
- Geospatial Locating
  - Determine survey location by using map provided from survey
  - Digitize location of survey (scan and geo-reference if needed)
- Data Entry
  - Enter tabular data into database with the use of created forms for each type of survey



Benefits of Inventorying Biological Surveys

- Benefits of a Microsoft SQL Server database
  - Ability to share the information electronically (office personnel, other offices, other federal and state agencies, etc…)
  - Perform queries based on specific needs (locations, sampling dates, water chemistry, types of species sampled, etc…)
  - Generate reports based on information from surveys
- Benefits of an ArcSDE geodatabase
  - Display geographic locations of the biological surveys
  - Perform queries based on the geographic locations
  - Relate the locations of each survey to the tabular data stored in SQL Server (using a unique Site ID)

Paradigm Shift



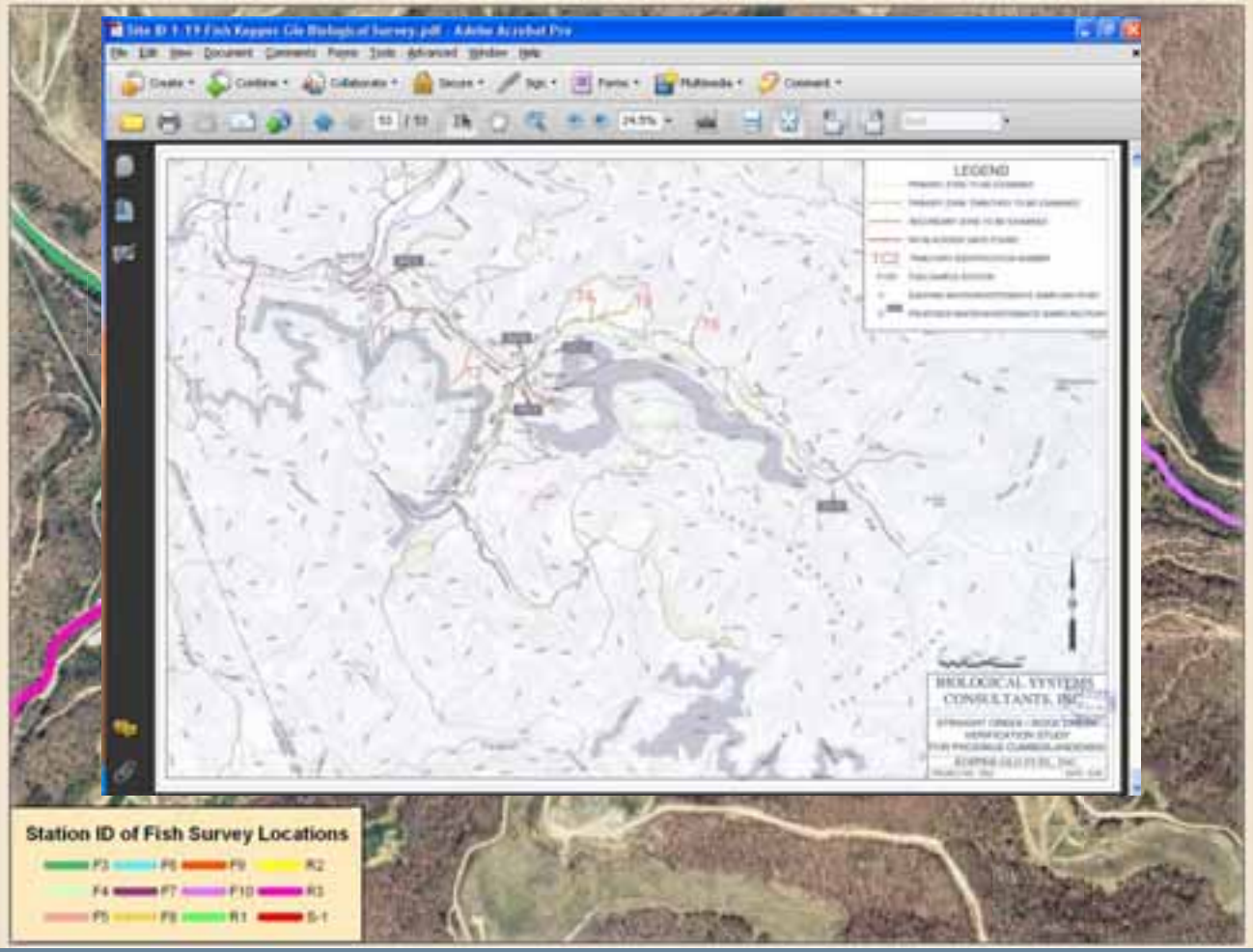
Capabilities of ArcGIS

Surface Coal Mining Permits in the Tennessee Coalfield

Capabilities of Biological Surveys in ArcGIS

Biological Survey Locations in relation to a Pending Permit

Utilizing Biological Surveys in ArcGIS



Out-of-Office Capability

- Ability to utilize ArcPad in the field
  - Locate specific biological survey locations
  - Identify possible environmental impacts based on results from the specific location
  - Conduct additional sampling if needed (present or future)
  - Determine possible water quality issues

Questions

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