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National Park Service
U.S. Department of the Interior



Natural Resource Program Center

Instructions to Authors – Natural Resource Report and Natural Resource Technical Report

Version 2.2

Natural Resource Report NPS/NRPC/NRR—2006/001



ON THE COVER

Reflection in a pothole at Arches National Park

NPS Photo

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National Park Service
Natural Resource Program Center
1201 Oak Ridge Drive, Suite 150
Fort Collins, CO 80525

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U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

The Natural Resource Publication series addresses natural resource topics that are of interest and applicability to a broad readership in the National Park Service and to others in the management of natural resources, including the scientific community, the public, and the NPS conservation and environmental constituencies. Manuscripts are peer-reviewed to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and is designed and published in a professional manner.

Natural Resource Reports are the designated medium for disseminating high priority, current natural resource management information with managerial application. The series targets a general, diverse audience, and may contain NPS policy considerations or address sensitive issues of management applicability. Examples of the diverse array of reports published in this series include vital signs monitoring plans; monitoring protocols; "how to" resource management papers; proceedings of resource management workshops or conferences; annual reports of resource programs or divisions of the Natural Resource Program Center; resource action plans; fact sheets; and regularly-published newsletters.

Views, statements, findings, conclusions, recommendations and data in this report are solely those of the author(s) and do not necessarily reflect views and policies of the U.S. Department of the Interior, National Park Service. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the National Park Service.

Printed copies of reports in these series may be produced in a limited quantity and they are only available as long as the supply lasts. This report is also available from the Natural Resource Publications Management Web site (<http://www.nature.nps.gov/publications/NRPM>) on the Internet, or by sending a request to the address on the back cover.

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Change History

Version numbers will be incremented by a whole number (e.g., Version 1.3 to Version 2.0) when a change is made that significantly affects requirements or procedures. Version numbers will be incremented by decimals (e.g., Version 1.6 to Version 1.7) when there are minor modifications that do not affect requirements or procedures included in the plan.

The following revisions have occurred to this plan since September 11, 2007

Version #	Date	Revised by	Changes	Justification
2.2	12/30/2008	J. Bennett	Layout adjustment, slight adjustment to procedures, updates to Exhibits C,E,F,L,M	More accurately reflect procedures and conform to formatting standards

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Executive Summary

This report describes manuscript preparation and submittal procedures and style/formatting guidelines for manuscripts submitted to the National Park Service's Natural Resource Report (NRR) and Natural Resource Technical Report (NRTR) national series. Manuscripts must adhere to a set of minimum standards and are peer-reviewed to ensure that information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. The manuscript and production standards described in this report apply to all contributors to the national series, including contractors and cooperators, and the same procedures and standards are required for reports that will be distributed primarily via the Internet as well as those distributed by printed copies. If an NPS region publishes a regional series they are encouraged to adopt the standards in full for their regional series, but each region may develop more specific guidance tailored to their unique organizational structure. The complete set of authorities, references, procedures, and standards for the preparation, printing, and dissemination of publications in the NPS series is contained in the Natural Resource Publications Management Handbook.

Publication in the NRR and NRTR series is overseen by NPS Key Officials who are designated by the Associate Director for Natural Resource Stewardship and Science for the national series, and the Regional Director for regional series. Regional series address natural resource topics that are of interest and applicability to a specialized or limited geographical readership in the National Park Service and to others charged with managing natural resources, and may feature preliminary data and results of study or summaries of ongoing study for rapid dissemination to park managers. The NPS Key Official oversees the process, but most of the responsibility for using the correct format/style and incorporating comments from peer reviewers is assumed by the contributors (authors) since the NPS does not have the funding to hire editors for the series. The contributor bears any costs for printing and distribution of the reports. The majority of reports are distributed via the Internet.

Step-by-step instructions, examples, and templates for preparing, submitting, and publishing reports in these two series are available on the Natural Resource Publications Management Web site at <http://www.nature.nps.gov/publications/NRPM>. To facilitate the preparation and peer review of draft manuscripts, and the timely publishing of routine scientific reports over the Internet, the minimum style/formatting standards and templates described in these Instructions to Authors use readily-available fonts and minimal formatting that do not require desktop-publishing skills. For reports that will be printed and distributed by hardcopy, however, or for which a large readership is expected, contributors should produce a final report using Frutiger and NPS Rawlinson fonts that is consistent with the "Communicating the National Park Service Mission" design standards and Director's Order 52. Instructions, examples and templates that will be occasionally updated to reflect current "best practices" are available on the [Natural Resource Publications Management Web site](#) to assist contributors with the final design and layout steps.

