

**Standard Operating Procedures:
Dorset Environmental Science Centre
Benthic-invertebrate Biology Laboratory**

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Standard Operating Procedures: Dorset Environmental Science Centre Benthic-invertebrate Biology Laboratory

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1 Table of Contents

1	TABLE OF CONTENTS	4
2	LIST OF TABLES	5
3	LIST OF FIGURES	5
4	DISCLAIMER.....	6
5	PREAMBLE TO THE SECOND EDITION	6
6	INTRODUCTION	7
7	FACILITIES	7
7.1	LONG TERM STORAGE (LTS) BUILDING	7
8	PROCEDURES.....	8
8.1	PERSONAL PROTECTIVE EQUIPMENT (PPE)	8
8.2	SAMPLE SUBMISSION PROCEDURE	9
8.3	SUBMISSION FORM.....	9
8.4	SAMPLE PROCESSING	11
8.5	QUALITY ASSURANCE.....	11
8.6	SAMPLE CATALOGUING AND ARCHIVING	12
	<i>Why Store Benthic-Invertebrate Samples?.....</i>	<i>12</i>
	<i>Cataloguing Samples using BADCat Database</i>	<i>13</i>
	<i>Sample Location.....</i>	<i>14</i>
	<i>Sample Information.....</i>	<i>16</i>
	<i>Vial Labels</i>	<i>17</i>
	<i>Archive Labels.....</i>	<i>17</i>
	<i>Multiple Archive Labels</i>	<i>17</i>
	<i>Temporary Labels</i>	<i>18</i>
	<i>Creating Storage Caddy Labels</i>	<i>19</i>
8.7	SAMPLE CURATION.....	20
8.8	SUMMARY OF SAMPLE-RELATED PROCEDURES	21
9	REFERENCES	22
	APPENDIX 1 SUBMISSION FORM	23
	APPENDIX 2 DESC SITE MAP	25
	APPENDIX 3 LTS AND COMPONENTS OF THE SAMPLE STORAGE ROOM	27
	APPENDIX 4 BUILDING STORAGE CADDIES	29

2 List of Tables

Table 1. The fields in the BADCat <i>Samples</i> table (asterisks denote fields from which labels for archived vials are created)	14
Table 2. Map-over from the Samples Submission Form to Benthos Sample Storage Fields.	17

3 List of Figures

Figure 1. Sample management from submission to archiving.....	7
Figure 2. DESC-style vial for archiving a benthic-invertebrate sample, showing mandatory sample-metadata and WHMIS labels (this example is borosilicate glass shell vial, manufactured by Fisherbrand™)	15
Figure 3. Storage caddy with 21 archive vials.	16
Figure 4. Formatted archive vial label.	19
Figure 5. Caddy Label.....	20
Figure 6. Long Term Storage Building.....	27
Figure 7. Storage Room 4a.	27
Figure 8. Metal Sample Storage Cabinet	28
Figure 9. Vent to outdoors.	28
Figure 10. Electrochemical Sensor, with a gas alert alarm.....	28
Figure 11. Explosion-Proof Heater.	28
Figure 12. Diagram for a storage caddy [Not to Scale].	29

4 Disclaimer

Any reference to specific equipment, manufacturers, or supplies is for descriptive purposes only and does not constitute an endorsement of a particular product.

5 Preamble to the Second Edition

On 20 September 2013, an accident, involving an exploding vial and two Dorset Environmental Science Centre (DESC) staff, occurred in the sample-archive of the Dorset Environmental Science Centre's Long-term Storage Building. Safety audits were conducted in the months following the incident to determine the factors that contributed to the accident. DESC's Joint Health and Safety Committee made a series of recommendations aimed at preventing a similar accident from occurring in the future. Most of the revisions contained in this second edition were made to incorporate a greater margin of safety into the standard operating procedures of the DESC Biology Lab.

Standard operating procedures in this document reflect the following principles:

- Standard operating procedures are fundamental to biomonitoring and benthic science because they ensure safety and consistency in the scientific process
- Archived samples represent important records that substantiate published scientific articles.
- A sample must be labelled to ensure that important metadata about that sample is available at all times
- A stored sample must be catalogued to ensure that it can be expediently retrieved when necessary, and so its contents can be verified
- Working with fragile glassware, and alcohols—which are volatile and highly flammable, and can form unstable compounds under certain conditions (e.g., heat, desiccation, exposure to sunlight) — requires facilities and procedures to manage the associated hazards.
- One cannot be sure of the contents of any sample container, particularly containers submitted by external partners, or found in old archives from studies completed long ago. Submission criteria and sample-curation procedures must seek to identify sample contents, and samples having unknown origins or contents should be removed and disposed of in a way that is safe and environmentally benign
- Personal protective equipment used during any procedure should match the hazards of that procedure
- The rigor of quality-assurance checks on biological samples should match the nature of the study and the credentials and experience of the technician(s) performing sample-related tasks

6 Introduction

This manual describes the standard operating procedures for submitting biological samples to the DESC Biology Lab, processing submitted samples, and storing and curating archived benthic-invertebrate samples at DESC (Figure 1)

