Principles of Silviculture
FWF 312
Laboratory Report Format

Requirements and Guidelines

This document is more than a statement of guidelines for lab abstracts and reports in FWF 312. Information contained herein can help you with similar efforts in other classes and even after graduation. There are examples of Figures and Tables in the Appendix that have been drafted with more equipment, skill, and requiring more time than I expect you to master. Still they are examples of the proper format.

Written Reports for the Lab Exercises

1. Abstracts
   a. Scientific Writing – present lab
   b. Stand Description
   c. Best Management Practices

2. Extended Abstract – Bent Creek Field Trip

3. Lab Reports
   a. Regeneration Survey and Prediction
   b. Thinning Exercise
   c. Silvicultural Prescription Exercise

LAB ABSTRACTS

The abstract should be a short synopsis of what you learned for a particular exercise or field trip. The abstract should still include the who, what, where and when, similar to the formal lab report, but in a shortened form. Headings and a title page are not needed. Abstracts should be 3 or 4 paragraphs or less than 2 pages long, double spaced.

Abstracts should still include many of the aspects of the formal lab report: Subject, objectives, study area, speaker, what you learned and a summary or conclusion. Be sure to address all major topics discussed and answer all questions in the assignment. All lab abstracts are due at the beginning of the designated laboratory period unless otherwise indicated.

Write complete thoughts and sentences. Do not simply produce headings and incomplete sentences (outlines) for the content of the abstract.
LAB REPORTS

Each lab report in FWF 312 will consist of 7 sections, namely (1) Title Page, (2) Introduction, (3) Objectives, (4) Materials & Methods, (5) Results with 2 Sub-sections, (6) Discussion, and (7) Conclusion. They should be typed, double-spaced and include a formal title page. I do encourage you to make the best presentation that is reasonable. Your report should be neat, properly organized, and well written; do whatever it takes.

Title Page
Complete information to identify who, what, where, and when is required on the title page, and it must be arranged neatly. This is the first opportunity to tell the reader of your professional competence and to make a good impression. The title is the most important information on the page. It must be fully explanatory and be prominent enough on the page to attract the eye of the reader FIRST! A good title conveys the most important information of "what" is in the report, but it does not include all the details. A lengthy title is just as unsatisfactory as one that is too brief.

Your name ("who") is the next most important information and would normally appear just below the title, all neatly arranged to catch the reader’s attention just after the title has been read. However, for purposes of fairness in grading, I only want the crew in which you work identified on the title page, i.e., Crew 1 with an alphabetical listing of crew members neatly positioned (including your name with all other lab members). Do not underline, bold,, or in any other way identify yourself as the author on the title page.

Before grading the reports, I will group them by crews and evaluate the figures and tables as a group. I will return to the title page and each individual section will be graded based upon your individual responses. The last thing I will write on the grading form will be your name. This procedure will assure anonymity while I grade your report, which is important to me in maintaining fairness and objectivity during, what has to be subjective evaluation of your work.

"Where" and "when" are important information, but much less so than title and author. They need to be on the title page, but out of the reader’s eye at first glance. Use the examples on some of the handouts to guide you.

Introduction
The introduction in a scientific paper is used to set the context of the paper. There needs to be sufficient background to allow the reader to judge the significance & relevance of the work. A few paragraphs stating the scientific problem or question being addressed, current state of knowledge concerning the papers topic and how this work may or can improve upon that understanding should suffice.
Objectives
Objectives are to be included within a short introductory paragraph. The statement of objectives is a positive statement of "why" the work was done, rather than "what" work or "how" the work was accomplished. "Why" always has something to do with gaining understanding. I am not interested in procedural objectives, which usually concentrate on what tasks were done. Measuring trees to learn how to measure trees is an objective more relevant to FWF 313 than to FWF 312. It's not the measurement that is important to me, rather it's what you learn about the tree after the measurement has been completed. Therefore, I want a statement of objectives that emphasizes "WHY" the work was done, and that involves you gaining understanding of the several biological truths and inferences.

