AN ABSTRACT OF A THESIS

GUIDE TO THE PREPARATION OF THESES AND DISSERTATIONS

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Master of Science in Electrical Engineering

This manual was designed to guide you in the preparation of your thesis or dissertation at Tennessee Technological University. It is adapted from the Tennessee Conference of Graduate Schools *Guide to the Preparation of Theses and Dissertations* [1] and the *Tennessee Technological University Thesis Manual* [2]. Following the practice of many guides and manuals, it is written in the second person, addressed directly to the reader. You should understand, however, that the second person is generally not appropriate usage in a thesis or dissertation.

Appreciation is extended to the authors of the manual: Dr. Suellen Alfred, Dr. Frank Bulow, Dr. Helen Deese, Mrs. Sheila Kendrick, Dr. Ken Purdy, and Dean Rebecca Quattlebaum.

GUIDE TO THE PREPARATION OF THESES AND DISSERTATIONS

A Thesis

Presented to

the Faculty of the Graduate School

Tennessee Technological University

by

Jan R. Doe

In Partial Fulfillment

of the Requirements for the Degree

MASTER OF SCIENCE

Electrical Engineering

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CERTIFICATE OF APPROVAL OF THESIS

GUIDE TO THE PREPARATION OF

THESES AND DISSERTATIONS

by

Jan R. Doe

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DEDICATION

This thesis is dedicated to my parents

who have given me invaluable educational opportunities.

ACKNOWLEGMENTS

Appreciation is extended to the authors of the manual: Dr. Suellen Alfred, Dr. Frank Bulow, Dr. Helen Deese, Mrs. Sheila Kendrick, Dr. Ken Purdy, and Dean Rebecca Quattlebaum.

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NOMENCLATURE

AAA American Automobile Association

AAB Atlas of Australian Birds

AAC Advanced Audio Coding

AAD American Academy of Dermatology

AAE American Association of Endodontists

AAF American Advertising Federation

AAG Association of American Geographers

AAH Australian Academy of the Humanities

AAI Architectural Association of Ireland

AAJ American Association for Justice

AAK Architectural Association of Kenya

AAL Australian Air League

AAM Automatic Acoustic Management

AAN American Academy of Neurology

AAO Anglo-Australian Observatory

AAP Australasian Association of Palaeontologists

AAR Association for Automated Reasoning

AAS Australian Academy of Science

AAT Association of Accounting Technicians

AAU Addis Ababa University

AAV Autonomous Aerial Vehicle

AAW Anti-aircraft warfare

ABA American Bar Association

ABB The Allman Brothers Band

ABC American Broadcasting Company

ABD All But Dissertation

ABE Association of Business Executives

ABF Africa Badminton Federation

ABG Atlanta Botanical Garden

ABH Ativan-Benadryl-Haldol

ABI American Biographical Institute

ABL Australian Baseball League

ABM Asynchronous Balanced Mode

ABN Alaska Board of Nursing

ABP Ambulatory Blood Pressure

ABR Available Bit Rate

ABS Acrylonitrile Butadiene Styrene

ABT American Ballet Theatre

ABU Ahmadu Bello University

ABV Assertion Based Verification

ABW Advanced Brake Warning

ABY After the Battle of Yavin

ACA American Choreography Awards

ACB Airport City Belgrade

ACC Associated Cement Companies

ACD Apple Cinema Display

ACE ASCII Compatible Encoding

ACF Australian Conservation Foundation

ACG American Comics Group

ACH American College of Heraldry

ACI American Concrete Institute

ACJ Asian College of Journalism

ACK Amsterdam Compiler Kit

ACL Access Control List

ACM Association for Computing Machinery

ACN Architecture for Control Networks

ACO Australian Chamber Orchestra

ACP Algebra of Communicating Processes

ACR Advanced Combat Rifle

ACS Affiliated Computer Services

ACT Academy of Clinical Thyroidologists

ACU Australian Catholic University

ACV Actual Cash Value

ACW Arts Council of Wales

ACZ Ace Combat Zero

ADA Aeronautical Development Agency

CBE Council of Biological Editors

MLA Modern Language Association

CHAPTER 1

THE ESSENTIALS

Purpose of the Guide

This guide is designed to be a basic source of information for thesis/dissertation preparation. It establishes the technical parameters within which you should work, such as quality of paper, number of copies to be submitted, margins, and the sequence of pages within the manuscript. Since most of you will publish during and after your graduate education, this guide encourages the use of leading professional publications to help establish specific formatting convention. You are encouraged to use publications within your field—journals and textbooks—to assist you in establishing bibliographic form, use of number, and other conventions that are discipline oriented. However, the application of this theory is not simple. You must understand the various elements of a manuscript and general publication formatting requirements in academic publishing. Although knowledge and use of publication formatting is essential, the regulations established by this guide always take precedence.

You should use style handbooks such as the most recent editions of the *MLA Handbook for Writers of Research Papers* (English) [3], *Publication Manual of the American Psychological Assocation* (Education) [4], *CBE Style Manual (Biology)* [5], *Form and Style* (Arts & Sciences, Engineering, Education) [6], *The Chicago Manual of Style* [7], and *Harbrace College Handbook* [8] as resources for basic style and grammar. In contrast, you should never use previously accepted theses and dissertations as the final guide to style. Examples taken from other theses may be out of context or may be incorrect. The existence of a particular style or usage in a previously accepted thesis does not establish a precedent for its continuation.

By accepting your thesis or dissertation and awarding the degree, Tennessee Technological

University places its academic reputation on the line. The content of your manuscript is carefully evaluated by experts in your field. The format requirements presented in this guide are imposed to ensure an appropriate academic appearance of your manuscript.

Ethical Standards

Since conferral of a graduate degree implies professional integrity and knowledge of scholarly methods, there are three areas in which you as a graduate student should be particularly cautious:

- proper acknowledgment of cited works
- the proper use of copyrighted material
- the proper reporting of work where research compliance is required

Plagiarism

Merriam-Webster's Collegiate Dictionary [9] defines plagiarism as "steal[ing] and pass[ing] off ideas or words of another as one's own" and "the use of a created production without crediting the source." "You must acknowledge all material quoted, paraphrased, or summarized from any published or unpublished work. Failing to cite a source, deliberately or accidentally, is plagiarism" [9, 424]. If you use the exact words of your source, they must be enclosed in quotation marks and the source cited; if you do not use the exact words but paraphrase or summarize the source, it still must be cited. When involved in collaborative research, you should exercise extreme caution to avoid questions of plagiarism. If in doubt, check with your major professor and the Graduate School about the project. Plagiarism will be investigated when suspected and prosecuted if established.

Copyright

If you use copyrighted material in a limited way, it is usually unnecessary to seek permission to quote. If, however, you use material from a copyrighted work to the extent that the rights of the copyright owner might be violated, you must obtain permission of the owner. In determining the extent of a written work that may be quoted without permission, you should consider the proportion of the material to be quoted in relation to the substance of the entire work. According to *The Chicago Manual of Style* [7], "A few lines from a sonnet, for instance, form a greater proportion of the work than do a few lines from a novel. Use of anything in its entirety is hardly ever acceptable" (p. 124). In no case should you copy a standardized test of similar material and include it in a thesis/dissertation without written permission. According to Circular 21 (Reproduction of Copyrighted Works by Educators and Librarians, p. 11) [10], "...the following shall be prohibited: ... There shall be no copying of or from works intended to be 'consumable' in the course of study or of teaching. These include workbooks, exercises, standardized tests and test booklets and answer sheets and like consumable material." The publisher usually has the authority to grant permission to quote excerpts from the copyrighted work or can refer requests to the copyright owner or designated representative. The copyright owner may charge for permission to quote. You should credit permissions with the acknowledgments, and the source should appear in the Bibliography[1].