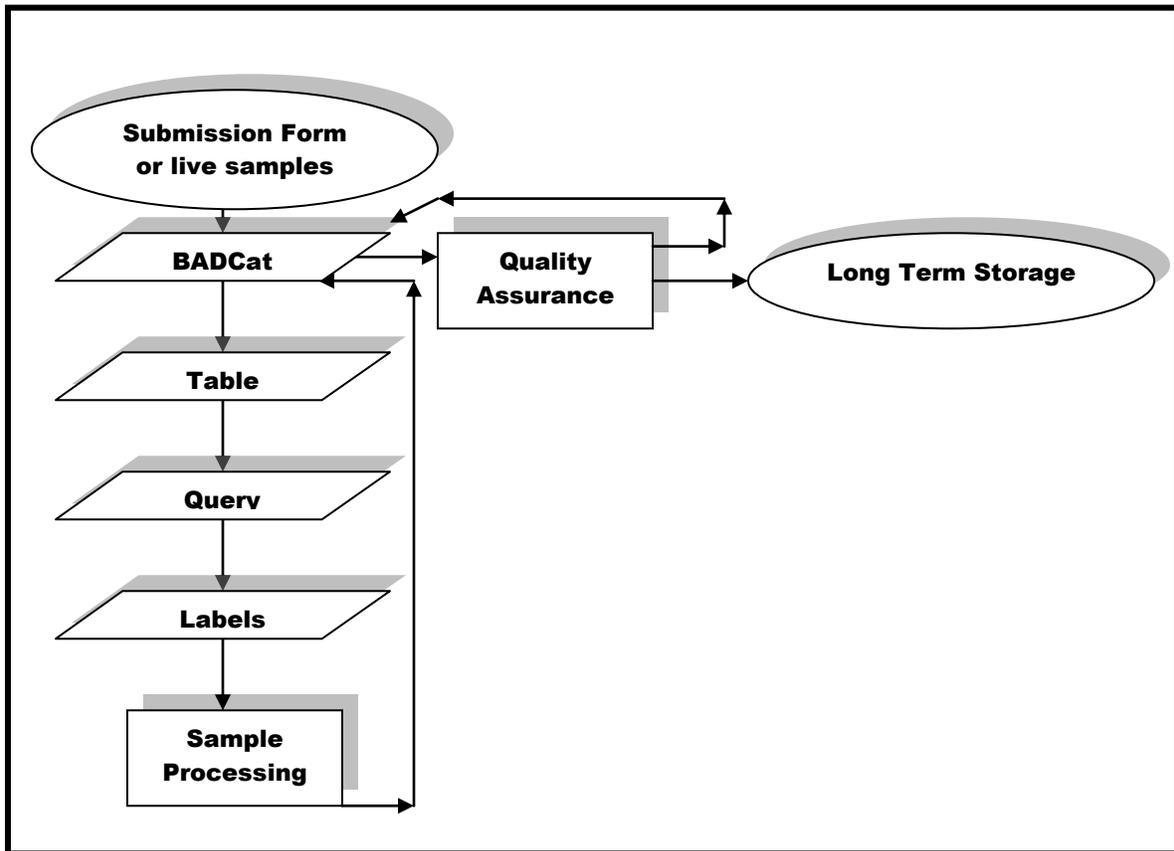


Figure 1. Sample management from submission to archiving.

7 Facilities

7.1 Long Term Storage (LTS) Building

The LTS building, DESC building #4, warehouses biological samples preserved in ethanol or formalin (Appendix 2). It was built in accordance with government regulations, including the Regulation for Industrial Establishments (R.R.O. 851/90) made under the Occupational Health and Safety Act of Ontario and the Ontario Fire Code (O. Reg. 388/97) made under the Fire Protection and Prevention Act. For safety reasons, it is an isolated building not attached to, or

abutting, any buildings occupied by personnel. This protects personnel in the event of a fire or explosion.

By regulation (i.e., IAPA, 2008), up to 235 litres of flammable liquid (i.e., alcohol preservative) may be stored in the Biology lab, in containers that have a nominal capacity of less than 23 litres each. Additional quantities must be stored in a separate area. Furthermore, isopropyl alcohol (2-propanol), may be used to preserve samples immediately following their collection in the field. Samples that are preserved in isopropyl alcohol, may be stored in the lab where they may be queued for processing, but no other isopropyl alcohol may be stored, or dispensed, in the biology lab. Stock of isopropyl alcohol must be stored in the bulk alcohol room (room 4c) of Long Term Storage.

Because of the high throughput of the DESC biology lab, and because many samples are archived on site, large volumes of alcohol are required. For this reason, special storage rooms were built in the LTS building: the archive of ethanol preserved benthic-invertebrate samples (room 4a), the archive of plankton samples (room 4b), which are preserved in either formalin (zooplankton) or Lugol's solution (phytoplankton); and the bulk ethanol storage (room 4c). Each of these rooms is equipped with special features that allow storage of flammable liquids (Appendix 3):

- Blow-out wall panels that are designed to dissipate energy from an explosion while maintaining the building's structural integrity
- Concrete floors that minimize static electricity
- Double-egress doors that swing outward
- Exhaust fans that are engaged before entering a room to channel vapors outside the building (Figure 9)
- Temperature sensors with hot and cold temperature alarms
- Electrochemical ethanol sensors that are connected to a gas-alert alarm (Figure 10)
- Explosion-proof, non-sparking fluorescent lights
- Explosion-proof, non-sparking convection heaters (Figure 11)
- Floor drain (room 4c only), which drains to a chemical storage tank
- No electrical outlets
- External and conduit wiring
- Fireproof metal cabinets that protect biological samples (rooms 4a and 4b; Figure 8)
- Copper grounding rail and grounding cable (room 4c) for proper grounding of bulk ethanol containers (e.g., drums)

8 Procedures

8.1 Personal Protective Equipment (PPE)

Small volume alcohol dispensing at the lab bench (i.e., for filling vials) shall be from drip-proof and WHMIS labelled ethanol-specific wash bottles.

Minimum PPE for routine handling of vials, for visually inspecting containers during sample curation, or for dispensing or decanting alcohol preservative in the lab or field shall be: safety glasses

Minimum PPE for disposing of samples, or for manipulating samples in long-term storage (i.e., for any procedures during annual sample curation that go beyond visual inspection) shall be: face shield and lab coat

8.2 Sample Submission Procedure

In order for biological samples to be accepted at the DESC biology lab, they must satisfy a series of criteria that have been designed to protect the safety of DESC staff and ensure that adequate metadata is available for each submitted sample. These criteria are reflected in the procedure below.

8.3 Submission Form

Samples submitted from outside organizations must be accompanied by a *Sample Submission Form* (Appendix 1). This form includes critical metadata about the sample. Samples are tracked through the laboratory processes using this submission form, until they are archived or returned to the owner.