A summary of the process for publishing in the NRR and NRTR series, which is described more fully in this report, is as follows:

- a. Contributor prepares draft manuscript following style/formatting guidelines outlined in these Instructions to Authors (use of templates posted on the [NRPM Web site](#) is highly recommended), and obtains initial peer reviews by qualified reviewers. Contributor makes initial determination whether material is appropriate for the NRR or the NRTR series.
- b. After making revisions recommended by peer reviewers, contributor submits draft manuscript and the [NRPM Manuscript Submittal Form and Checklist](#) via email to the region's Key Official or their delegate.
- c. The NPS Key Official determines whether or not additional peer review is necessary based on the manuscript content and the quality of the initial reviews, and if deemed appropriate, arranges for and oversees additional peer review. The NPS Key Official determines whether or not a Management Review is necessary, and if so, selects an appropriate reviewer who can verify consistency with NPS policy or clear and appropriate relation to NPS policy, and that appropriate treatment is given to sensitive data or issues.
- d. Once the Key Official is satisfied that reviewer comments have been adequately incorporated and the report meets the minimum standards for the series, the report is approved for publication in one of the series. The contributor then requests a report number and NPS Technical Information Center (TIC) reference number from the Natural Resources Program Center (NRPC) office in Fort Collins (following the guidance on the [NRPM Web site](#)). At this time the contributor also submits the draft report for a review to make sure the report meets the minimum formatting requirements.
- e. Once the report numbers are added and review comments addressed, the contributor produces a PDF (portable document format) version of the publication, enters the citation into the NatureBib national database, and uploads the report to NatureBib.

If the report will be printed and distributed by hardcopy, or if a large readership is expected, contributors produce a final report that is consistent with the "Communicating the National Park Service Mission" design standards following the instructions, examples, and templates available on the [NRPM Web site](#). The preferred alternative for final reports uses a two and one half-column layout with Frutiger and NPS Rawlinson fonts.

1 - Introduction

This report describes manuscript preparation and submittal procedures and style/formatting guidelines for manuscripts submitted to the National Park Service's Natural Resource Report (NRR) and Natural Resource Technical Report (NRTR) national series. Manuscripts must adhere to a set of minimum standards and are peer-reviewed to ensure that information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. The manuscript and production standards described in this report apply to all contributors to the national series, including contractors and cooperators, and the same procedures and standards are required for reports that will be distributed primarily via the Internet as well as those distributed by printed copies. If an NPS region publishes a regional series they are encouraged to adopt the standards in full for their regional series, but each region may develop more specific guidance tailored to their unique organizational structure. The complete set of authorities, references, procedures, and standards for the preparation, printing, and dissemination of publications in the NPS series is contained in the Natural Resource Publications Management Handbook.

Publication in the NRR and NRTR series is overseen by NPS Key Officials who are designated by the Associate Director for Natural Resource Stewardship and Science for the national series, and the Regional Director for regional series. Regional series address natural resource topics that are of interest and applicability to a specialized or limited geographical readership in the National Park Service and to others charged with managing natural resources, and may feature preliminary data and results of study or summaries of ongoing study for rapid dissemination to park managers. The NPS Key Official oversees the process, but most of the burden for using the correct format/style and incorporating comments from peer reviewers is assumed by the contributors (authors) since the NPS does not have the funding to hire editors for the series. The contributor bears any costs for printing and distribution of the reports. The majority of reports are distributed via the Internet.

Instructions, examples and templates that will be occasionally updated to reflect current "best practices" are available on the [Natural Resource Publications Management Web site](#) to assist contributors with the final design and layout steps. To facilitate the preparation and peer review of draft manuscripts, and the timely publishing of routine scientific reports over the Internet, the minimum style/formatting standards and templates use readily-available fonts and minimal formatting that do not require desktop-publishing skills. For reports that will be printed and distributed by hardcopy, however, or for which a large readership is expected, contributors should produce a final report using Frutiger and NPS Rawlinson fonts and a 3-column layout that is consistent with the "Communicating the National Park Service Mission" design standards and Director's Order 52. Instructions, examples and templates are available on the [Natural Resource Publications Management Web site](#) to assist contributors with the final design and layout steps.

2 - Procedures for Submitting and Publishing Reports

Step 1. Contributor prepares draft manuscript following style/formatting guidelines outlined in this report (use of templates posted on the [NRPM Web site](#) is highly recommended), and obtains peer reviews by at least two (and preferably three) qualified reviewers. Contributor makes initial determination whether material is appropriate for the NRR or NRTR series. The difference between these series are as follows:

Natural Resource Reports are the designated medium for disseminating high priority, current natural resource management information with managerial application. The series targets a general, diverse audience, and may contain NPS policy considerations or address sensitive issues of management applicability. Examples of the diverse array of reports published in this series include vital signs monitoring plans; monitoring protocols; "how to" resource management papers; proceedings of resource management workshops or conferences; annual reports of resource programs or divisions of the Natural Resource Program Center; resource action plans; fact sheets; and regularly-published newsletters.