Federal and State Regulations

Compliance with federal and state regulations governing the use of human subjects, animal care, radiation, legend drugs, recombinant DNA, or the handling of hazardous materials/wastes in research is monitored by a number of regulatory agencies. Because of these regulations, research compliance is another area of importance to you as a graduate student and to the conduct of your research. Tennessee Technological University requires you to verify that you have complied with

[1]Some fields alternatively use Literature Cited, References, or Works Cited.

the appropriate approval procedure(s) prior to the initation of the thesis- or dissertation-related research, if approval is relevant to the research. If your research involves any of the areas mentioned above, you should determine what compliance is required by the school (available in the Office of Research).

Definitions

Typeface or Font

These terms apply to all the features available within a "type" family. For many printers, typeface includes bold, italic, and the various sizes of any named type (Helvetica, Times Roman, New York, Geneva, etc.).

Text

In the discussion of formatting, text is used as a generic term to designate the main body of the thesis/dissertation and to distinguish this element from preliminary pages, references, tables, figures, and appendices.

Preliminary Pages

Sometimes called "front matter," preliminary pages serve as a guide to the contents and nature of the manuscript [7]. The approval or acceptance sheets, as part of the preliminary pages, confirm acceptance by the committee members acting for the department, and the Dean of Graduate Studies, acting for the university or college.

Table

A table consists of numbers, words, or both, and presents information that is separated into columns. Tabular information allows you, the author, to convey information to a reader in a

structured format.

Figure

Any diagram, drawing, graph, chart, map, photograph, or material that does not fit into the restricted format for a table is a figure. Figures generally show relationships or illustrate information rather than present precise data.

Appendix

An appendix is generally a "catch-all" for supplementary material to the thesis/dissertation. In some cases, tables and/or figures are placed in an appendix to avoid interrupting the text.

CHAPTER 2

THESIS/DISSERTATION ELEMENTS AND STYLE

Preliminary Pages

Figure 2.1 shows the sequence and numbering scheme of the various thesis/dissertation parts. Samples of all preliminary pages can be found at the start of this document.

Abstract

You must include an abstract with each copy of the thesis/dissertation submitted to the Graduate School. Although the content of the abstract is determined by you and your graduate committee, the following information is appropriate:

1. a short statement concerning the area of investigation
2. a brief discussion of the methods and procedures used in gathering the data
3. a condensed summary of the findings
4. conclusions reached in the study

There is no word limit on the abstract appearing in the thesis or dissertation but it must be confined to one page in the typestyle consistent with the text. All doctoral candidates must provide the Graduate School with an additional abstract that is limited to 350 words (approximately 35 lines) to be sent to Dissertation Abstracts International.

Title Page

You will assign the title page the Roman numeral "i," although the number does not appear on the page. The date which appears shall be the month and year of commencement. Your name

Thesis/Dissertation Parts	*Page Assignment*
Abstract	No page number assigned
Title Page	Small Roman numeral (Assigned, not typed)
Copyright Page	Small Roman numeral (Typed)
Approval Sheet	
Statement of Permission to Use (Master's theses only)	
Dedication page	
Acknowledgments	
Table of Contents	
List of Tables (if 2 or more)	
List of Figures (if 2 of more)	
List of Symbols and/or Abbreviations (if needed; may be included as an appendix)	
Body of thesis (divided into chapters or parts)	Arabic numerals, starting with 1
Separation sheet	
Bibliography	
Separation sheet (if an appendix or appendixes follow)	
Appendix	
Vita	
Parts in **bold type** are required; all others are optional.	

Figure 2.1: Arrangement of Thesis/Dissertation Parts

must appear as you are registered at the University. The wording and format of the title page must be exactly as shown in Appendix A.

Copyright Page

You will include a copyright page only if the manuscript is being formally copyrighted (Appendix A). You will find additional information about copyrighting in Chapter 6.

Approval Sheet

Each of the copies of the thesis/dissertation submitted to the University must have an approval sheet using the exact wording and format shown in the front matter of this manual. This sheet must be on the same brand and weight of cotton paper and be in the same base typeface as the

remainder of the thesis/dissertation. The name used on the approval sheets and title page must be that under which you are registered at the University. Although the approval sheets may be copies, the committee signatures must be originals. Black ink is recommended for the original signatures. The number of signature lines must equal the number of committee members. The major and degree to be awarded must be exactly those to which you were admitted officially by the Graduate School. Majors and degrees can be found in the University's graduate catalog. Number the approval sheet.

Statement of Permission to Use

For Master's theses, the Statement of Permission to Use allows the University Library to provide copies of a thesis for academic use without securing further permission from you. Unlike dissertations, theses are not microfilmed, so access to them is limited to that which can be provided by the Library. You must include with each of the copies of the thesis submitted to the University a Statement of Permission to Use on the same brand and weight of paper and in the same base typestyle. This statement is in addition to optional copyrighting of the thesis. It follows the approval sheet and is assigned a page number.

Dedication Page

If you wish to dedicate the manuscript, include the dedication statement at this point.

Acknowledgments

You should use the acknowledgments to thank those who have helped in the process of obtaining the graduate degree. Also, list permissions to quote copyrighted material here, as well as acknowledgments for grants and special funding.

Table of Contents

The Table of Contents may vary in style and amount of information included. However, you must include List of Figures, List of Tables, List of Symbols, chapter or part titles, the Bibliography, the Appendix(es), if any, and the Vita. The page numbers for the Bibliography and the Appendix(es) are the numbers assigned to the separation sheet preceding each of these items. All headings and subheadings must be listed in the Table of Contents.

List of Tables/List of Figures

If there are two or more tables, you must include a List of Tables. Similarly if there are two or more figures, you must include a List of Figures. There must be separate lists for tables and figures. Include in the appropriate list any tables or figures appearing in the appendix(es). Be sure that each title is different from the other titles, and that the wording of all titles entered in the lists is exactly as it appears on the table or figure. This includes the information up to the first terminal punctuation. You do not include additional explanatory information in the list.

List of Symbols/List of Abbreviations/Nomenclature

You should make the title of this section reflect its content. You may use this section to define specialized terms or symbols, or you may place such information in an appendix.

Text

Divisions

This manual has been written in the format described herein. You must divide the manuscript into a logical scheme that you follow consistently throughout the work. Chapters are the most common major division; parts are also permissible. Examples of chapter and part headings are shown in Appendix B. For a discussion of divisions into "parts," see Chapter 4.

Number each chapter or part consecutively and begin on a new page. A division entitled **INTRODUCTION** may be the first numbered chapter or part. Chapter or part titles are primary divisions of the entire manuscript and are not part of the subdivision scheme.

Subdivisions

You may use either the format and order of subdivisions that are described in this manual or the numerical decimal system of identifying heading and subheading. The subdivisions within a chapter or part do not begin on a new page unless the preceding page is filled. First and second level subdivisions are always preceded by an extra blank line to indicate to the reader a major shift in subject. **Never** have **only one** subdivision at any level.

Centered head. If there is not room for the complete heading and at least two lines of text at the bottom of a page, begin the new subdivision on the next page. If a chapter contains only one level of subdivision, use the centered head. Type the first letter of each word in caps, place it in bold type (or underline if bold is not available), and center it four inches from the right edge of the page. Place it two blank lines (line spacing = 3) below the preceding text and two blank lines above the text which follows. Double-space (line spacing = 2) in an inverted pyramid format a centered head that is longer than four inches. **If a second level of subdivision immediately follows the centered head, use only one blank line (line spacing = 2) between the two subheadings.**

Freestanding sidehead. If a chapter makes use of two levels of subdivision, then a freestanding sidehead is the second subdivision. Position the freestanding sidehead flush with the left margin (see Margin Settings and Justification), two blank lines below the preceding text (**double space if preceded by a centered head**) and two blank lines above the text that follows. Capitalize the first letter of each major word. Place the sidehead in bold type; there is no end punctuation. If the heading is longer than 2.5 inches, use a second line. Indent the second line two spaces and

double space between the two lines.