From time to time, samples collected and processed by third-party agencies external to the Ontario Ministry of Environment and Climate Change may be submitted to DESC so that quality-assurance checks may be performed by study leads and/or certified taxonomists, or so that samples that are part of multi-partner collaborative research studies may be archived together in one place.

- 1) In the Biology Lab, check all samples to ensure that they are accompanied by submission sheets (third-party samples only) and all other sample submission conditions are met:
 - a) Unprocessed samples:
 - i) Contained in acceptably robust and tightly sealed vessels
 - ii) each container bears a WHMIS label that identifies the preservative used (i.e., either ethanol or isopropyl alcohol)
 - iii) each container bears a sample-identification label that includes: site code, description of the sampled location (waterbody name as a minimum), agency that collected the sample, sample date, sample or replicate number (e.g., “sample 1, riffle”), and the container’s number and the total number of containers the sample is contained in (e.g., “1 of 3”)
 - b) Processed (ready to be archived) samples:
 - i) Contained in DESC-style vials (i.e., similar to the one shown in Figure 2)
 - ii) Each sample is preserved in ethanol, and each sample’s container bears a WHMIS label that identifies the preservative used in the vial as ethanol
 - iii) Each vial bears internal and external labels that specify: site code, description of the sampled location (waterbody name as a minimum), agency that collected the sample, sample date, and sample or replicate number (e.g., “sample 1, riffle”).
- 2) Record the date the sample is received in ***Date Received by Lab*** on the *Sample Submission Form*.
- 3) Check for damaged containers and/or leakage. If either is present, obtain and wear appropriate protective equipment (at minimum, safety glasses and rubber gloves):
 - a) Attempt to recover lost specimens that may remain in external packaging and transfer compromised samples to standard replacement containers, either wide-mouth HDPE jars (unprocessed samples) or DESC-style vials (processed samples) and refill with an appropriate volume of ethanol.
 - b) Contact the sample owner and recommend proper packing techniques for future deliveries.
- 4) Verify all information on submission form is filled in correctly.
- 5) Verify that all samples correspond with the information on the form.
- 6) Keep the *Sample Submission Form* with its associated sample(s) throughout all future laboratory processes, until the sample is either returned to its owner or archived in LTS.
- 7) Put samples in queue by entering sample information into the Biological-sample Archive at Dorset Catalogue (BADCat) database, which is described in subsequent sections
- 8) Store samples temporarily in the lab until they can be processed¹.
- 9) Enter sample information into BADCat to generate archive labels.

¹ Monitor the amount of ethanol in the lab and ensure it does not exceed the safe limit. Periodically move samples into the LTS building if ethanol volumes approach the permitted maximum volume.

- 10) Process samples according to the OBBN protocol (Jones et al. 2007), protocols for the DESC Rapid Bioassessment Program (David et al. 1998), or other study-specific procedures as may be dictated by certain studies.

8.4 Sample Processing

Unless study-specific sample-processing requirements are indicated, the following procedures apply to benthic-invertebrate samples processed in the DESC Biology Lab:

- Samples are to be randomly sub-sampled, using either a spoon-and-bucket method or Marchant Box to obtain ~100-count specimen collections that represent the relative abundances of their parent samples
- Specimens are to be enumerated on bench sheets that are archived permanently by study in file cabinets in the DESC Administrative Building
- Enumerated specimens are archived in small labeled vials, and preserved in ethanol
- Taxonomic precision is family-level

Specific details are elaborated in following sections.

8.5 Quality Assurance

Quality-assurance (QA) checks are completed on a random 5-10% of samples, by either a peer of the technician who originally processed the sample, or by the scientist overseeing the program. Anyone providing QA checks at the DESC Biology Lab must be certified under the Society for Freshwater Science's (SFS's) Taxonomic Certification Program, at least to the family level. Standard QA checks on samples processed by OBBN- and SFS-certified technicians involve re-identifying and re-tallying all specimens associated with a given sample. Numbers and taxonomic diagnoses are then compared with those written on the original bench sheets. 95% accuracy is considered sufficient. Where lower accuracy is found, discrepancies between the original and QA paperwork must be ratified, more frequent or comprehensive QA checks on the technician's work may be called for, and standard procedures should be emphasized while subsequent samples are processed (i.e., conducting systematic searches through collected sediments; making sure specimens are actually transferred from forceps into archival vials; keying specimens, or obtaining second opinions from peers, whenever a taxonomic diagnosis is uncertain; double checking tallies; taking periodic breaks to relieve eye-strain; etc.)

From time-to-time uncertified technicians (e.g., co-op students, grad students, assistants hired via short-term contracts) may be employed in the DESC Biology Lab. Until such personnel are certified as OBBN participants and as SFS taxonomists, QA checks must be performed on each of their samples. Such QA checks shall include everything described in the paragraph above. In addition, processed sample residue should be maintained and thoroughly re-searched during the QA process to ensure acceptable specimen recovery rates of at least 90%. Where possible, QA checks should be done collaboratively with the new technician (using video camera and monitor) to recognize the training opportunities that QA checks provide.

8.6 Sample Cataloguing and Archiving

Processed Samples

1. Check vials for evaporation. Make sure lids are tightly sealed and there are no cracks in the glass.
2. Make sure the storage caddy and vials are labelled adequately.
3. Archive the storage caddy in the LTS building in the correct **Cabinet-Shelf-Row**.
4. Fill in the remaining fields in the *Samples* table once samples are stored:
 - **Archive location**
 - **Archive Date**
 - **Vial Return**
5. Store *Sample Submission Form* in the appropriate filing cabinet.

Unprocessed Samples

The majority of unprocessed samples are to be stored in study-specific batches, on the wooden or metal shelving units installed in Room 4a of LTS. Stacking of wide-mouth HDPE bottles is not permitted, thus bottles should never be placed one on top of another (the walls of some bottles have insufficient structural rigidity to bear the weight of additional filled containers, which can cause leaks and loss of samples).

A limited number of unprocessed samples may be queued in the Biology Lab while they await processing. Such samples should be stored in the appropriate fridges (to keep vapour pressures low), and care should be taken to ensure that regulated limits on the alcohol volume permitted in the lab is not exceeded (i.e., 235 litres, refer to section 6.3).

