DEVELOPMENT OF EXTENSIBLE ELECTRONIC FIELD FORMS FOR ECOLOGICAL DATA COLLECTION

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ABSTRACT

The U.S. Geological Survey (USGS) National Water-Quality Assessment Program (NAWQA) is developing electronic field forms and batch-loading capabilities in order to improve data quality, and increase efficiency of data collection and entry. Field data have been recorded on paper forms and hand entered into a central database for the nearly 6,000 reach habitat and fish community samples that NAWQA personnel have collected since 1994. Compared to filling out paper field forms, using electronic field forms can improve data quality by allowing for real-time enforcement of data-collection business rules and reducing the number of data-entry errors.

A guiding principle for the development is that the system be extensible – designed to rapidly accommodate changes and be modifiable for other collection protocols. Essential user requirements were collected early in the development process and included efficient data entry, data-entry status indicators, and uncomplicated upload capabilities. Decisions were made to: design the application with two database files to accommodate extensibility; use tablet computer hardware for the large screen size; and incorporate interface elements found in web pages for ease of use.

In the summer of 2007, NAWQA deployed the Biological Electronic Field Forms system (BioEFF) for reach habitat data collection. Personnel used Windows Tablet OS laptops to enter data at about 70 sites and to upload data to the central database. Data entry was made with a stylus through pull-down boxes, radio buttons, and handwriting recognition. Free-form entry was used to draw the site sketch and keep “margin notes.” The user interface was readily embraced, even by inexperienced users; however, the developers learned that they need to provide better guidance with file management. Plans for the future include wider deployment of the reach habitat forms and adding fish community forms.

KEYWORDS

Electronic field forms, habitat data, stream ecology, National Water-Quality Assessment Program, data collection, databases, field computers