Paragraph sidehead. A third subdivision is indicated by a paragraph sidehead which is subordinate to both the centered head and the freestanding sidehead. Place the paragraph sidehead a single blank line below the preceding text. Indent it like a regular paragraph. Capitalize only the first letter of the first word. Place the heading in bold type, followed by a period, and in every instance begin the text on the same line.

Quotations

You must give full credit for every quotation or paraphrase used. A carefully worded paraphrase is usually preferable to a long quotation. Paraphrases are not enclosed in quotation marks. If you use a footnote to acknowledge a source, its' superscript normally follows the final punctuation of the material cited; however, you should place the superscript at the end of a sentence if only the sentence is referenced.

Quotations are used when it is desirable to reproduce literary material in exact detail. Quotations which are not over three lines long are usually enclosed in quotation marks and are place within the text. When quotations are longer, they are usually set off from the test in a separate paragraph or paragraphs and single-spaced. Follow the guidelines of conventional practice in your discipline.

References Within Text

Notes documenting the text and corresponding to a superscripted number in the text are called footnotes when they are printed at the bottom of the page [7]. This format is only used occasionally and has generally been replaced by references. References usually consist of information in parenthesis or square brackets within the text. Two common methods of referencing are (1) to use author's name and date of publication, as in (Smith, 1990), or (2) to assign numbers to the

bibliographical entries and insert the corresponding number for the authors as they are cited in the text, as in Smith [95]. The purpose of references is to guide the reader to the corresponding entry in the Bibliography, where complete information is available. Footnotes or reference notes collected at the end of each chapter or part (end note) are not acceptable. In microfilm or other electronic format, large numbers or pages are reproduced on a single sheet of film, making end notes difficult for the reader to locate. You must determine the form, style, and contents of footnotes or reference notes by what is generally accepted in your field of study.

Most of the popular word processing applications have a footnote feature that provides automatic formatting and placement of footnotes at the bottom of the page. For disciplines using that convention, the formatting provided by the software application would be acceptable.

Tables and Figures

General Information

Titles. Since tables and figures are separate entities, you must number them independently. Each table or figure must have a unique title descriptive of its contents. This title appears at the top of the table and at the bottom of the figure. Give figures containing parts a general title, after which you may break the figure down into "A" and "B" parts. For multiple-part figures, you may integrate the title, with titles for each part as part of the general figure title, or composite, with no reference to the individual parts. No two figures may have exactly the same title. The formatting of the titles must be consistent for all tables and figures.

Numbering. You may number tables and figures in one of several ways. Three of the most common numbering schemes are:

- to number consecutively throughout the manuscript, including the appendix(es), using either Roman or Arabic numerals

- to number consecutively within chapters, parts, or appendixes, with a prefix designating the chapter/part/appendix (e.g., 3-1, 3-2 . . . 4-1, 4-2, A-1, B-1)
- to establish a consecutive numbering system for the body of the manuscript and a different one for the appendix(es) (e.g., 1, 2, 3 for text and A-1, A-2, A-3 for appendix)

The style of numbering must be consistent.

Placement within the body of the manuscript. You must make each table or figure immediately follow the page on which it is first mentioned (except as noted in the next paragraph), and you must refer to all tables and figures by number, not by expressions such as "the following table/figure." When more than one table or figure is introduced on a page of text, each follows in the order mentioned. You may find it convenient to assign tables and figures pages separate from the text to avoid problems in shifting during last-minute revisions. In degree of importance, tables and figures are secondary to the text so that the text dictates where the tables or figures are placed. You must fill all pages with text and in no case should a page be left significantly short because of the mention of a table or figure.

You may incorporate within the text a table or figure less than one-half page in length (approximately four inches), provided it meets the following conditions:

- Is in numerical order
- Is separated from the text by extra space (approximately one-half inch)
- Is not continued onto a following page
- Follows its specific mention in the text

If tables and figures are integrated with text, you must place them so that they appear either at the top or the bottom of a page. A mention on the upper half of a page of text would mean that the bottom half of the page would be reserved for the table or figure, and a mention in the bottom

half of the page would place the table or figure at the top of the next page. Always have a balance of no less than one-half page of text and no more than one-half page of table or figure. If multiple tables or figures are mentioned together on a page, you may place them on pages together, provided there is approximately one-half inch between each. You need not designate as figures small diagrams within the text, nor designate as formal tables compilations which are no more than a few lines in length.

Placement of tables and figures in the appendix. When all tables and/or figures are in an appendix, you will so state in a footnote in the body of the text attached to the first mention of a table or figure; do not repeat this information thereafter. When only some of the tables and figures are in an appendix, clearly indicate their location when the items are mentioned in the text (e.g., Table 1, Appendix A), unless the numbering scheme makes the location obvious (e.g., Table A-1).

Horizontal tables and figures. To accommodate large tables or figures you must sometimes place them in horizontal (landscape) orientation on the page. The margin at the binding edge must still be 1.5 inches, and all other margins at least one inch. The margin at the top of the page and the placement of the page number must be consistent with the rest of the thesis. Place the table or figure and its caption so that they can be read when the thesis is turned 90 degrees clockwise.

Foldout Pages. If possible, reduce large tables and figures to fit an 8.5×11 inch page. If not, you may include in the thesis material on approved paper larger than 8.5×11 inches, provided the page itself is 11 inches vertically and is folded properly. The fold on the right side must be at least one-half inch from the edge of the paper. The second fold, on the left side, if needed, must be at least 1.5 inches from the binding edge of the paper. The finished page, folded, should measure 8.5×11 inches. If the page is to be bound into the thesis or dissertation, the paper submitted to the Graduate School must be the same brand of 25 percent cotton bond[1] as the rest of the manuscript.

[1]See page 25 for specific paper requirements.

Material in pockets. If it is necessary to include a large map, drawing, floppy disk, videotape, or any other material which cannot be bound, you must itemize these materials in the Table of Contents and designate them as being "In Pocket." Affix to the pocket material a label including number, title, your name, and year of graduation. A pocket for the material will be attached to the inside back cover of the bound copies.

It is also permissible to include less bulky material such as a survey instrument or pamplets in a pocket attached to a sheet of approved paper with permanent cement. You must treat this material as a figure, mention it in the text, and give it a number and caption. Observe caution in using pockets since the material in them is easily lost.

Tables

Typeface. For the table captions you must use the base typeface and size used for the manuscript. The size of the type within the table may differ, depending on the "fit" of the information within the margins.

Required components. Since tables consist of tabulated material or columns, the use of ruling or horizontal lines in tables helps the reader distinguish the various parts of the table. Vertical lines are accepted but not required. One of the characteristics that identifies tabulated material as a table is the presence of at least the following three horizontal lines:

- The table opening line, which appears after the table caption and before the columnar headings
- The columnar heading closing line, which closes off the headings from the main body of the table
- The table closing line, signaling that the data are complete

Anything appearing below the closing line is footnote material.

Tables must have a least two columns which carry headings at the top as brief indications of the material in the columns [7, 329]. The headings appearing between the table opening line and the column heading closing line must apply to the entire column down to the table closing line. It is never appropriate to change columnar headings on continued pages. One method of avoiding a problem is to use subcolumnar heads, which are headings that appear below the column heading closing line, cut across the columns of the table and apply to all the tabular matter lying below it [7, 330].