Why Store Benthic-Invertebrate Samples?

Storing samples allows scientists to revisit samples and to make new, or verify old, observations or measurements. Storing samples permits new data to be gathered in the future, even though the relevance of such data may not have been foreseen at the time samples were collected. Possible applications for archived benthic invertebrate samples include the following:

- Identifying morphological deformities
- Morphometric analyses
- Isotope analyses
- Contaminant analyses
- DNA-based taxonomic verification
- Biomass calculations

Cataloguing Samples using BADCat Database

The Biological-sample Archive at Dorset Catalogue (BADCat)² contains archive-related information for all benthic-invertebrate samples processed or stored at the Dorset Environmental Science Centre (DESC). It is vital that each sample's status, from sample submission to long-term archiving, be tracked at all times via the BADCat database.

In the database, each sample has a unique identifier, and a variety of metadata is associated each unique identifier (Table 1).

As of 1 August 2014, DESC had 17,414 samples in its biological storage and catalogued in the BADCat database. The collection is from numerous Ontario lakes, streams and wetlands: approximately 13,000 samples were collected through DESC's long-term lake and stream Rapid Bioassessment Program (Rapid Bio), and the remaining approximately 4000 samples were collected by a variety of partners — conservation authorities, provincial or national parks, government agencies, non-government organizations, citizen-scientist volunteers — as part of monitoring or research studies related to the Ontario Benthos Biomonitoring Network.

² BADCat is currently stored on: *G:/Databases/BioDB/BADCat.mdb*.

Table 1. The fields in the BADCat *Samples* table (asterisks denote fields from which labels for archived vials are created)

Field Name	Data Type	Description
Sample ID*	AutoNumber	A unique AutoNumber format identifier for each sample in the database
Agency*	Text	Owner of sample
Name	Text	Sample owner's name
Phone	Text	Sample owner's phone number
Description*	Text	Short site descriptor: water body name, location, study name.
Water Body Type	Text	Pick-list elements are: <u>Lake</u> , <u>Stream</u> or <u>Wetland</u>
Site Code New*	Text	A unique alphanumeric code to identify sampling sites
Replicate*	Text	Replicate or sample number
# of Vials*	Number	Number of vials
SDATE*	Date/Time	Sampling Date
Received	Date/Time	Date sample received at DESC
Processed	Date/Time	Date sample processed at DESC - if sent in a batch, enter the date when last sample was completed for the whole group
Taxonomy	Text	Pick-list elements are: <u>OBBN 27-group</u> , <u>Family</u> or <u>Lowest practical level</u>
QA Date	Date/Time	Date quality-assurance check completed
Archive Location	Text	Pick-list elements are: <u>DESC</u> or <u>Return to Owner</u>
Archive Date	Date/Time	Date sample archived in Long-term Storage building or returned to owner
Cabinet*	Number	Cabinet number in biological storage
Shelf*	Number	Shelf number in cabinet
Row*	Number	Row on cabinet shelf
Vial Return	Yes/No	Check Yes = Transport vials to be returned to partner; No = Vials to be re-used at DESC

Sample Location

The location of samples in the LTS building is determined by the maximum number of glass archive vials (Figure 2) that can fit in one row, which is equal to one wooden storage caddy³ (Figure 3), then the number of rows that can fit on one shelf and then how many shelves are in one cabinet. Each sample is given a Cabinet-Shelf-Row number in the BADCat *Samples* table.

³ Instructions for making these storage caddies are in Appendix 4.



Figure 2. DESC-style vial for archiving a benthic-invertebrate sample, showing mandatory sample-metadata and WHMIS labels (this example is borosilicate glass shell vial, manufactured by Fisherbrand™)

1. Confirm that other database users have finished entering their data.
2. Open *BADCat.mdb*.
3. Select *Samples* table in the main BADCat window. Click on **Datasheet View** .
4. Go to the last record in the table. Use the navigation buttons at the bottom of the window.

Click the **Last** button to move to the last record. 

5. Start numbering the **Cabinet-Shelf-Row** from where the last record left off. Number each row until you reach 19 records. Then start a new row.
6. When you reach the 32nd row, start a new shelf and re-number the row from 1 until you reach the 32nd row on that shelf.
7. Fill all 11 shelves and start filling the next cabinet.

EXAMPLE: There are 15 samples with the same location: **Cabinet-5 Shelf- 2 Row- 32**. Add 6 more samples to make it equal 21-22 records in that row even if the samples are not

from the same study. The next batch of vials will have this location, **Cabinet-5 Shelf- 3 Row-1**.



Figure 3. Storage caddy with 21 archive vials.

EXCEPTION:

For ethanol preserved and sorted samples acquired from outside organizations, predict how the contents from those sample containers will transfer to a glass archive vial before processing them to family. Usually, the ratio is 1:1 and the **Cabinet-Shelf-Row** numbers can be added by following the previous steps. If the ratio is not 1:1 and one replicate has multiple vials put these in the storage caddy but **DO NOT** enter these vials as separate records in the *Samples* table. For example, there are 21 vials and two of those pertain to single a sample that are contained in more than one vial, enter 19 out of 21 records for that row in the *Samples* table. Only make reference to the multiple vials in the **# of Vials** field. Label the multiple vials accordingly (see Duplicate Labels).

Sample Information

1. While still in **Datasheet View** of the *Samples* table, go to the first record of the batch of samples previously entered.
2. Enter the information chronologically from the *Samples Submission Form* into the appropriate fields (Table 2).
3. Review the records to ensure that there are no errors.

Table 2. Map-over from the Samples Submission Form to Benthos Sample Storage Fields.

Samples Submission Form	Benthos Sample Storage Fields
Agency	Agency ⁴
Name	Name
Phone	Phone
Water Body Name	Description ⁵
Water Body Type	Water Body Type
Site Code	Site Code New
Sample	Replicate
# of Vials	# of Vials
Sample Date	SDATE
Date Received by Lab	Date Received ⁶

Vial Labels

Labels specify vital metadata about the samples they identify. For this reason, labels are as important to the scientific process as their associated samples are. There are three types of labels, archive labels, duplicate labels and temporary labels.

