

# **DEVELOPMENT OF A STATEWIDE COLLECTION AND DATABASE OF AQUATIC MACROINVERTEBRATES FOR SOUTH DAKOTA**

Work Plan – January 31, 2008

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## Specimen Accession

Specimens may be deposited into the collection from any qualified water resources project conducted within South Dakota. However, we will not accept unsorted samples or specimens with missing metadata. In addition, pdf copies of project reports should be submitted alongside specimens as metadata required for the digital database exceeds that which would normally be placed on a vial label. Digital reports providing metadata in support of collected specimens will be archived alongside digital images of specimens in the collection. Citations of these reports will be included as metadata within the digital database.

Specimens which do not meet our criteria will be returned and not entered onto the database. These returned specimens may be resubmitted once minimum data requirements have been met.

## Specimen Verification

Specimen identifications must meet the minimum identification requirements of EPA (2004) in order to be included within the database (Table 1). Identifications will not be routinely verified for every individual specimen received. Rather, individual specimen identifications will be the responsibility of the submitting individual or group. The database will include the name and affiliation of the collector with a separate entry for the individual performing determinations.

We will check listed taxonomic information against the IT IS taxa list. If the name on the label does not match an approved IT IS taxon, we will check the specimen. In addition, if we encounter a specimen whose distribution is not known in South Dakota, we will check the specimen. If a specimen has been found to be identified incorrectly, we will correct the identification and notify the submitting group.

## Digital Images

Individuals in the best condition within each submitted vial will be photographed using an Olympus DP71 digital camera. Dorsal and ventral views of each specimen will be photographed along with selected images specific to a particular taxon. These images will be saved as JPG files for inclusion in the database. While JPG files will slightly distort dimensions, they are more readily utilized from a web-based database.

### Specimen Deposition

Once metadata sources have been received, the specimen has been verified and digital images obtained, the specimen will be transferred to a 4 dram vial with a cone seal lid containing fresh 70% ethanol and glycerin. Label information from the original specimen vial will be transferred onto new collection labels along with the accession code assigned to the specimen. The original sample label will also be placed into the collection vial. The specimen will then be placed in its proper location in the collection.

### Database Entry

SPECIFY has been chosen as the official database package for the collection. This database package has been developed with the support of the National Science Foundation for use by natural history collections. It is designed to handle small to large collections and may be installed to operate as a stand alone system or be hosted on a SQL server with open access over the Internet. We will develop the database on a stand alone system with the objective of migrating the data to a network-based system at the end of this project.

Metadata from the specimen label and accompanying digital report will be entered onto the SPECIFY database. These data will include latitude and longitude coordinates (if available) to facilitate the generation of distribution maps of each taxon in the database. The current version of the SPECIFY database allows generation of point maps through Google Earth. Future generations of SPECIFY are likely to have a GIS interface. Following entry of data onto the database, the specimen will officially be admitted to the collection. Database back-ups will be maintained on an external hard drive.

### Collection Organization

Vouchered macroinvertebrate specimens will be maintained in vials with 70% ethanol and glycerin or will be slide mounted. Unmounted specimens will be curated in cabinets, drawers and vial trays using a hierarchical cataloguing system (see below). All specimens will be transferred to vials with cone-sealed, screw-on lids. Mounted specimens will be maintained in separate slide cabinets using a similar hierarchical scheme.