Continued tables. You may continue tables on as many pages as necessary, provided the columnar headings within the columnar block remain the same. Repeat the columnar block for each page. Do not repeat the table caption, but indicate continuation pages with the designation: Table __ (Continued). You may reduce tables too large to fit within margins. See Chapter 6 for hints on technical production.

Table footnotes. Footnotes to tables consist of four different categories [11]:

- **Source notes.** If you take the table or data within the table from another source,use the word **Source(s):**, followed by the full reference citation, regardless of the format of referencing used in the main body of the text. This ensures that if that specific page is copied in the future by an interested reader, all bibliographic information is contained within the page. Include all references in the Bibliography.

- **General Notes.** Introduce general notes, which may include remarks that refer to the table as a whole, as **Note(s):**.

- **Superscript notes.** For notes to specific parts of the table use superscripts (letters for tables consisting of numbers; numerals for tables consisting of words; symbols if letters or numbers might be mistaken for exponents) that are attached to the part of the table to which they apply.

- **Level of probability notes.** For a table containing values for which levels of probability are given, use asterisks. Use a single asterisk for the lowest level of probability, two for the next higher, etc. [7].

Figures

Typeface. Since figures are considered illustrations, regardless of the nature of their content, any print that is part of the figure can be in any neat and legible typeface. You must use the same base typeface and size for the figure caption and page number as in the rest of the manuscript because this material is considered to be part of the typeset body of the manuscript (see Chapter 6).

Legends. You may place explanatory material for figures within the figure, either above or below the caption, or continue it after the period following the caption. If a figure has a long caption and/or legend which must be placed on a separate sheet because of the size of the figure, place this page immediately before the figure. The page number assigned to the caption page is considered to be the first page of the figure.

Continued figures. You may continue onto other pages a figure containing several related parts too large to be included on a single page. The first page contains the figure number and complete caption, and subsequent pages contain the remainder of the figure and the designation: Figure __ (Continued).

Figure footnotes. Footnotes to figures consist of two different categories [11]:

- **Source notes.** If the figure or information within the figure is taken from another source, use the word **Source(s):**, followed by the full reference citation, regardless of the format for referencing used in the main body of the text. This ensures that if that specific page is copied in the future by an interested reader,all bibliographic information is contained within the page.

If you have made changes in a figure from another source, so indicate by using the phrase "Adapted from ...."

- **General notes.** Introduce general notes, which may include remarks that refer to the figure as a whole, as **Note(s):**.

You must include all references in the Bibliography.

Equations

The most recent edition of *The Chicago Manual of Style* [7] is a good resource. Generally, it is expected that all equations will be typewritten or printed in the final copy. With some word processing programs (e.g., Word, WordPerfect) you can create equations that contain any number of special characters and symbols. When questions arise concerning the placement of equations, proper spacing, and indentations, feel free to consult with the thesis/dissertation consultant in the Graduate School. The following general rules apply in the use of equations:

- Align on operational signs equations that have more than one line.
- Center equations between the left- and right-hand margins.
- Do not break at the end of a line a short equation in the text; rather you should "space out" the line so that the equation will begin on the next line; or you may center the equation on a line by itself.
- Set connecting words of explanation such as *hence*, *therefore*, and *similarly* at the left-hand margin either on the same line with the equation or on a separate line (if used with a numbered equations). Do not use commas following these words.
- Number displayed equations (those set on separate lines) consecutively throughout each chapter, flush with the right margin.

- Follow equations that end a sentence with a period, normally on the line of type which conludes the equation. For equations that have several horizontal lines, align the period with the equal sign. The use of the period should be regarded as an aid to clarity.

Bibliography

You must include a list of materials used in the preparation of the manuscript of the thesis/dissertation. This may consist only of references cited in the text or it may include works consulted as well. The list is preceded by a numbered page with the title centered vertically and horizontally (see Appendices H–K). The purpose of listing the citations is threefold:

1. to serve as an acknowledgement of sources
2. to give readers sufficient information to locate the volume
3. in the case of personal interviews or correspondence, to save readers the trouble of attempting to locate material that is not available

If your appendix contains references, the appendix **must** precede the bibliography. Follow the format for the citations used in your field of study.

Appendix

An appendix (appendixes or appendices), if included, is preceded by a numbered page with the designation centered vertically and horizontally between the margins. Place original data and supplementary materials in the appendix. In some cases, all tables and figures are included in the appendix(es).

Vita

Write the vita, which contains appropriate personal, academic, and professional information about you, in narrative form. Since copies of the manuscript will be available to the public, do not include private information. The vita is the last item in the manuscript and appears with no preceding separation page.

CHAPTER 3

FORMATTING

Typeface and Quality

Typeface or Font

The typeface or font you use affects the physical appearance of your manuscript more than any other single element. Because of computers and the availability of laser printers and high-quality dot matrix printers, typewriters no longer represent the standard by which the physical appearance of the manuscript is defined. Although typewritten text is still acceptable, word processing is considered to be the latest technology.

If a typewriter or standard printer is used, use the basic typeface (e.g., Letter Gothic, Prestige, Courier) consistently throughout the thesis. The pitch used must be the pitch for which the type was designed (i.e., Courier 10 must be set on 10 spaces to the inch and Prestige Elite must be set on 12 spaces). You may insert symbols not available on the typewriter by using dry transfer lettering or a template, or by printing symbols onto drafting film applique from a printer.

Laser printers provide the opportunity to use different type sizes and special effects such as bold and italics. Although most laser printers also have some typewriter styles available as options, the sizes of the type on a laser printer are often measured in points rather than in characters per inch. Text is normally most readable in 12-point, so this size is highly recommended. You may use other sizes for emphasis.

You must consistently follow your styles or conventions used for special effects throughout the manuscript. If you decide to set single-spaced quotes in italics or in a smaller type than that used for the regular text, you must follow that convention for all single-spaced quotes. Other illustrations of special effects may be found in journals or textbooks.

The typeface or font selected for text will be the base style or the "starting point" for all type selection [12] and will establish the framework for the entire manuscript. All the following items must be in the family of type selected as the "base" style:

- Preliminary pages
- Text
- Table captions
- Figure captions
- Page numbers

Type Quality

Acceptable type quality for the final **master** copy is determined by the following factors:

- The visual smoothness of the letters
- Standard uppercase and lowercase letters
- The presence of descenders (parts of letters that normally extend below the line, such as p, q, y)
- A high-contrast, solid image

The printers most commonly used to produce the final master copy are laser, 24-pin dot matrix, ink-jet, and daisy-wheel printers. You should confirm the acceptability of other printers with the thesis/dissertation consultant in the Graduate School. Some general guidelines for producing acceptable-quality master copy are:

- install new ribbon, toner cartridge, or ink cartridge

- clean the printer head or daisy wheel
- use plain white paper (not 25 percent cotton)

Spacing

Spacing has both aesthetic and utilitarian effects on the appearance of a page. Vertical spacing determines the number of typed lines that will fit on a page and can make a manuscript appear either cluttered or uncluttered, depending on space left between lines. Horizontal spacing "tightens up the spaces between certain pairs of letters, such as WA" [13, 604], and makes the spacing of proportional fonts pleasing to the eye.

Most technical decisions about both vertical and horizontal spacing are determined by the software package. When you select a typeface and size, the default values for spacing are automatically set. Most word processing packages then allow you to set the line spacing, using the predetermined line height as a basis. Single spacing leaves a small space between two lines of type and double spacing leaves the equivalent of the height of a line between the two lines of type.

You must double space the general text. You may use single spacing to set off quoted material and for references and tables. In the event that an extra blank line is needed (e.g., between chapter number and title), you should add an additional "enter," doubling the white space. See Subdivisions, for specific spacing instructions for headings.