Archive Labels

Archive labels are generated from the records stored in the BADCat *Samples* table. Changes made in the table will be automatically updated on labels. External and internal labels are laser-printed on regular paper. The internal label is put into a vial before any benthic-invertebrates are added to prevent damage to the soft bodied animals. An external label is affixed to the exterior of a vial using clear tape. Multiple archive labels are made in the case of a single sample being archived in multiple vials.

Multiple Archive Labels

Print off the same label for each vial in the multi-vial sample and handwrite an alphabetic character (A, B, C) on the internal and external label to denote the series of vials. Store the multiple vials so they are contiguous with one another in the sample-storage caddy.

⁴ **Agency** will be **DESC** for Rapid Bio studies, OBBN research studies will be **OBBN** and other studies will be the acronym of the organization.

⁵ Examples of Descriptions :

OBBN network studies can be descriptive or brief: Rocky Saugeen @ Con. 9, Glenelg Twp. or Dickie Lake @ Fluckers Bay or Campbell's Creek

For OBBN research studies always use a dash followed by the study name: Livingston Creek-Temporal Study

For Rapid Bio samples Rapid Bio (100 Animals): Harp Lake- Rapid Bio (100 Animals)

⁶ If processing live samples, enter the date the entire batch of samples to be sorted.

Temporary Labels

Temporary labels are neatly handwritten in pencil on regular paper and put into the glass archive vials. These labels include the basic information about the sample. They are only used for studies where the streams and dates sampled are unknown until sample collection is complete. These samples are then stored temporarily in the lab until a quality-assurance check is completed. Once sampling is completed and all sample information is entered into BADCat, laser printed archive labels are substituted with the temporary label.

Queries and Label Reports formats have been created in BADCat for the most common inquiries, OBBN and DESC's long-term Rapid Bioassessment Programs for Dorset-area lakes and rivers.

Archive labels are created via the following 3 steps:

1. Query records from the *Samples* table
2. Review the label report based on the query
3. Print labels (including duplicate labels for multi-vial samples, if needed)

Queries

For each new set of records, update the query information in either **OBBN Query** or **Rapid Bio Study Query** working in Design View. For example, under **Sample ID** criteria type an expression like: *Between 1256 And 1265*, to retrieve that batch of records.

Label Reports

Then once you have created and saved this query go to either the **Labels OBBN Query** or the **Labels Rapid Bio Study Query** to review your labels in Print View. The final labels should look like the label in Figure 6. If the labels do not look like the label in Figure 6 (e.g., some label fields don't fit correctly in the label dimensions), try to abbreviate label information. Abbreviation may be achieved by navigating to the *Samples* table, finding the record that corresponds to the non-conforming label and abbreviating nouns or adverbs in the **Description** field (e.g., change *management* to *mgmt.*; *road* to *Rd.*; *river* to *Rv.*; or *upstream* to *U/S*). If a place name is too long, use an acronym. Decreasing spacing between placeholders in Design View will also ensure all information is contained within the printed rectangle. Print the labels.

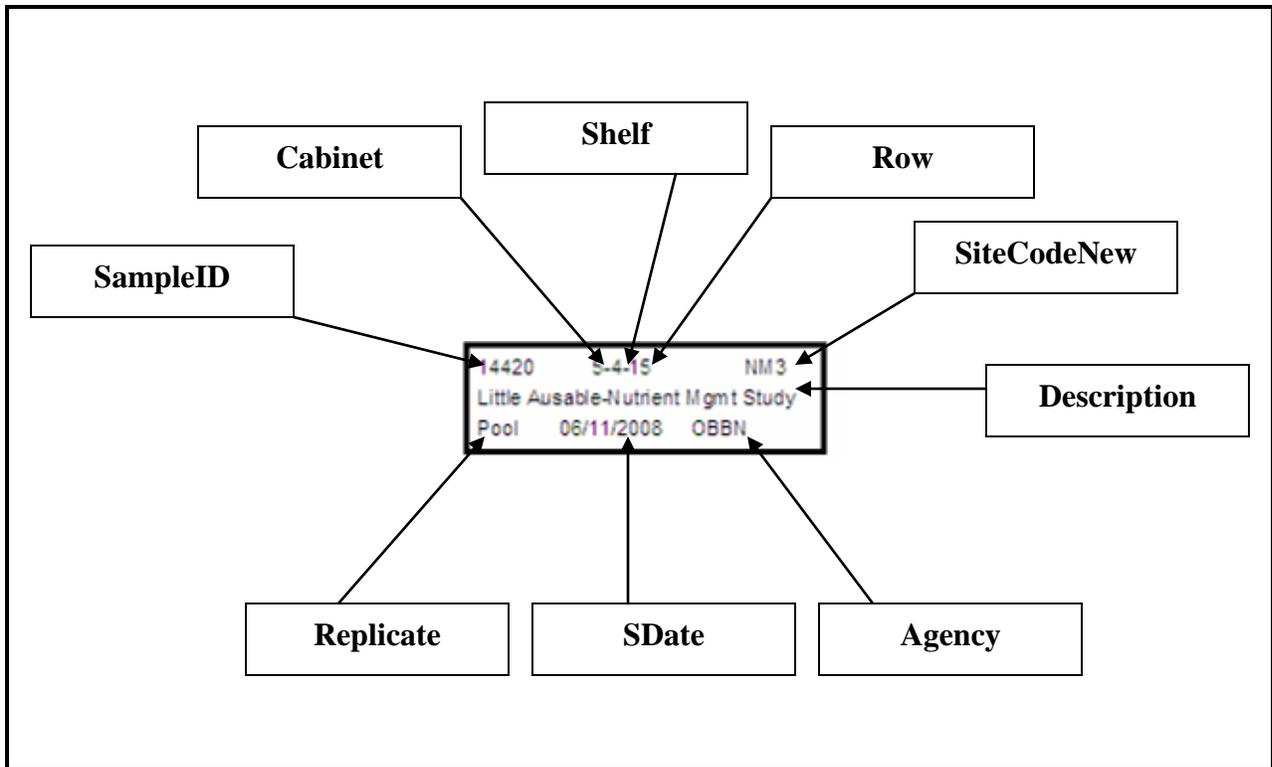


Figure 4. Formatted archive vial label.

