ENVIRONMENTAL DATA UPLOAD AND VISUALIZATION TOOLS

RMP AND INFORMATICS
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ABSTRACT

Easy access to reliable data is a primary objective of any environmental information management system. Providing high quality, scientific information allows for the formulation of technically sound policies and the ability to address specific management questions. Tools can assist with the flow of information through the various data management steps of data collection and uploading, and facilitate the retrieval, exchange, and visualization of results. This poster highlights tool development from two projects. The Regional Monitoring Program for Water Quality (RMP) is the primary source of long-term contaminant monitoring data for the San Francisco Estuary. The RMP annually collects water, sediment, and tissue samples. The South Bay Mercury Project (SBMP) is a collaborative, three-year project that characterizes mercury in the sediment, water, and sentinel species indicative of different landscape management endpoints in South Baylands.

Field data collection entry forms have been developed in Microsoft Access for both projects and enable data to be easily uploaded into a database. These entry forms have reduced staff time in the field and costs for entering standardized information into project databases. Constraints prevent entry of erroneous data by providing standard code lists.

The SBMP uses Google Earth for visualizing mercury results at specific sample sites. Concentrations are distinguished using a range of colors and symbol heights. This visualization tool provides scientists with a valuable aerial perspective for evaluating results.

The RMP makes its 15-year dataset available online through a user-defined query tool, from which results can be downloaded into Excel in both a cross-tabulated and flat-file format. Dynamic mapping of concentrations allows users to view spatial distributions across the Estuary, and statistical functions, such as cumulative distribution function plots, provide aggregated summaries.

These visualization tools are powerful methods for conveying information in meaningful ways to environmental managers and scientists responsible for managing the Estuary's resources.

Acknowledgements

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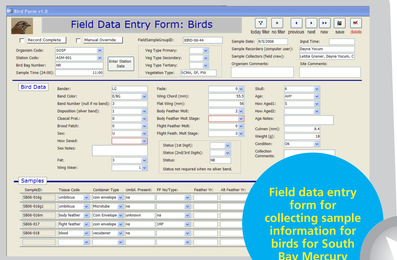
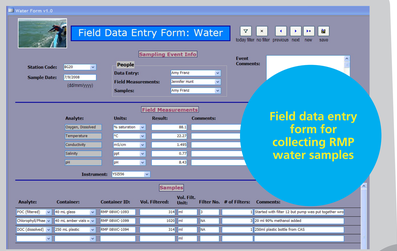
DATA UPLOAD



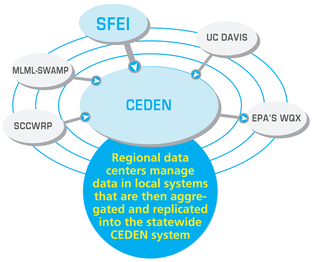
Field data entry form for collecting sample information for birds for South Bay Mercury Project



Field data entry form for collecting RMP water samples

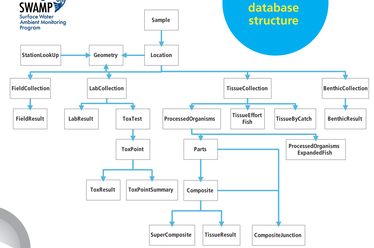
- Field data collection entry forms developed in Microsoft Access
- Standard format enables easy upload of data to main database
- Forms save in both staff time and costs for entering standardized information into database
- Constraints prevent erroneous data entry by forcing users to select from pre-defined code lists (e.g., analyte and collection device names) and to enter data based on validation rules (e.g., station codes cannot be used more than once for a sampling date)

TO



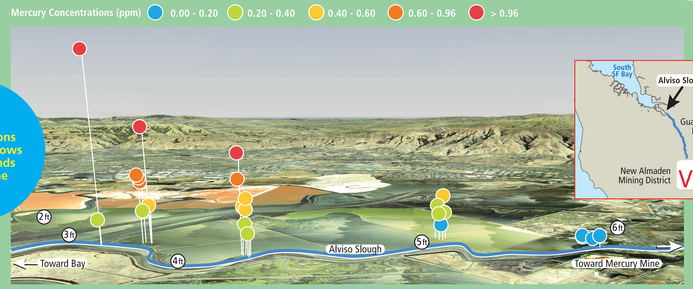
Regional data centers manage data in local systems that are then aggregated and replicated into the statewide CEDEN system

SWAMP v.2.5 database structure



- SWAMP v.2.5 database structure enables the same tools to be used on different datasets and exchange with the California Environmental Data Exchange Network (CEDEN), www.ceden.org
- Constraints ensure standard codes are used across years and datasets
- Queries check that data quality objectives for accuracy, precision, blank contamination, completeness, and method detection limits have been met

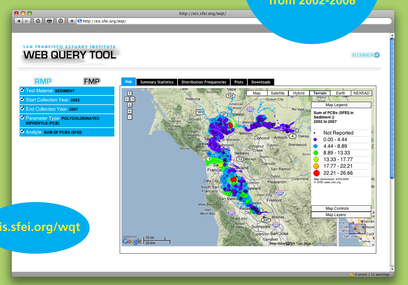
VISUALIZATION



Mercury concentrations in song sparrows from wetlands fringing the Estuary

- Google Earth functionality leveraged for visualizing mercury results at specific sample sites
- Concentrations distinguished using a range of colors and symbol heights
- Visualization tool provides scientists with a valuable aerial perspective for evaluating results

Map of Sum of PCBs concentrations in sediment from 2002-2006



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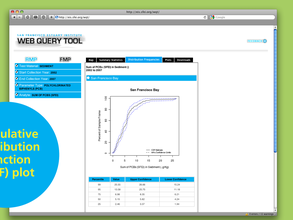
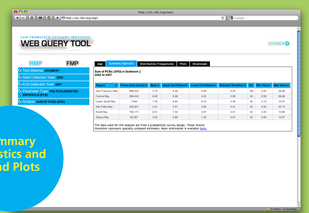
- Drop-down lists allow users to define their query selection
- Dynamic mapping of concentrations allows users to view spatial distributions across the Estuary

Cumulative Distribution Function (CDF) plot



- Statistical functions, such as cumulative distribution function plots, provide aggregated summaries
- CDF plots help address questions such as what percentage of the Estuary is above a guideline for an analyte for the total sampled area in the Estuary and by region

Summary Statistics and Trend Plots



- User can download results in Excel file in two formats: a cross-tabulated format for reviewing data across stations and time in a table, and a flat-file format for importing data into statistical programs
- Valuable summary statistics are provided, including min/max values, mean, and standard deviation