When you write the objectives section of your reports, be sure to word the lead sentence of the first paragraph to clearly identify the principle(s) about which you are gaining understanding. What are the concepts, the ideas, the theses, the precepts that form the central core of the project? Be careful to identify only "understanding" objectives and not "procedural" objectives. What are procedural objectives?

Procedural objectives identify the mechanics of how work was done (How To), and they usually have very little to do with gaining understanding of the silvicultural principles involved. For instance, it is possible for you to learn how to measure the diameter of the tree, thereby satisfying procedural objectives, without understanding why the measurement is made at 4.5 feet above the soil surface on the high side of the tree or why the tape has inch designations that are 3.14159 inches apart. In other words, you can become a robotic technician, knowing how to measure tree diameter, but totally lacking understanding of why you are doing it. Above all else this semester, I want you to gain all the silvicultural understanding possible.

Materials & Methods
Normally in a report of this type, there would be some elaboration of the procedures used to collect and analyze the data. Never assume that the reader knows and understands what you did with the full intimacy that you possess. Enough information, regarding the methodology, should be included as to allow someone to re-create your work simply by reading your paper.

Results
Data are presented in the RESULTS section, in the form of charts, figures, and/or tables that may be necessary for completeness and clarity. In our lab reports, the Results will consist of two units, namely, (1) a brief presentation in the manuscript that identifies the most important relationships apparent in the data, and (2) a separate section of tables and figures. They will be graded separately. See the sample grading form for clarification.
Within the manuscript you must present the most important data relationships so the reader can be looking for your interpretation of the facts during the report. For example, consider the following statement of results that could be made from a study of poultry: "The relationship of comb size to male chicken feather color is presented in Figure 1. Chickens with red feathers had the largest comb mass." That is a statement of sufficient length and clarity. Brevity is important throughout the report.

**Discussion**
Discussion is explanation and interpretation of data that are presented as results. As the foremost expert on what you accomplished and what it means, your responsibility is to guide the reader into the important facts and inferences discovered in your work. The data should be explained coherently, for they must surely make sense and they must be scientifically reasonable. Dumping a bunch of data on someone and not leading him or her into the scientific explanation is improper. Gain understanding above all else.

For our purposes in FWF 312, the discussion will center upon the questions in the lab handout, all of which are designed to lead you into the major data relationships that I want you to understand as you develop your report. I have chosen just a few; there are always more. My purpose is to guide you into the most important facts and inferences found in the data; after graduation you will have to provide independent interpretation to your employer.

**Summary or Conclusions**
The Summary is a recapitulation of the absolute, the most important facts that were brought to light in the report. Nothing new can be presented here. This section will be the least difficult to write, if you have correctly identified the most important facts and inferences in the data. I suggest that you simply list the conclusions, with the most important first, making a strong definitive statement of the fact, and do so without any additional interpretation. Hedge words are not allowed at this stage. For example, consider the following conclusion from our poultry data:

"1. Male chickens with red feathers had the largest combs." (Isn't brevity wonderful?)

You don't have to say how large the combs were, or what colors of feathers were used in the comparisons, or which came first. Just state the facts in conclusion format as you reported them! What's a hedge word?

**Appendix**

**Literature Cited**
Any time you use material (ideas, data, graphics, conclusions, procedures, etc.) that you did not originate in your work, proper credit should be given to the
original author. This is the honorable thing to do, and every professional ethic in the book requires it. To present someone else's work without proper credit is dishonest, stealing, unethical, and if copyright is violated, it is also illegal. Most of the time, you will not find it necessary to cite published literature in your FWF 312 reports. Occasionally you may need to confirm an idea in the literature so you need to be familiar with the procedure. You do not need to cite your textbook or our classroom discussions, but anything on your reading list will need to be cited.

There are several systems currently used for citing literature, at least in part influenced by the requirements of the journal or book publisher. Footnotes are usually not used in scientific writing, except for unpublished information. Personal correspondence or preliminary data are two examples where footnotes are appropriate.