Creating Storage Caddy Labels

Storage caddy labels are made and attached to a wooden storage caddy before it is filled with vials. The label identifies the series of vials within the caddy as well as the row and shelf numbers.

1. Open the *Storage Caddy Label Template*⁷:
2. Enter the range of **Sample ID** numbers contained within the caddy, the shelf and row number (Figure 5).

⁷ The *Storage Caddy Label Template* is currently stored: **G:\Programs\Benthos OBBN\OBBN Sample Processing\Storage Caddy Label Template.doc.**

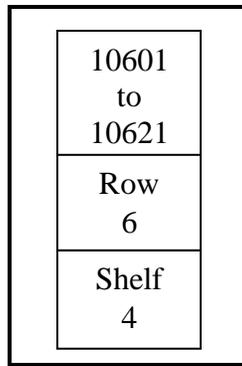


Figure 5. Caddy Label.

3. Print, cut-out and attach the label to one end of the caddy with an office stapler.

8.7 Sample curation

Over time, sample preservatives and archival vials can degrade. Annual curation of unprocessed and processed samples is required to ensure the integrity of all samples, and to ensure that all samples are properly accounted for in the BADCat database.

Sample curation can be an onerous task, and the procedures below attempt to strike an appropriate balance by minimizing staff time required for curation while ensuring reasonable integrity of stored samples.

Unprocessed samples

Assume isopropyl alcohol preservative for all containers not otherwise labelled.

At least once per year...

- Check all samples in storage for liquid preservative level and integrity of their containers. In the case of a damaged container, decant sample to a suitable container, top-up with sufficient ethanol to cover the sample, re-cap, and affix an ethanol WHMIS label to the new container
- Check sample labels for collection date and preservative type. Any container not labeled with ethanol WHMIS label and having been collected a year or longer ago, pour-off preservative, dispose as waste alcohol (liquid waste storage tank), replace with ethanol, re-cap, affix ethanol WHMIS label, and return to storage location

(Refer to 8.1 for mandatory personal protective equipment)

Processed samples

At least once per year, inspect each vial for liquid level, transparency and colour of preservative, integrity of cap, presence and legibility of labels and integrity of vial.

- If liquid level is significantly drawn-down, top-up with ethanol.
- If preservative is cloudy or discoloured, pour off (using 500-micron sieve to ensure no specimens are lost), discard as per waste alcohol, and replace with ethanol
- If cap appears defective, replace. If replacement is not possible, transfer sample to a new vial and seal with corresponding cap

- If external label with sample metadata is missing or not legible, create a new label, and affix with clear tape
- If external WHMIS label is missing, replace with Ethanol label

(Refer to 8.1 for mandatory personal protective equipment)

Supplementary tasks to be completed during sample curation

Conduct standard DESC building inspection in LTS and Biology Lab at time of annual sample curation. During this process, particular attention should be given to identifying and properly disposing of unwanted samples, dry (unusable) samples, samples of unknown origin, and samples with incomplete labels. To dispose of such samples, use appropriate personal protective equipment (refer to 8.1), place them in a burlap (or similar bag) and deposit into the on-site dumpster.

Should you suspect any container to have hazardous contents, do not move or touch the container. Notify DESC's Joint Health and Safety Committee. Contact the Ontario Provincial Police for assistance with disposal.

8.8 Summary of Sample-related Procedures

1. Ensure sample submission criteria are met.
2. Enter sample information into the BADCat database
3. Process samples according to OBBN, DESC, or special methods, as called for by the study design
4. Create and affix sample-metadata and preservative labels
5. Complete quality assurance checks appropriate given study design and technician credentials and track record
6. Archive samples in LTS building.
7. Update sample status in BADCat throughout the laboratory process, from submission to archiving
8. Curate samples annually

9 References

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Appendix 1 Submission Form

Sample Submission Form

To: Dorset Environmental Science Centre, 1026 Bellwood Acres Rd, PO Box 39 Dorset,
 Ontario, P0A 1E0, Attn: OBBN Assistant Coordinator
 Phone: 705-766-2412
 Fax: 705-766-2254
 E-mail: obbnassistant@gmail.com

INSTRUCTIONS/DETAILS

- Samples should be sent in sturdy, well sealed containers, with sufficient packing materials.
- Samples should be free of most of the debris. Those with excessive debris will be sent back unprocessed.
- Use a pencil (not pen) to write on the labels or use adhesive laser-printed labels.
- Please specify a site code. A site code is a unique and descriptive code used to identify individual sampling sites. It can be a number or a combination of letters and numbers. The code will be used to track samples through the lab and once they are archived. It is also used in the OBBN database.

Example: Harlow Creek: Site Code: HAC01 OR Site Code: #155

- The following example illustrates how to complete the form:

#	Site Code	Sample	Water Body Name	Sample Date (mm/dd/yyyy)	Water Body Type (S, L or W) ⁸	Tally Sheet Sent		Field Sheet Sent		# of Vials
1	HAC01	1	Harlow Creek	05/12/2009	S	<input checked="" type="radio"/>	N	<input checked="" type="radio"/>	N	2
2	HAC01	2	Harlow Creek	05/12/2009	S	<input checked="" type="radio"/>	N			1
3	HAC01	3	Harlow Creek	05/12/2009	S	<input checked="" type="radio"/>	N			1

- Reference-site samples can be archived in our long-term storage in Dorset or we can return them (please indicate in comments section).
- Samples to be kept in Dorset will be transferred into our glass archive vials and are tracked in our biological sample database.
- As a minimum, we return a list of taxa (family and order level), our counts and your counts in a Microsoft Excel spreadsheet.
- As a result of the large number of samples sent to us, we often have a backlog. Expect a turn-around time of several months.