### Voucher Cabinet Organization

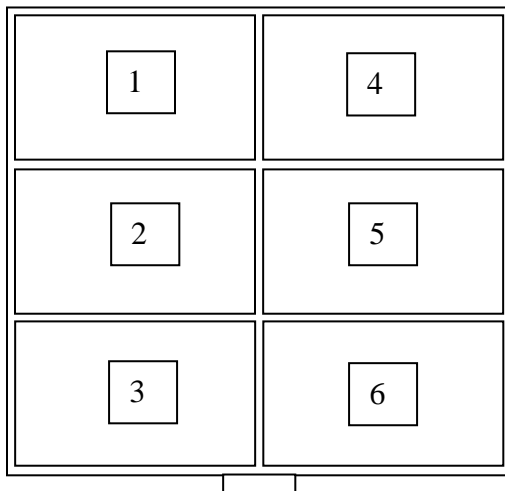
1	WORMS
2	Crustacea
3	Mollusca
4	Coleoptera
5	Diptera
6	Ephemeroptera
7	Hemiptera
8	Odonata
9	Trichoptera
10	CLMP

WORMS – Nematomorpha, Platyhelminthes, Annelida

CLMP – Collembola, Lepidoptera, Megaloptera, Plecoptera

### Vial Tray Organization within Cabinet Drawers

Each numbered cabinet drawer will contain six numbered vial trays in the following configuration.



Vial Organization within Vial Trays

Each vial tray will contain a grid with column addresses identified as letters and row addresses identified by numbers. Thus, each vial within each numbered tray has its own unique location in the collection.

	A	B	C	D	E	F	G	H	I	J
5										
4										
3			■							
2										
1										

Vial Address for Dark Cell – 3C within this tray

Example Specimen Address within Collection

C1D2T4V3c

Translated: Cabinet #1, Drawer #2, Tray #4, Vial Address 3c

Slide-Mounted Specimens

Slide mounted specimens will be vouchered in separate slide cabinets using a hierarchical address similar to that demonstrated above. Most mounted specimens will belong to the following three groups:

- Annelida
- Chironomidae
- Nematoda

Time Line

Efforts to develop the collection and database will begin January 1, 2008 and the final products are expected by December 31, 2010. A time line for tasks is listed below.

Task	2008					2009			
	Jan	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec
Hire undergraduate student	■								
Order equipment and database software	■								
Obtain agency voucher specimens	■	■							
Present outline of database structure		■							
Check ID's on specimens received		■	■	■	■				
Generate digital images			■	■	■	■			
Enter specimens onto database			■	■	■	■	■	■	■
Final report and presentation								■	■

## Progress Report

The contracted start-date for this project was January 1, 2008. However, considerable effort had already been expended prior to that date to purchase equipment and supplies.

Progress in the first month of this project included:

- Acquired cabinetry and other supplies for the deposition of specimens.
- Acquired new stereozoom microscope and digital camera system.
- Acquired dedicated computer for the database and camera system.
- Acquired and installed SPECIFY database onto the dedicated computer.
- Acquired SD DENR voucher specimens and inventoried those specimens.
- Hired undergraduate technician to work with submitted specimens.

## Modifications and Issues Encountered

1. We originally proposed to work with the TAXIS database package. We learned that a new on-line version of this package was in development (beta version) and that some of the features (i.e., GIS interface) were being discontinued in the new version. We decided instead to adopt the SPECIFY database described above.
2. We inventoried specimens received from DENR and found many problems with label information. Some specimens had no label information at all. Others had partial information but were missing critical metadata for the database. We are now working with DENR to acquire digital copies of reports for these collections. We have considered putting an EXCEL template together for distribution to active projects which would allow them to enter metadata necessary for SPECIFY as they acquire their specimens. This would place the burden of data entry and data QA onto the projects submitting specimens.
3. Based upon the number of DENR specimens received so far (see attached file), we have already exceeded the capacity of our collection cabinet. No specimens have yet been deposited by GF&P and our specimens have also not yet been included. Thus, we will approach DENR regarding funds necessary to purchase another cabinet and vials necessary to house additional specimens. These supplies are estimated to cost \$2000.

## References

U.S. EPA. 2004. Wadeable stream assessment: Benthic laboratory methods. EPA 841-B-04-007. U.S. Environmental Protection Agency, Office of Water and Office of Research and Development, Washington, DC.

URL to Information on SPECIFY Database: <http://www.specifysoftware.org/Specify>