My preference is the "name and date" system, wherein the author's name and the date of publication are stated in the sentence, either using the author's name as the subject or in parentheses at the end of the sentence. For example:

2. Crown thinning is a form of thinning in which . . . .(Smith, 1997).

If the cited reference is a journal article, the page number is not cited in the manuscript text. Complete identification and publication location of the article is accomplished in the "Literature Cited" section. Use the following format for journal articles:


When the reference is a book, there are two ways of identifying the page number of the citation you have used. If you have only used one citation from the book, the page number is indicated in the "Literature Cited" section. See below. If you make several citations from the same book, the page of each citation is given in the citation itself, e.g., Smith (1997, p. 261) or (Smith, 1997; p. 261) depending upon the sentence structure.

Books with only one citation

Books with several citations
Writing Techniques
Writing technique and style are somewhat unique to each person since we each have certain talents which we use in our thought expression. However, there is a certain style that is acceptable and preferred in scientific writing, and it differs significantly from what you might use when you write a letter to your grandmother. There are several style manuals available and some of you will even take courses in writing technique during your tenure at the University. You may find the following suggestions helpful.

1. Complete, concise, and coherent sentence structure is a necessity. Wordy jargon is unacceptable. In first grade, I encountered the most perfect sentence structure ever written, i.e., "See Dick run." Everything you need is in that sentence. Who cares where Dick ran, or how fast he ran, or whom he ran with, or what he did when he got there, or what he wore as he ran? The important components of the sentence, namely subject and verb, are there. As I grade your papers, I remember a saying that I heard several years ago, "Brevity is next to Godliness." Make sure that your thoughts are well articulated and complete in your writing.

2. Exercise proper word selection. Write to the level of understanding of your audience. In FWF 312, assume your audience to be your peers, not me. Sure I know enough about what you are writing to be able to read between the lines, but I will not do that as I grade your paper. You must say what you mean and say it clearly. Proper word selection will help you. This is also a good time to improve your working professional vocabulary. Use words that reflect your professional accomplishments and level of training. Strive to talk to your audience at their level of understanding without sacrificing your professional expertise.

3. Check your spelling. Misspelled words either show carelessness or ignorance, neither of which is desirable or acceptable.

4. If an abbreviation is used repeatedly, write the complete word or phrase the first time with the abbreviation in parentheses immediately after it, e.g., diameter breast height (dbh). Thereafter, dbh may be used alone and with complete understanding.

5. All figures and tables should be cited in the text according to their reference numbers, e.g., Figure 1/H or Table 1.

Figures And Tables
Several proper methods are available for drafting figures and tables, again depending upon the publisher and the chosen format. For our purposes in FWF 312, the following suggestions should be taken seriously.
1. A reference number is required. There is just one Table 1 in any report, and regardless of where it's located, it's identified.

2. Each figure and table must have a self-explanatory title that fully describes and identifies the data. Note the examples in the handouts, and refer to my suggestions on drafting a title for the title page. **Table captions are listed above the table. Figure captions are located underneath the figure.**

3. For tables, column headings must be clear and neatly spaced. Coded headings are possible when the full identification is provided in a footnote. Block the tables neatly, and not always with lines drawn on the page. Align numbers on the right or on the decimal; a column of numbers that is not aligned presents a careless image of the author.

4. For figures, draw neat lines of uniform width with concise corners on quality paper.

   If the plotted relationship is linear or approaches linearity, a straight line usually suffices. Sometimes the points may be connected directly or with a curvilinear function. Illustrate the data to maximize on the interpretation you want to convey to the reader. If multiple lines are needed, use coded lines. Red, yellow, blue, and green lines all appear as black when xeroxed. The necessary information on figures should be neatly lettered. Use all the help available to you; rarely can any of us letter freehand and it be presentable.
AN EXAMPLE OF A TITLE PAGE

EVEN-AGED STANDS:
DEFINITION AND DESCRIPTION

by

C. CHRISTINE EDWARDS
JOHN T. FOREST
EDWARD J. STAND
MONIQUE S. WOODS

THE UNIVERSITY OF TENNESSEE
DEPARTMENT OF FORESTRY, WILDLIFE & FISHERIES

FORESTRY, WILDLIFE & FISHERIES 312
PRINCIPLES OF SILVICULTURE

DATE DUE
Principles of Silviculture
FWF 312

Laboratory Grading Report Form

Evaluation of each report is based upon content and format. Content will always be weighted more heavily than format. Scores are number of points earned in each category. Letter grades will correspond to those previously published, but will not be assigned until the end of the semester.

