Aurora Mastodont Project – Matrix Analyses Project

I – Introduction

- Use powerpoint from website (http://www.waubonsee.edu/faculty/dvoorhees/MastodontMatrix/index.html) or background information in lab handout

II – Sorting screen wash

- Spread container on white paper (2 pieces of 8x10 or 11x17 taped together work well. Use tweezers, pointers, magnets to separate screenwash into the basic components: snails, rocks & pebbles, plants, insect parts, historic (slag). Use magnifiers and/microscopes to identify questionable pieces. Place unidentified pieces aside. Keep 'special' or unusual pieces separate. You probably will not find any bones, but there may be the VERY rare fish bone (we did see some "large" ones during the excavation). See the poster session and the lab handout or the introduction powerpoint for what slag looks like.
- If you are sent 50 ml vials (~ 4 cm (1.5") diameter and 6 cm (2.5") tall), these will take 2 students about an hour to an hour and a half to sort. The samples that are mostly all snails tend to be sorted quicker (unless you are asking them to do environmental analyses using the snail species with the ID chart). You can shorten the sorting time by increasing the number of students per vial. If you are given a100 ml vial (~ 5 cm (12") diameter and 7.5 cm (3") tall), you can probably double the time estimates of the 50 ml vial.
- Weigh each fraction (snails, plants, etc) and record weight on data sheet. Fill out sample information on data sheet. Place each fraction in an envelope and seal it. On each envelope, please write the following information
    - Date
    - School
    - Names of scientists
    - Square number
    - Elevation (m)
    - Geologic formation
    - Fraction name (snails, plants, etc)
- Submit data to AMP-MAP website (http://www.livebinders.com/play/play/627554)

III – Interpreting data

- See later part of lab handout for ideas, such as:
    - Plotting data with a line graph using Excel to show vertical variations with changing geologic formations. Use elevation as the vertical axis and per cent of sample (50 or 100 ml) as the horizontal axis. See examples provided in this document.
        - Discussion questions
        - Where does snail intensity peak? Why?
        - Are there other fractions that are diagnostic (dominant) for a particular layer or geologic formation? Why?
        - How far down does the historic debris infiltrate? Does this make sense with the radiocarbon dates we have (see the lab handout)?
        - If they are 'out of place', how did that happen?
    - Using snail guide for geologic (lacustrine) environment interpretation
    - Using plant guide to determine (lacustrine) environment
    - Using all data to evaluate climate of Aurora IL 14,000 years ago
    - Using data to recognize that a glacial kettle gives a different kind of sediment record in a glacial environment than till

IV – Return all the sorted materials (PLEASE keep them all separate!) and empty vials back to David Voorhees, who will hold on to them for eventual permanent curation in the Illinois State Museum.

Above all **HAVE FUN**

AMP-MAP Suggested equipment list

Bold = minimum

Background information for instructor

- Powerpoint presentation on website
- Laboratory exercise used by D Voorhees on website and 1 copy included in this package
- VERY small version of poster used at Geological Society of America, provided in this package
- Small version of a students Honors project (Hannah Dorn) from Waubonsee Community College, included in this package
- Identification chart of snails, available for download on the website
- List of plants identified, available for download on the website

Tools/Equipment for each 2 students

- Snail Identification Chart
- **AMP-MAP data recording form** (in this handout)
- **2 tweezers**
- 2 to 4 magnets
- 2 hand lenses
- 2 bio-dissecting pick
- **(2) 11x17 (or 8 x 10) sheets of white paper taped together**
- rulers
- watch glasses to transport unknown discoveries to microscope for identification

For each table of 4 students

- AMP-MAP gastropod guide
- AMP-MAP list of plant macrofossils
- **balance with weighing paper**
- stratigraphic column (fill/sandy silt/paleosol/marl/gyttja)

Work area

- colored pencils
- **2 laptops or computers with internet to upload data**
- 2 binocular microscopes

Aurora Mastodont Project – Matrix Analyses Project Evaluation

After you have completed any or all of the lessons and the screenwash sorting exercise, it would be helpful if you could complete this evaluation form.

1. Please list and describe 3 things that you liked about the AMP – MAP

2. Please list and describe 3 things that you did not like about the AMP – MAP

3. Please list the lessons that you used, or describe what you did in your class

4. What was the major benefit or lesson learned by your students?

5. Do you have any suggestions to improve this experience for future students?

6. Would you recommend the AMP – MAP to a colleague?

7. Do you know of a colleague (or colleagues) who would be interested in AMP – MAP? If so, please provide their name, their school and an email address or phone number.

Please include this with the sorted screenwash when you return to us.