Indentations

Make paragraph indentations uniform throughout the thesis/dissertation. Indent the paragraph from five to 10 spaces.

Widow/Orphan Lines

Avoid single lines of a paragraph at the top and bottom of a page (widow and orphan lines). If you must divide a paragraph at the bottom of a page, make at least two lines appear at the bottom and carry at least two lines to the top of the next page. If there is not room for a complete heading and at least two lines of text at the bottom of a page, begin the new subdivision on the next page.

Other Formatting Considerations

Margin Settings and Justification

The left margin **must** be no less than 1.5 inches; the right, top, and bottom margins no less than 1 inch. All images, including the page number, must fit within these margins. These margins define the minimum white space to be maintained on all sides.

A fully justified line of type, regardless of the number of words in it, is exactly the same length as all other lines [7]. This feature is an option in most word processing packages. Either fully justified or left-justified margins are acceptable. The use of justified margins must be consistent throughout the manuscript.

Pagination

The Abstract is not assigned a page number. Use small Roman numerals to number all other pages preceding the text. Although the preliminary paging begins with the title page, no number appears on that page; therefore, the following page is page ii. Beginning with the first page of text, number all pages consecutively throughout the manuscript, including the Bibliography, Appendix(es), and Vita, with Arabic numerals. Pagination using letter suffixes (i.e., 10a and 10b) is not allowed. Number the initials page of any major subdivision (e.g., the first page of a chapter,

division pages) at the bottom, leaving a margin below the page number of 1 inch from the bottom edge and centered on 4 inches from the right edge of the page. **Update: if you are having difficulty with the placement of the page numbers being in two different locations, you may choose to place the page number at the bottom center on all pages.** Place the numbers of other pages in the upper right-hand corner, leaving a margin of one inch from the top edge and one inch from the right edge of the page, with the text beginning a double space below. Make sure that numbers appear on separation sheets.

Paper and Duplication

Print or type the master copy on plain white paper. Reproduce the two copies of the thesis/dissertation submitted to the Graduate School on 25 percent cotton content, 20 pound weight, white paper. Use the same brand of paper throughout both copies and for the approval pages.

CHAPTER 4

SPECIAL PROBLEMS AND CONSIDERATIONS

The guidelines given in the previous chapters are sufficient for most theses/dissertations; however, there are several circumstances that require additional guidance. This chapter addresses a few of the more specific questions that may exist in the preparation of your thesis/dissertation, such as the use of papers that have been or will be submitted to journals, and the division of unusually long manuscripts.

Theses/Dissertations in the Form of Journal Articles

A thesis or dissertation may include articles submitted or about to be submitted to professional journals. However, some guidelines apply. You must integrate the individual papers into a unified presentation. This might be done through an introductory chapter containing, among other things, a detailed literature review of the type not presented in journal articles. Additionally, you might use one or more connecting chapters to expand upon the methodology or the theoretical implications of the findings presented in the individual articles. You must adopt a uniform style of headings, reference citations, and bibliographical format—in compliance with this guide—for the thesis/dissertation, even though you may have prepared the individual papers for submission to different journals. You may list each paper as an individual chapter within the thesis/dissertation, or you may treat each paper as a part and follow the multipart format discussed in the next section. If you use chapter divisions, you will include only one Bibliography (including all references from the various articles) at the end of the text. Finally, you may add appendixes to present information not included in the chapters. Number pages consecutively throughout the manuscript.

Multipart Theses and Dissertations

With approval of the committee members, you may divide the thesis/dissertation into parts, rather than sections or chapters. The use of parts is an effective method of organization when you have performed research in two or more areas not practical to be combined into a single presentation or when you wish to maintain consistent format for journal articles. You may treat each part as a separate unit, with its own chapters, figures, tables, Bibliography, and Appendix(es) (if needed). You may combine the Bibliography and Appendix(ex) at the end, as in the case of theses/dissertations in the form of journal articles (see previous section). In all cases, you must include an abstract or foreword which provides an overview and summary of the project, and a single Table of Contents, List of Tables, and List of Figures. Use consecutive pagination throughout the manuscript, including numbering of the required separation sheets listing the part number and title placed before each part.

Two-Volume Theses/Dissertations

If a manuscript is more than 2.5 inches in thickness (approximately 500 sheets of 20 pound 25 percent cotton paper), you must divide it as equally as possible into two volumes not exceeding 2.5 inches each. You must make the divisions between chapters or major divisions, such as Bibliography or Appendixes. List the contents for the entire manuscript in the Table of Contents at the beginning of Volume 1. Pagination is continuous throughout both volumes. Just prior to Chapter 1, insert a sheet with VOLUME 1 centered both horizontally and vertically between margins. Volume 2 opens with a title page followed by a sheet showing VOLUME 2. Do not assign a page number to either volume separation sheet.

CHAPTER 5

TECHNICAL POINTERS

Computer use has enabled you to assume responsibility for all aspects of thesis/dissertation preparation, allowing you to function as author, editor, and publisher of your manuscript. With this freedom has come the full responsibility of ensuring that the content is accurate, grammar and mechanics are acceptable, and all elements of formatting are handled correctly. The purpose of this chapter is to provide some pointers on technical production and to address some common production problems.

Appearance

The element that contributes most to the attractiveness of a manuscript is consistency. Consistency in formatting means that you establish and adhere to a series of conventions or protocols regarding spacing, heading sequencing, and other aspects of appearance to guide readers through the manuscript visually, thus enabling them to concentrate on the content. Consistency in thesis/dissertation production is especially critical, since it determines in part the committee reaction to content and, ultimately, acceptance of the manuscript by the Graduate School.

Content

Taped Copy

You should avoid wasting valuable time attempting to force the computer to solve a printing problem when quicker and easier solutions exist. If not everything to be included in a thesis or dissertation is on your disk, you must use alternative methods to transfer the image to a "working copy," such as taping the material to the page. Examples include material from other sources,

photographs, tables, or other material too large for a standard page. Below are guidelines to help in taping material–an alternative method of dealing with noncomputerized material:

- Prepare tape-up sheets for any material that must be repositioned or reduced. Tape-up sheets will have the page number, title, and source (if needed) printed in proper position in preparation for the material to be taped into place. For pages that need only the number, you can create tape-up pages as part of the body of the manuscript. All software packages have a means of terminating a page at a specific point and advancing to a new page. Repeating this will create an empty page, numbered in sequence with the rest of the manuscript.
- For reductions, note that the maximum size of the image area, including page number, is 6 by 9 inches. Black and white contrast must be sharp. Position of the image on the reduced page is unimportant, because the image will be cut out and placed on the tape-up page.
- Trim away nonimage area so that the image can be taped into place on the tape-up sheet, using transparent (not cellophane) tape. Tape fully all four sides of the image to screen out shadow lines. This will become the master copy.

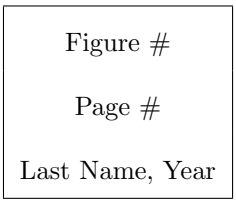
Photographs

There are at least six methods for including photographs in your thesis or dissertation. Each methods differs in quality and cost, and each requires different handling.

- With the high-quality reproduction capability of the newer copiers, some of which have an automatic screening mode for photographs, it is often possible to mount an original photograph on a tape-up sheet and have it copied onto 25 percent cotton paper without any charge other than the normal copying fee.
- Individual photographic prints can be mounted in each copy using permanent photomount spray adhesive. If you select this option, prepare the tape-up sheets and one copy of the

photographs trimmed approximately 1/8 inch smaller than the other prints. Tape the trimmed photographs on all four sides onto the tape-up sheet and insert the page into the master copy. Each time you copy the master copy, the photographs are also copied. Cost depends on the number of negatives and copies purchased. Quality depends on the quality of the original photograph.