⁸ S = Stream L = Lake W = Wetland

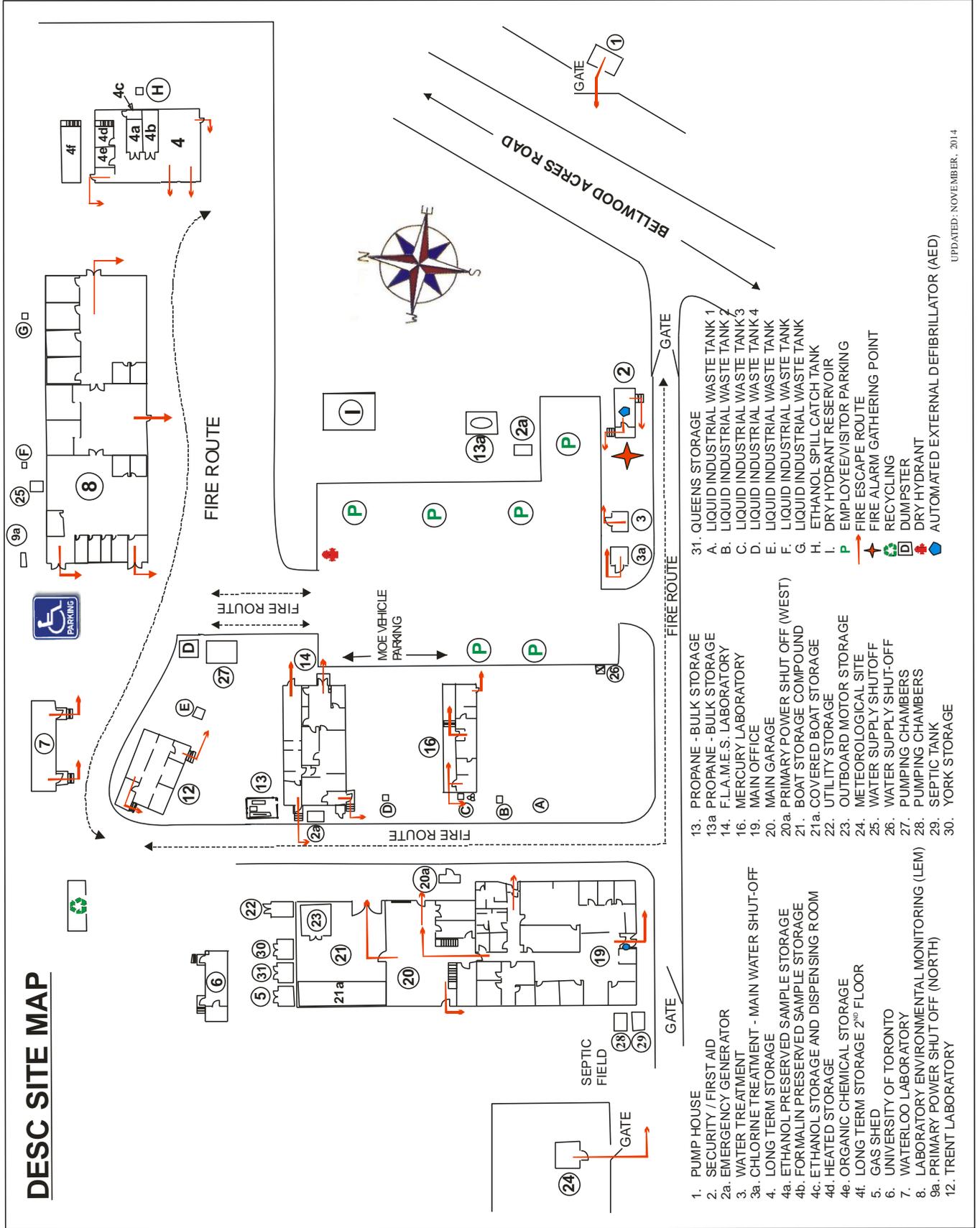
Sample Information										
#	Site Code	Sample	Water Body Name	Sample Date (mm/dd/yyyy)	Water Body Type (S, L or W)	Tally Sheet Sent		Field Sheet Sent		# of Vials
						Y	N	Y	N	
1						Y	N			
2						Y	N	Y	N	
3						Y	N			
4						Y	N			
5						Y	N	Y	N	
6						Y	N			
7						Y	N			
8						Y	N	Y	N	
9						Y	N			
10						Y	N			
11						Y	N	Y	N	
12						Y	N			
13						Y	N			
14						Y	N	Y	N	
15						Y	N			
16						Y	N			
17						Y	N	Y	N	
18						Y	N			
19						Y	N			
20						Y	N	Y	N	
21						Y	N			
22						Y	N			
23						Y	N	Y	N	
24						Y	N			
25						Y	N			
26						Y	N	Y	N	
27						Y	N			
28						Y	N			
29						Y	N	Y	N	
30						Y	N			
31						Y	N			
32						Y	N	Y	N	
33						Y	N			
34						Y	N			
35						Y	N	Y	N	

#	Site Code	Sample	Water Body Name	Sample Date (mm/dd/yyyy)	Water Body Type (S, L or W)	Tally Sheet Sent		Field Sheet Sent		# of Vials
						Y	N	Y	N	
36						Y	N			
37						Y	N			
38						Y	N	Y	N	
39						Y	N			
40						Y	N			
41						Y	N	Y	N	
42						Y	N			
43						Y	N			
44						Y	N	Y	N	
45						Y	N			
46						Y	N			
47						Y	N	Y	N	
48						Y	N			
49						Y	N			
50						Y	N	Y	N	
51						Y	N			
52						Y	N			
53						Y	N	Y	N	
54						Y	N			
55						Y	N			
56						Y	N	Y	N	
57						Y	N			