David Voorhees
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Sugar Grove, IL 60554

Aurora Mastodont Project-Matrix Analysis Project
Data Recording Form

Student/Volunteer name(s):_____

Sponsoring Institution:_____

Today's Date:_____

Sample information

Sample #: _____

Excavation unit _____ (i.e. D-12 or B-4)

Elevation (m):_____

Geological Stratum: _____ (i.e. marl or gyttja)

Original Volume of sample: _____mL (total of the vial volume)

Results

1) Plant Pieces (g):_____

2) Bones and bone fragments (g):_____

3) Snails (g):_____

4) Insects and insect parts (g):_____

5) Rocks and Pebbles (g):_____

6) Historic Debris (slag, metal, glass, plastic, etc.)(g):_____

7) Unknown or other (g):_____

Describe:_____

_____

Comments

_____

_____

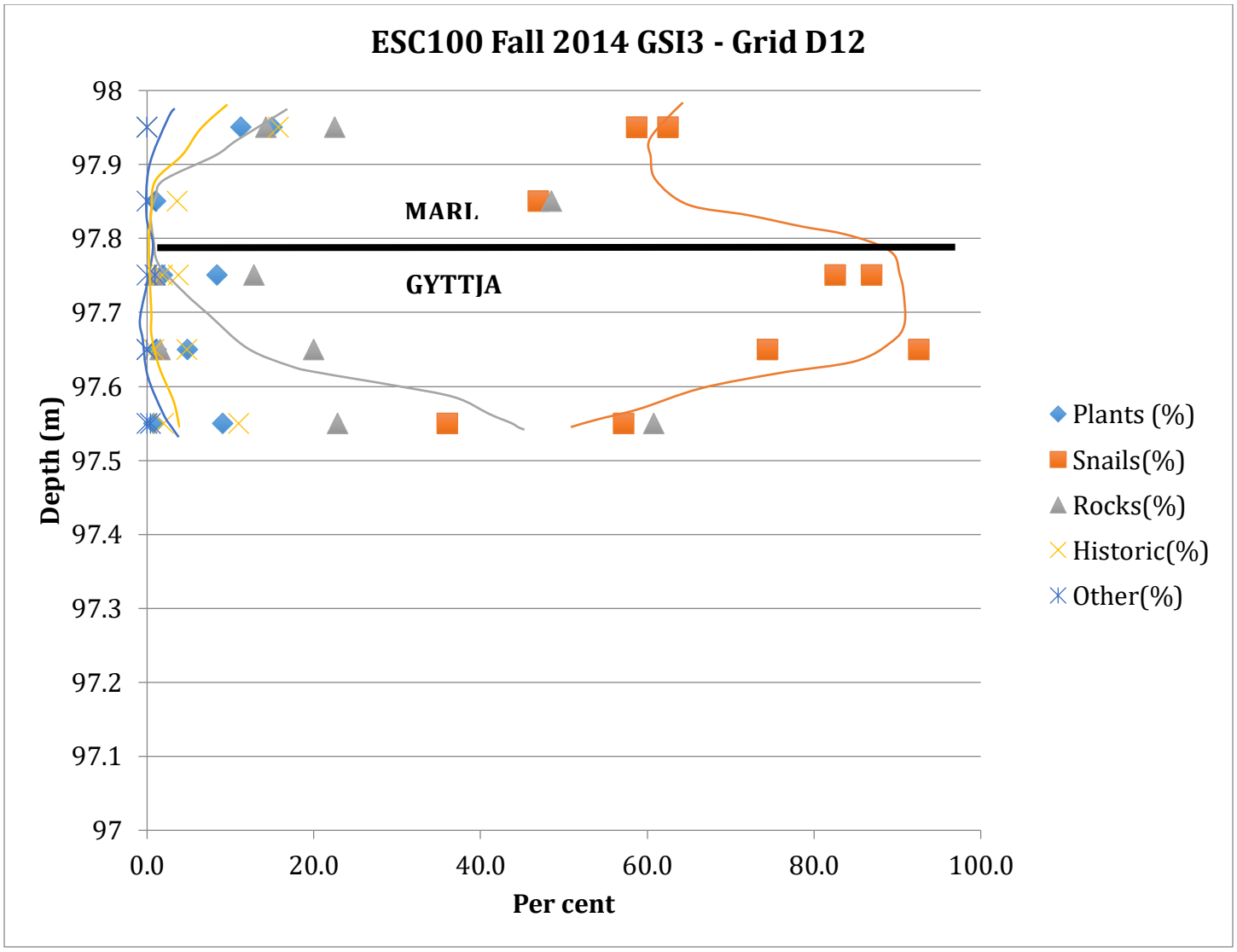