- Many students with darkroom access use full-page-size 8.5×11 inch photographic paper with an image area of 6×9 inches (standard margins). Double weight glossy paper is recommended for preservation and crisp image. If you select this option, print the title and other information on a legend page, which precedes the actual photograph, and mount an address label on the back of the photograph, one inch down and one inch in from the right edge (with the photograph facing downward). Type the label as shown below. Give page numbers to both the legend page and the photographic page; in the List of Figures, the number shown is that of the legend page. There should be no printing on the front of the photograph. The cost of this process depends on whether the darkroom work is done by you or by a professional agency. The paper may have to be ordered in advance (often 11×14 inch sheets are cut down to 8.5×11 inches). The detail quality is excellent.



- Halftone prints are made of each photograph and mounted onto paste-up pages. The PMT (photo-mechanical transfer) process screens the halftone image and converts it into dots, which can then be copied. Generally a dot density of 85 lines per inch gives the best image on most copiers. The quality of reproduction is comparable to that of a newspaper and probably

would not be satisfactory for scientific applications. The cost is relatively low, since as many photographs as will fit on a sheet of PMT material can be made in one shot.

- Many students use scanners to reproduce photographs, making them part of the computer-contained manuscript. Essentially, the scanner performs the same function as the PMT process and converts the photograph to dots, which are printed as graphics. Fine detail may be lost, but the overall image is attractive and copies well.

- Offset printing is a final option. The process is done by full-service print shops and requires the processing of two negatives—one for the printed copy and one for the halftone photograph. Done well, this process produces excellent quality in a form that will last as long as the paper on which it is printed. The expense, however, may limit its use in thesis/dissertation production.

CHAPTER 6

BRINGING IT TO FRUITION

At this point in the development of your thesis/dissertation you have prepared a draft which must now be brought to fruition. This chapter describes the possible steps for completion and final acceptance of the final manuscript. These steps are summarized in Figure 6.1.

Draft Copy to Committee

Before you submit a draft copy of your thesis/dissertation to your committee, it should be checked out by at least your major professor for content. His/her recommendations should be incorporated in the draft copy that you submit to your graduate advisory committee. **Please note that this review by your major professor is a crucial step, and it may need to be repeated several times.**

When your major professor is satisfied with your draft copy, you must submit a copy to all members of your advisory committee for their review. At the same time you should set a date, time, and place that is convenient for all your committee members for the presentation and final examination/defense of your thesis/dissertation. This date should be no sooner than one week after you submit your draft copy to them.

Final Examination/Defense of Thesis/Dissertation

The format of your presentation and final examination and/or defense of your thesis/dissertation (which in some departments requires more than one session) is set by the policy of your department or college. Although its length may vary with whether it is for a thesis or dissertation, there is typically a formal oral presentation of your research to your advisory committee and any guests whom you or your committee members might have invited. A period for questions normally

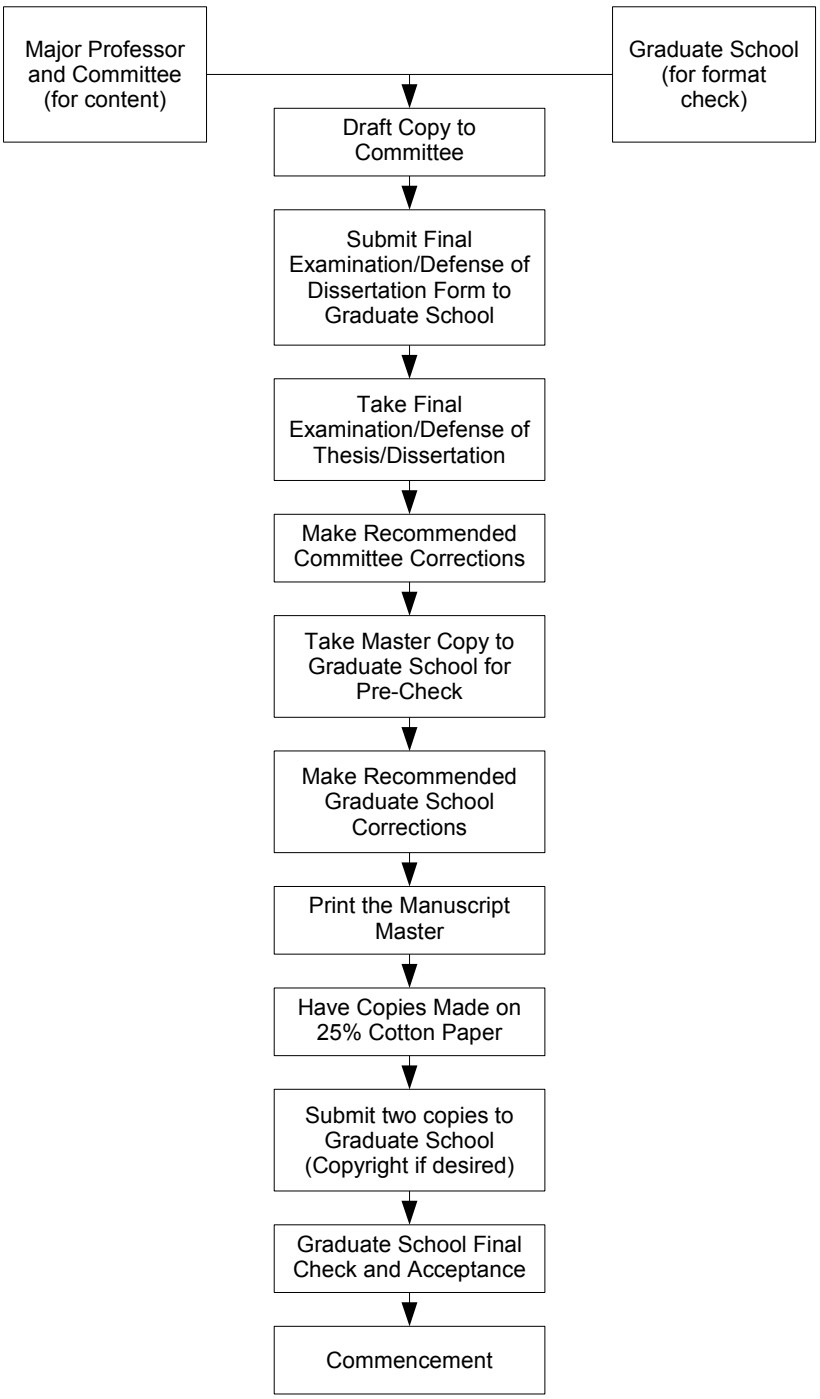


Figure 6.1: Sample Flowchart Summarizing Possible Steps to Completion and Acceptance of a Thesis/Dissertation

follows. The intention of this process is to verify your understanding of your contribution to the body of knowledge in your research area and your general field of study.

Committee Revisions

Recommendations for changes and/or additions are a natural byproduct of this review of your thesis/dissertation by your entire committee and your defense of it. These should be critically reviewed with both your major professor and the individual committee members who made the recommendation, and incorporated as appropriate.

Graduate School Pre-check

At this point your manuscript is ready for a pre-check by the Graduate School prior to its final approval by your advisory committee and submission to the printer for reproduction. This pre-check will pick up any format problems that must be corrected before the thesis/dissertation is printed. The Graduate School must receive, by the date published in the Bulletin, one preliminary copy of the thesis/dissertation for pre-check. Failure to submit the preliminary copy by the deadline will result in your removal from the commencement list.

Graduate School Revisions

You must now make the revisions recommended by the Graduate School. If there is any doubt about a revision, check with the Graduate School again. This is also the appropriate time to take a copy of your manuscript to each of your advisory committee members to obtain their final approval of your thesis/dissertation, as reflected by their signature on your Certificate of Approval of Thesis/Dissertation.