Total # of Vials Sent: _____

Comments or Special Instruction	
<hr/> <hr/> <hr/> <hr/>	
Share data pertaining to these samples with other network members via the OBBN database:	Y N
Send samples back:	Y N
Send sampling containers back:	Y N
Date for data to be returned:	_____
Supplementary materials submitted (e.g. CD/DVD, report or photos):	_____

DESC SITE MAP



- 1. PUMP HOUSE
- 2. SECURITY / FIRST AID
- 2a. EMERGENCY GENERATOR
- 3. WATER TREATMENT
- 3a. CHLORINE TREATMENT - MAIN WATER SHUT-OFF
- 4. LONG TERM STORAGE
- 4a. ETHANOL PRESERVED SAMPLE STORAGE
- 4b. FORMALIN PRESERVED SAMPLE STORAGE
- 4c. ETHANOL STORAGE AND DISPENSING ROOM
- 4d. HEATED STORAGE
- 4e. ORGANIC CHEMICAL STORAGE
- 4f. LONG TERM STORAGE 2ND FLOOR
- 5. GAS SHED
- 6. UNIVERSITY OF TORONTO
- 7. WATERLOO LABORATORY
- 8. LABORATORY ENVIRONMENTAL MONITORING (LEM)
- 9a. PRIMARY POWER SHUT OFF (NORTH)
- 12. TRENT LABORATORY
- 13. PROPANE - BULK STORAGE
- 13a. PROPANE - BULK STORAGE
- 14. F.L.A.M.E.S. LABORATORY
- 16. MERCURY LABORATORY
- 19. MAIN OFFICE
- 20. MAIN GARAGE
- 20a. PRIMARY POWER SHUT OFF (WEST)
- 21. BOAT STORAGE COMPOUND
- 21a. COVERED BOAT STORAGE
- 22. UTILITY STORAGE
- 23. OUTBOARD MOTOR STORAGE
- 24. METEOROLOGICAL SITE
- 25. WATER SUPPLY SHUT-OFF
- 26. WATER SUPPLY SHUT-OFF
- 27. PUMPING CHAMBERS
- 28. PUMPING CHAMBERS
- 29. SEPTIC TANK
- 30. YORK STORAGE
- 31. QUEENS STORAGE
- A. LIQUID INDUSTRIAL WASTE TANK 1
- B. LIQUID INDUSTRIAL WASTE TANK 2
- C. LIQUID INDUSTRIAL WASTE TANK 3
- D. LIQUID INDUSTRIAL WASTE TANK 4
- E. LIQUID INDUSTRIAL WASTE TANK
- F. LIQUID INDUSTRIAL WASTE TANK
- G. LIQUID INDUSTRIAL WASTE TANK
- H. ETHANOL SPILL CATCH TANK
- I. DRY HYDRANT RESERVOIR
- P. EMPLOYEE/VISITOR PARKING
- P. FIRE ESCAPE ROUTE
- I. FIRE ALARM GATHERING POINT
- RECYCLING
- DUMPSTER
- DRY HYDRANT
- AUTOMATED EXTERNAL DEFIBRILLATOR (AED)

Appendix 3 LTS and Components of the Sample Storage Room



Figure 6. Long Term Storage Building



Figure 7. Storage Room 4a.



Figure 8. Metal Sample Storage Cabinet
Figure 9. Vent to outdoors.



Figure 10. Electrochemical Sensor, with a gas alert alarm.
Figure 11. Explosion-Proof Heater.

Appendix 4 Building Storage Caddies

Storage caddies keep the archive vials organized in long-term storage cabinets. They are very simply constructed.

Materials

- 0.5cm plywood
- ¼” Staples
- Staple Gun
- Clear plastic on a roll that is 10cm high
- 1 1/2 cm finishing nails(12 per caddy)
- Wood glue
- Hammer
- Masking tape

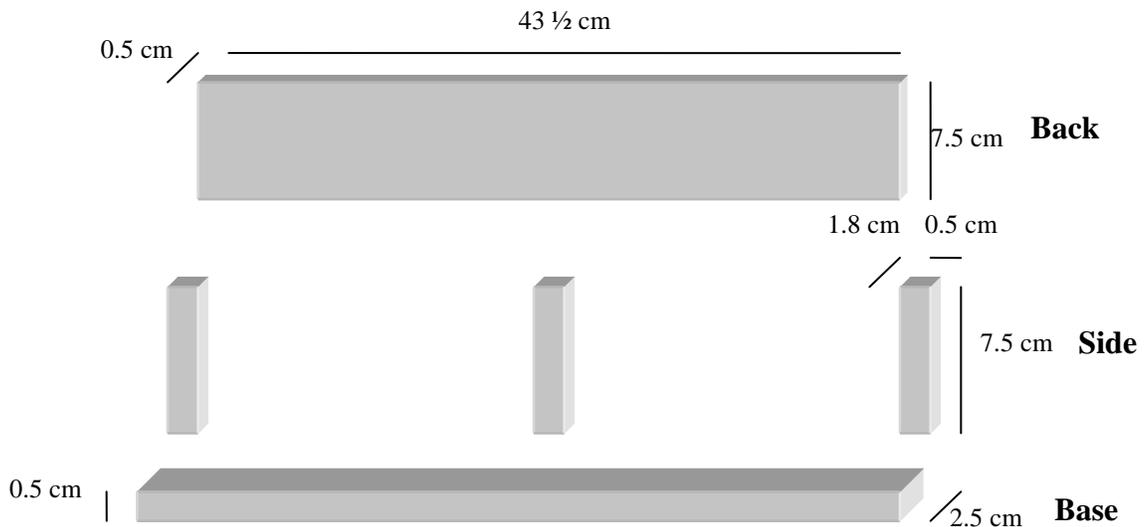


Figure 12. Diagram for a storage caddy [Not to Scale].

1. Cut plywood to the correct lengths.
2. Nail the frame of the storage caddy together.
3. Cut plastic strip to the length of the storage caddy. Temporarily attach this strip to the caddy using masking tape.
4. Cut any plastic protruding from the sides or the top of the caddy.
5. Staple the plastic onto the caddy with the staple gun.