

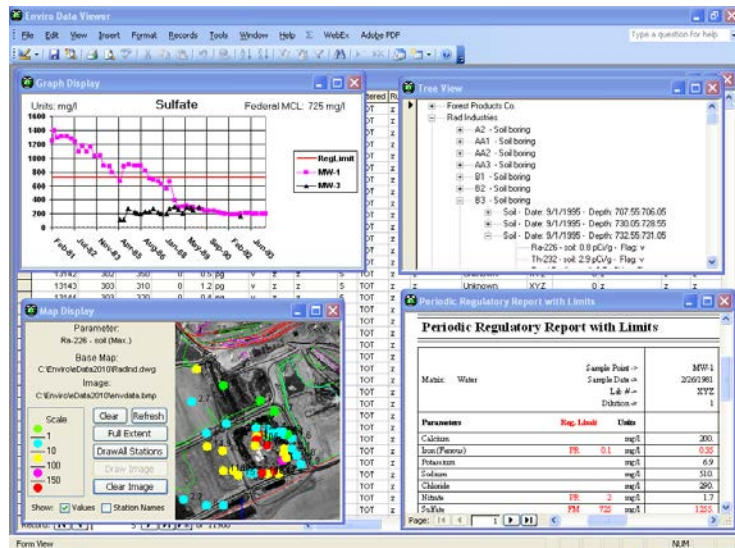


**Enviro  
Data®**

**Managing  
Biological Data**

Enviro Data is a program for storing and displaying environmental quality data. It has applications in a variety of areas including site investigation, remediation, monitoring, water supply, wastewater, and facility operations. This document discusses the application of Enviro Data for managing biological data to save time, improve work quality, and minimize drudgery.

Along with its other uses, Enviro Data has been used for many years to manage laboratory data for tissue sampling. Over the last several months Geotech has been working with Oak Ridge National Laboratory in Tennessee to expand the Enviro Data software to better handle additional types of biological data by integrating the system that they have used internally for many years, into Enviro Data, combining the best capabilities of both into a flexible, yet easy to use system. This has resulted in the addition of a number of data fields into existing Enviro Data tables. For example, at the samples level, new data fields, controlled by lookup tables (valid value lists), are being added for taxon (such as genus and species), life stage, gender, and tissue type. An example of data being managed using this new functionality is shown in the following figure:



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Samp. ID	Sta. #	QC Code	Species	Gender	Life Stage	Tissue Type	Comment	Len. (cm)	Wt. (g)	LWT (g)
19000	ERM8.0	Original	LMBASS	Female	Adult	Whole body		40.5	888.2	8.4675
19001	ERM8.0	Original	LMBASS	Female	Adult	Whole body	Liver parasites	46.1	1662.6	18.3530
19002	ERM8.0	Original	LMBASS	Female	Adult	Whole body	Very undevelop	45.7	1287.4	12.9843
19003	ERM8.0	Original	REDEAR	Female	Adult	Whole body		16.7	77.0	1.0720
19004	ERM8.0	Original	LMBASS	Female	Adult	Whole body	Very undevelop	41.0	892.6	4.4180
19006	LERM2.0	Original	REDEAR	Female	Adult	Whole body		16.9	82.1	0.8063
19007	LERM2.0	Original	LMBASS	Female	Adult	Whole body	Liver parasites	40.9	919.20	11.3666
19055	ERM8.0	Original	REDEAR	Female	Adult	Whole body		18.3	101.5	1.1035

At the analysis level, new data fields for taxon and life stage are being added. Also, a field for categorical (non-numeric) results is being added to analyses to handle information such as color. The benefit of these changes will be in handling population census data. At the sample level will be information about the bulk sample. Then at the result level can be multiple records for count, cumulative weight, or other parameters by species.