Printing the Manuscript Master

Under no circumstances should you generate the two final copies from a printer. You must photocopy them from the manuscript master onto 25 percent cotton content, 20 pound paper. The surface of cotton paper is such that ink from nonimpact printers does not always adhere permanently. The general premise of most photocopying is a combination of heat and pressure which produces a stronger permanent bond of the ink or toner with the paper. Although some printers function in much the same way, neither the heat or pressure is sufficient to assure a permanent bond to 25 percent cotton paper. This is a potential problem of all nonimpact printers. The problem has been noted on various brands of cotton paper and with a variety of printers. In some cases there has been flaking on random pages or smearing of copy from pages rubbing against each other.

The printer quality should be sufficient to produce a smooth, high-contrast copy. The poor quality of low-density dot matrix print is not acceptable.

Copying

ou will find area copy shops that are familiar with the University's requirements concerning paper and copy quality. The cost of having copies made by local shops is reasonable, and you will save little money by buying your paper and doing your own copying. Professional shops are responsible for equipment malfunctions and should maintain a supply of 25 percent cotton paper.

All brands of 20 pound, 25 percent cotton paper are acceptable, but all pages, including the approval sheets and any outsize pages (11×17 inches), must be on the same brand. If you are an out-of-town student, you may wish to investigate copy shops in your location for comparison with those in this area. Often local shops will make arrangements to accept the master copy by mail, make the copies, and deliver them to the Graduate School for a fee.

Submission to Graduate School

Official Copies

The Graduate School must receive, by the date published in the Bulletin, two official copies of the thesis/dissertation, including the Certificate of Approval of Thesis/Dissertation with original signatures, on 20 pound 25 percent cotton paper in an 8.5×11 inch file folder. These two official copies will be hard-bound and placed in the Tennessee Technological University Library under arrangements made by the Graduate School. Doctoral students must provide one additional copy for microfilming by University Microfilms International of Ann Arbor, Michigan. This constitutes publication and makes the dissertation available to the public. Your department may require additional copies of your thesis/dissertation.

Additional Copies and Binding

You are also responsible for the reproduction of all other copies of the thesis/dissertation. Hard binding of these copies may be arranged through the Graduate School. Your major professor can help determine who expects to receive copies and how they should be bound.

Copyright

If the research work for your thesis or dissertation was supported in part by a contract or grant, you should check with your major advisor relative to any restrictions that might apply to copyrighting the material. After consultation with the chairperson of your advisory committee, you should decide whether or not to copyright the thesis to discourage unauthorized copying. If you decide to copyright, you must insert an extra page after the title page of each volume. Assign this page the number ii, but do not type the number on the page. Type and center the following information on the copyright page:

Registration of your thesis/dissertation document with the U.S. Copyright Office is optional. Once the copyright notice is placed in the document, it is fully protected by the Copyright Law; however, registration is a prerequisite to certain remedies for infringement.

In view of the University's Policy on Patents and Copyrights, with regard to thesis/dissertation support, you should consult the chairperson of your advisory committee before the copyright notice is placed in the document. A copy of the University Policy is available in the Office of Research.

Graduate School Final Check and Acceptance

After you have submitted the final copies to the Graduate School, that office will review your thesis/dissertation again for corrections made on any previous errors and will count the pages. When this review has been successfully completed, your thesis/dissertation will be approved.

Commencement

Commencement is a fitting culmination of your effort to obtain a graduate degree. Whatever the degree to be conferred, it marks an appropriate beginning.

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APPENDIX A

SAMPLE TABLES

Table A.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table A.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table A.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX B

SAMPLE TABLES

Table B.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table B.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
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Summer 1991	Walleye	10	12.2[a]	1.16
Fall 1991	Threadfin shad	39	4.4[a]	0.47
Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

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Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX C

SAMPLE TABLES

Table C.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

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	6.0	-1.04	-1.100	-.992	-1.000

Table C.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table C.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX D

SAMPLE TABLES

Table D.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table D.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
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Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table D.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX E

SAMPLE TABLES

Table E.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table E.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
Summer 1990	Alewife	816	12.5[b]	0.13
Summer 1990	Walleye	22	10.3[c]	0.62
Fall 1990	Threadfin shad	283	6.7[a]	0.29
Fall 1990	Alewife	447	9.0[b]	0.33
Fall 1990	Walleye	26	10.5[b]	0.96
Winter 1990	Threadfin shad	72	3.0[a]	0.34
Winter 1990	Alewife	395	7.3[b]	0.31
Winter 1990	Walleye	13	10.5[b]	1.63
Spring 1991	Threadfin shad	749	2.7[a]	0.07
Spring 1991	Alewife	689	4.5[b]	0.08
Spring 1991	Walleye	3	4.3[a]	1.67
Summer 1991	Threadfin shad	151	10.5[a]	0.13
Summer 1991	Alewife	1251	12.3[b]	0.09
Summer 1991	Walleye	10	12.2[a]	1.16
Fall 1991	Threadfin shad	39	4.4[a]	0.47
Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table E.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX F

SAMPLE TABLES

Table F.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table F.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
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Table F.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
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Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX G

SAMPLE TABLES

Table G.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table G.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
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APPENDIX H

SAMPLE TABLES

Table H.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

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		Lin Plate	Incremental Loading Method		
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Table H.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

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APPENDIX I

SAMPLE TABLES

Table I.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

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Table I.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

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Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX J

SAMPLE TABLES

Table J.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
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0.722	1.0	-.04	-.043	-.046	-.047
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	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table J.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
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Spring 1991	Threadfin shad	749	2.7[a]	0.07
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Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table J.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX K

SAMPLE TABLES

Table K.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table K.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table K.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX L

SAMPLE TABLES

Table L.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table L.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table L.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX M

SAMPLE TABLES

Table M.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table M.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
Summer 1990	Alewife	816	12.5[b]	0.13
Summer 1990	Walleye	22	10.3[c]	0.62
Fall 1990	Threadfin shad	283	6.7[a]	0.29
Fall 1990	Alewife	447	9.0[b]	0.33
Fall 1990	Walleye	26	10.5[b]	0.96
Winter 1990	Threadfin shad	72	3.0[a]	0.34
Winter 1990	Alewife	395	7.3[b]	0.31
Winter 1990	Walleye	13	10.5[b]	1.63
Spring 1991	Threadfin shad	749	2.7[a]	0.07
Spring 1991	Alewife	689	4.5[b]	0.08
Spring 1991	Walleye	3	4.3[a]	1.67
Summer 1991	Threadfin shad	151	10.5[a]	0.13
Summer 1991	Alewife	1251	12.3[b]	0.09
Summer 1991	Walleye	10	12.2[a]	1.16
Fall 1991	Threadfin shad	39	4.4[a]	0.47
Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table M.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX N

SAMPLE TABLES

Table N.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table N.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table N.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX O

SAMPLE TABLES

Table O.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table O.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
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Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table O.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX P

SAMPLE TABLES

Table P.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table P.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
Summer 1990	Alewife	816	12.5[b]	0.13
Summer 1990	Walleye	22	10.3[c]	0.62
Fall 1990	Threadfin shad	283	6.7[a]	0.29
Fall 1990	Alewife	447	9.0[b]	0.33
Fall 1990	Walleye	26	10.5[b]	0.96
Winter 1990	Threadfin shad	72	3.0[a]	0.34
Winter 1990	Alewife	395	7.3[b]	0.31
Winter 1990	Walleye	13	10.5[b]	1.63
Spring 1991	Threadfin shad	749	2.7[a]	0.07
Spring 1991	Alewife	689	4.5[b]	0.08
Spring 1991	Walleye	3	4.3[a]	1.67
Summer 1991	Threadfin shad	151	10.5[a]	0.13
Summer 1991	Alewife	1251	12.3[b]	0.09
Summer 1991	Walleye	10	12.2[a]	1.16
Fall 1991	Threadfin shad	39	4.4[a]	0.47
Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table P.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX Q