_____

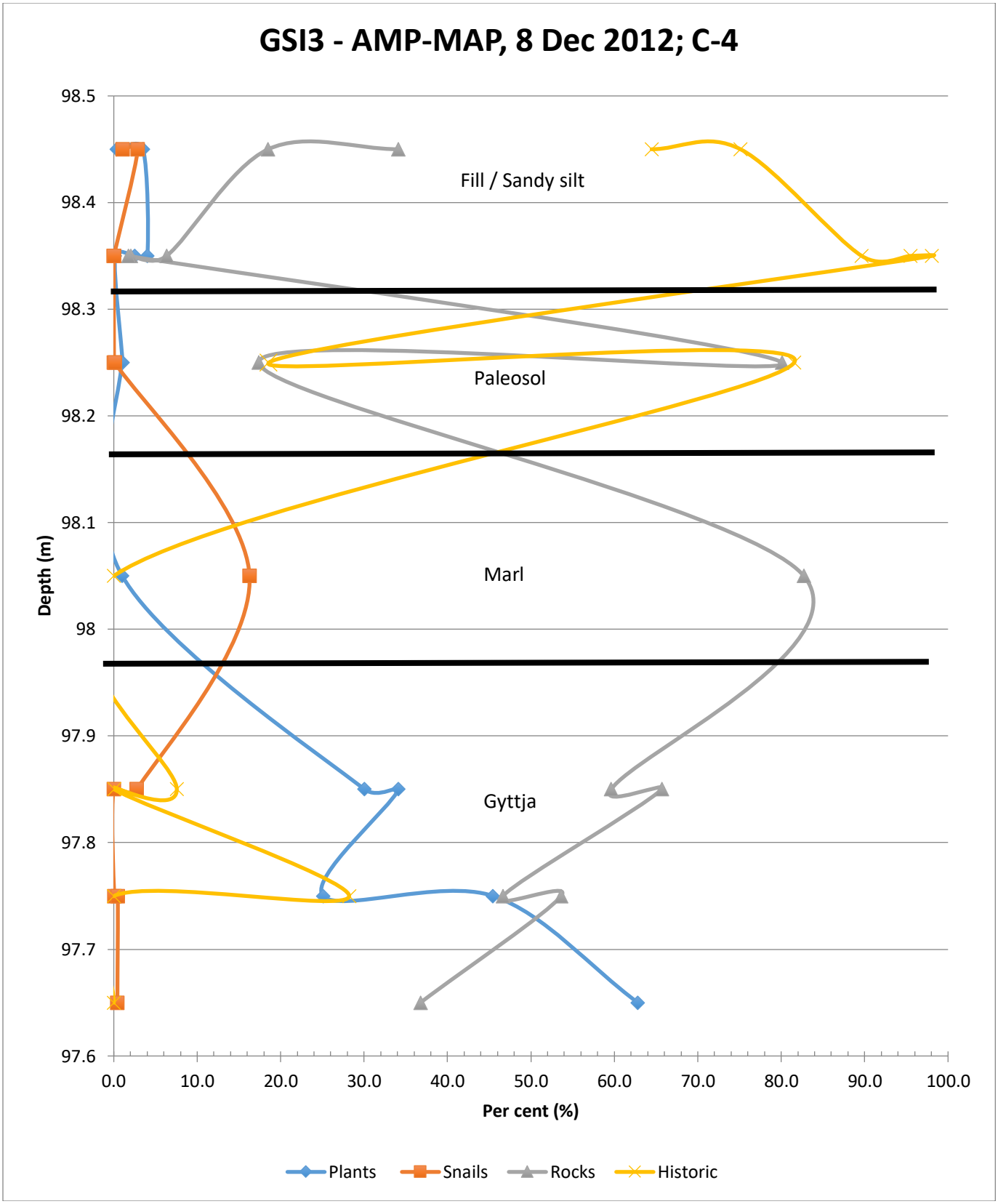
_____

Did you submit your data to the AMP-MAP website (http://www.livebinders.com/play/play/627554)

YES NO

Examples of data plots




GSI3 - AMP-MAP, 8 Dec 2012; C-4
98.5
98.4
98.3
98.2
98.1
98
97.9
97.8
97.7
97.6
Depth (m)
Fill / Sandy silt
Paleosol
Marl
Gyttja
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Per cent (%)
Plants
Snails
Rocks
Historic

Some images of slag (other than in powerpoint or lab handout) like you might see. Most are the size of peas to grapenuts.

http://bulkgroup.activeweb.info/products/GRANULATED-BLAST-FURNACE-SLAG.jpg

http://itcinter.com/wp-content/uploads/2014/04/raw_slag_lg.jpg

http://www.sandeessoilandrock.com/wp-content/uploads/20-balck-slag.jpg

http://www.euroslag.com/typo3temp/pics/033c78f986.jpg