Name__________________________________________

<table>
<thead>
<tr>
<th>Graded Item</th>
<th>Content Points Possible</th>
<th>Content Points Earned</th>
<th>Format Points Possible</th>
<th>Format Points Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title Page</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objectives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials and Methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td>a. Manuscript</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Tables &amp; Figures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conclusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:
Recorded Grade: ________________

**Completed Lab Report**

Your completed lab report will be comprised of the following:

1. A title page is required, as per previous instructions.
2. A statement of objectives, as per previous instructions.
3. Short paragraph of materials and methods.
4. Presentation of results within the manuscript, as described earlier.
5. Presentation of figures and tables.
6. Answers to the questions using the discussion format designated earlier.
7. A conclusion, making a strong, definitive statement of facts.
8. Your name should appear on the back of the last page.
Example
### TABLE 2. Calculations to Derive Stems per Acre based upon Prism Point Sampling with a 20-BAP Prism.

<table>
<thead>
<tr>
<th>Diameter Class</th>
<th>Plot Radius</th>
<th>Plot Area</th>
<th>Stems per Acre</th>
<th>Basal Area per Acre</th>
<th>square feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>Feet</td>
<td>acres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.5645</td>
<td>0.0003</td>
<td>3661.9299</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3.8892</td>
<td>0.0011</td>
<td>926.7325</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5.8336</td>
<td>0.0025</td>
<td>407.4367</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>7.7778</td>
<td>0.0044</td>
<td>229.1831</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9.7222</td>
<td>0.0068</td>
<td>166.6772</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>11.6666</td>
<td>0.0098</td>
<td>101.8592</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>13.6111</td>
<td>0.0134</td>
<td>74.8353</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>15.5556</td>
<td>0.0175</td>
<td>57.2958</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>17.5000</td>
<td>0.0221</td>
<td>45.2707</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>19.4444</td>
<td>0.0273</td>
<td>36.6693</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>21.3889</td>
<td>0.0320</td>
<td>30.3052</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>23.3333</td>
<td>0.0369</td>
<td>25.4648</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>25.2778</td>
<td>0.0416</td>
<td>21.6978</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>27.2222</td>
<td>0.0465</td>
<td>18.7088</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>28.1667</td>
<td>0.0516</td>
<td>16.2976</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>31.1111</td>
<td>0.0614</td>
<td>14.3219</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>32.0555</td>
<td>0.0698</td>
<td>12.0883</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>33.0000</td>
<td>0.0789</td>
<td>11.3177</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>34.9444</td>
<td>0.0884</td>
<td>10.1577</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>36.8889</td>
<td>0.0984</td>
<td>9.2673</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>38.8333</td>
<td>0.1091</td>
<td>8.3160</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>40.7778</td>
<td>0.1203</td>
<td>7.5783</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>42.7222</td>
<td>0.1443</td>
<td>6.9330</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>44.6666</td>
<td>0.1571</td>
<td>6.3684</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>46.6111</td>
<td>0.1704</td>
<td>5.8685</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>48.5555</td>
<td>0.1843</td>
<td>5.4259</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>50.5000</td>
<td>0.1988</td>
<td>5.0402</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>52.4444</td>
<td>0.2138</td>
<td>4.6773</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>54.3889</td>
<td>0.2293</td>
<td>4.3611</td>
<td>19.5994</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>56.3333</td>
<td>0.2454</td>
<td>4.0750</td>
<td>19.5994</td>
<td></td>
</tr>
</tbody>
</table>

**Example**

- **BAF** = Basal Area Factor
- **Plot Radius** = maximum distance from plot center that a tree can still be an "out" tree.
- **Plot Area** = area of a circle with the specified radius, expressed in acres (43,560 square feet per acre).