SAMPLE TABLES

Table Q.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table Q.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
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Fall 1991	Walleye	10	10.1^{c}	0.77

Table Q.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX R

SAMPLE TABLES

Table R.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table R.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table R.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX S

SAMPLE TABLES

Table S.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table S.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
Summer 1990	Alewife	816	12.5[b]	0.13
Summer 1990	Walleye	22	10.3[c]	0.62
Fall 1990	Threadfin shad	283	6.7[a]	0.29
Fall 1990	Alewife	447	9.0[b]	0.33
Fall 1990	Walleye	26	10.5[b]	0.96
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Winter 1990	Alewife	395	7.3[b]	0.31
Winter 1990	Walleye	13	10.5[b]	1.63
Spring 1991	Threadfin shad	749	2.7[a]	0.07
Spring 1991	Alewife	689	4.5[b]	0.08
Spring 1991	Walleye	3	4.3[a]	1.67
Summer 1991	Threadfin shad	151	10.5[a]	0.13
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Fall 1991	Threadfin shad	39	4.4[a]	0.47
Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table S.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX T

SAMPLE TABLES

Table T.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table T.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
Summer 1990	Alewife	816	12.5[b]	0.13
Summer 1990	Walleye	22	10.3[c]	0.62
Fall 1990	Threadfin shad	283	6.7[a]	0.29
Fall 1990	Alewife	447	9.0[b]	0.33
Fall 1990	Walleye	26	10.5[b]	0.96
Winter 1990	Threadfin shad	72	3.0[a]	0.34
Winter 1990	Alewife	395	7.3[b]	0.31
Winter 1990	Walleye	13	10.5[b]	1.63
Spring 1991	Threadfin shad	749	2.7[a]	0.07
Spring 1991	Alewife	689	4.5[b]	0.08
Spring 1991	Walleye	3	4.3[a]	1.67
Summer 1991	Threadfin shad	151	10.5[a]	0.13
Summer 1991	Alewife	1251	12.3[b]	0.09
Summer 1991	Walleye	10	12.2[a]	1.16
Fall 1991	Threadfin shad	39	4.4[a]	0.47
Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table T.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX U

SAMPLE TABLES

Table U.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table U.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6[a]	0.08
Summer 1990	Alewife	816	12.5[b]	0.13
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Fall 1991	Alewife	66	6.3[b]	0.48
Fall 1991	Walleye	10	10.1[c]	0.77

Table U.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX V

SAMPLE TABLES

Table V.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table V.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
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Winter 1990	Walleye	13	10.5[b]	1.63
Spring 1991	Threadfin shad	749	2.7[a]	0.07
Spring 1991	Alewife	689	4.5[b]	0.08
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Summer 1991	Alewife	1251	12.3[b]	0.09
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Fall 1991	Threadfin shad	39	4.4[a]	0.47
Fall 1991	Alewife	66	6.3[b]	0.48
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Table V.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
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Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX W

SAMPLE TABLES

Table W.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
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	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table W.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
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Table W.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

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Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
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Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX X

SAMPLE TABLES

Table X.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
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	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table X.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
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Summer 1991	Walleye	10	12.2[a]	1.16
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Fall 1991	Alewife	66	6.3[b]	0.48
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Table X.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
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Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX Y

SAMPLE TABLES

Table Y.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections Lin Plate	Incremental Loading Method 1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table Y.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
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Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
Spring 1991	Walleye	3	4.3^{a}	1.67
Summer 1991	Threadfin shad	151	10.5^{a}	0.13
Summer 1991	Alewife	1251	12.3^{b}	0.09
Summer 1991	Walleye	10	12.2^{a}	1.16
Fall 1991	Threadfin shad	39	4.4^{a}	0.47
Fall 1991	Alewife	66	6.3^{b}	0.48
Fall 1991	Walleye	10	10.1^{c}	0.77

Table Y.3: Meristic Characters used in Distinguishing Redeye Bass, Smallmouth Bass, and Meristic Hybrids from Roaring River, Tennessee, 1988

Meristic	*Micropterus coosae* $n = 32$ $x\pm$ SD (range)	Meristic Hybrids $n = 20$ $x\pm$ SD (range)	*Micropterus dolomieui* $n = 35$ $x\pm$ SD (range)
Lateral line scales	66.9 ± 2.6 (61–71)	71.4 ± 1.6 (70–75)	74.1 ± 2.4 (69–79)
Scales above lateral line	8.7 ± 0.5 (8–10)	9.9 ± 1.0 (8–12)	11.8 ± 0.7 (11–13)
Scales below lateral line	15.9 ± 1.8 (11–19)	17.5 ± 2.4 (13–21)	21.8 ± 2.4 (14–25)
Anal rays	10.1 ± 0.7 (9–12)	10.7 ± 0.7 (9–12)	11.1 ± 0.4 (10-12)
Pyloric cacea	10.8 ± 2.0 (7–17)	11.7 ± 0.7 (10–14)	11.1 ± 0.4 (10–16)
Meristic index	112.2 ± 3.7 (102–120)	119.1 ± 3.6 (115–125)	131.6 ± 4.2 (123–140)

Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

APPENDIX Z

SAMPLE TABLES

Table Z.1: Lin Plate and Incremental Loading Method Deflections Along Free Edge in Inches

Total Load (lbs)	Position X-axis (in)	Deflections			
		Lin Plate	Incremental Loading Method		
			1,49,72	10,49,72	20,169,288
0.722	1.0	-.04	-.043	-.046	-.047
	2.0	-.16	-.166	-.165	-.166
	3.0	-.36	-.349	-.331	-.333
	4.0	-.56	-.574	-.531	-.533
	5.0	-.78	-.828	-.753	-.757
	6.0	-1.04	-1.100	-.992	-1.000

Table Z.2: Means and standard errors of depths occupied by threadfin shad, alewife, and walleye in Dale Hollow Reservoir, Tennessee. Mean depths that share the same letter are not significantly different (Tukey's test; $P > 0.05$)

			DEPTH (m)	
SEASON	SPECIES	N	MEAN	SE
Summer 1990	Threadfin shad	2043	6.6^{a}	0.08
Summer 1990	Alewife	816	12.5^{b}	0.13
Summer 1990	Walleye	22	10.3^{c}	0.62
Fall 1990	Threadfin shad	283	6.7^{a}	0.29
Fall 1990	Alewife	447	9.0^{b}	0.33
Fall 1990	Walleye	26	10.5^{b}	0.96
Winter 1990	Threadfin shad	72	3.0^{a}	0.34
Winter 1990	Alewife	395	7.3^{b}	0.31
Winter 1990	Walleye	13	10.5^{b}	1.63
Spring 1991	Threadfin shad	749	2.7^{a}	0.07
Spring 1991	Alewife	689	4.5^{b}	0.08
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Source: William D. Crumby, "Growth Dynamics of an Introduced Population of Redeye Bass in a North-Central Tennessee Stream." Master of Science Thesis in Biology, Tennessee Technological University, August 1987.

VITA

John W. Buck was born in Orlando, Florida, on July 21, 1961. He attended elementary schools in the Orange County School District and graduated from Apopka High School with honors in June 1978. The following August he entered University of Florida and in August 1982 received the degree of Bachelor of Science in Electrical Engineering. He entered Georgia Institute of Technology in January 1983 and received a Master of Science degree in Electrical Engineering in August 1984. He entered Tennessee Technological University in August 1985 and is a candidate for the Doctor of Philosophy Degree in Engineering.