Another change is the addition of a new table to provide more comprehensive handling of associated samples. For example, for a typical fish sample event each fish would be assigned a field sample identification number, and measurements performed such as length and weight. Then the fish might be dissected, and each filet, liver, or ovary weighed and described, such as

color or appearance. Then the organs from several fish might be composited and analyzed, resulting in a suite of laboratory results by various methods. Using the new associated sample feature, the parent-child relationship between these different samples can be stored. Then display features will be provided to collapse the results, so that the weight of a fish can be displayed along with the weight of its liver and the concentration of selected metals.

Samp. ID	Sta. #	QC Code	Species	Gender	Life Stage	Tissue Type	Comment	Len. (cm)												
19000	ERM8.0	Original	LMBASS	Female	Adult	Whole body		40.5												
19001	ERM8.0	Original	LMBASS	Female	Adult	Whole body	Liver parasites	46.1												
19002	ERM8.0	Original	LMBASS	Female	Adult	Whole body	Very undeveloped	45.7												
<table border="1"> <thead> <tr> <th>Sample</th> <th>Assoc.Samp</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>19002</td> <td>29002</td> <td>Split</td> </tr> <tr> <td>* 19002</td> <td></td> <td></td> </tr> </tbody> </table>									Sample	Assoc.Samp	Reason	19002	29002	Split	* 19002					
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19007	LERM2.0	Original	LMBASS	Female	Adult	Whole body	Liver parasites	40.9												
19055	ERM8.0	Original	REDEAR	Female	Adult	Whole body		18.3												
29001	ERM8.0	Original	LMBASS	Unknown	Adult	Liver														
29002	ERM8.0	Original	LMBASS	Female	Adult	Liver														
39001	ERM8.0	Original	LMBASS	Unknown	Adult	Liver	Composite													
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For analytical and other data, existing functionality in Enviro Data will continue to work well. Sample planning capabilities such as preparing container labels and laboratory chains of custody can save time and improve quality for field samples. Quality control features such as consistency and range checking during import can help maximize data quality, and a full set of data validation tools is also provided. Then it's easy for you to select and display your data in a variety of useful formats, or move it to other programs for further analysis and display, for example to a geographic information system to create maps of your results. You may need to analyze the distribution in space and time of certain constituents, for example to determine the source of an increase in a particular contaminant. The software lets you display graphs and maps of the data to nail down the time and place of the increase, to help you look for the cause.

A strong point in Enviro Data is in letting you compare your data to limits. You can have as many limit types as you wish, assign limits to types based on parameter and matrix, and group limits into user-defined limit groups, allowing you to manage various limits and alerts. Many of the reports and graphs can use one or more of these limits for comparison. The report shown in the following figure can compare results to multiple limits, and color-code exceedences.

Crosstab Report										Summary Statistics						
Station Name	Units	Federal MCL	State MCL	Tribal MCL	Provisional	SW-1	SW-1	SW-1	SW-1		Count	Non-Detects	Min	Max	Mean	Std Dev.
Sample Date						2/26/1981	4/20/1981	6/19/1981	10/1/1981	1/1/1981						
<b>Inorganics</b>																
Chloride	mg/l					290	380	270	280		53	0	120	380	190	60.6
Nitrate	mg/l		2			1.70	<1.00	<1.00	1.00		36	24	<0.1	10	2.01	2.06
Sulfate	mg/l	725	800	350	500	1255	1400	1290	1320		53	0	190	1400	641	411
<b>Metals</b>																
Calcium	mg/l					200.44	180	190	200		52	0	105	210	148	33.2
Iron (Ferrous)	mg/l		0.1			0.35		1.7	0.76		52	0	0.04	5.5	2.04	1.81
Potassium	mg/l					6.90	6.60 BJ	6.80	48		53	0	1.1	48	6.21	6.33
Sodium	mg/l					510	530	540	450		53	0	96.6	550	290	164

Biological monitoring programs are coming under increasing monitoring and reporting regulatory requirements, and Enviro Data can help with this. Many organizations have adopted Enviro Data because of its cost-effective power and ease-of-use, along with open-system flexibility not found in any other off-the-shelf or home-grown solutions. In summary, our clients have found Enviro Data to be a superior solution for their data management needs.