The Natural Resource Technical Reports series is used to disseminate the peer-reviewed results of scientific studies in the physical, biological, and social sciences for both the advancement of science and the achievement of the National Park Service's mission. The reports provide contributors with a forum for displaying comprehensive data that are often deleted from journals because of page limitations. Current examples of such reports include the results of research that addresses natural resource management issues; natural resource inventory and monitoring activities; resource assessment reports; scientific literature reviews; and peer reviewed proceedings of technical workshops, conferences, or symposia.

Step 2. After making revisions recommended by the qualified peer reviewers, contributor submits draft manuscript and the [NRPM Manuscript Submittal Form and Checklist](#) via email to one of the NPS Key Officials listed on the NRPM Web site. The submittal form should (1) briefly describe why the material is appropriate for the Natural Resource Report series, (2) identify the initial peer reviewers and the process by which peer review comments were or were not incorporated into the revised manuscript, and (3) identify whether or not the manuscript includes any sensitive or commercially-valuable information that may potentially jeopardize a park resource, any material that might not be consistent with NPS policy, or any other material that might require a Management Review.

Step 3. The NPS Key Official determines whether or not additional peer review is necessary based on the manuscript content and the quality of the initial reviews, and if deemed appropriate, arranges for and oversees additional peer review. Reviewers may or may not be incumbents of the National Park Service, and may or may not be anonymous. The NPS Key Official determines whether or not a Management Review is necessary, and if so, selects an appropriate reviewer who can verify consistency with NPS policy or clear and appropriate relation to NPS policy and that appropriate treatment is given to sensitive issues. The reviewers are instructed to provide their comments to the NPS Key Official.

Step 4. The NPS Key Official reviews the peer reviewer comments and forwards them to the contributor.

Step 5. The contributor revises the manuscript in accordance with the recommendations by the peer reviewers. If the recommendations are not appropriate, the contributor provides a written justification for not making the revisions. The contributor forwards the revised manuscript and comments to the NPS Key Official.

Step 6. The NPS Key Official determines whether the contributor made the requested revisions or provided satisfactory written justification for not making revisions, and if so, gives the contributor approval to obtain the next number in the national series.

Step 7. The contributor obtains the next number in the national series and the NPS Technical Information Center (TIC) reference number by request to the Natural Resources Program Center (NRPC) office in Fort Collins and submitting a draft copy of the report. The contributor includes these numbers on the cover and title page of the publication, incorporates formatting comments by NRPC staff, and creates a PDF (portable document format) version of the file. The contributor enters the record into [NatureBib](#), uploads a copy of document to NatureBib, and emails the NRPC contact with the NatureBib Bibkey and URL.

For reports that will be printed and distributed by hardcopy, or for which a large readership is expected, contributors should produce a final report using Frutiger and NPS Rawlinson fonts that is consistent with the “Communicating the National Park Service Mission” design standards and Director’s Order 52. Instructions, examples and templates are available on the [Natural Resource Publications Management Web site](#) to assist contributors with the final design and layout steps. Special software and training may be needed for this option.

2.1 Series and Reference Numbers

The report numbering system for all Natural Resource national and regional series is a modification of the American National Standard Technical Report Numbering (STRN) System. The intent of the numbering system is (1) the facilitation of reference and ordering, (2) the generation of lists of reports by number without confusion or apparent duplication for indexing services, (3) the identification, location, and organization of the literature for libraries, and (4) efficient and accurate citing of material. The numbers for national series publications are to be obtained from the NPS Key Official through use of the Natural Resource Publications Management Web site. The format and examples of the series numbers are as follows:

2.1.1 National Series Numbers

NPS/xxxx/yyyy/zzzz—2006/002

NPS - Agency

xxxx – Originating office, park, or network

yyyy – Optional subdivision of Originating Office if desired

zzzz – NRR or NRTR depending on which report series is used, followed by an em-dash

2006 - Year

2 - Sequential Number of report series

Examples:

NPS/NRPC/NRR—2005/002 (report by the NRPC that applies to all divisions)

NPS/NRPC/ARD/NRTR—2005/002 (report by one of the NRPC divisions)

NPS/SODN/NRR—2006/010 (report by an I&M network in the national series)

NPS/SHEN/NRTR—2005/002 (report by a park in the national series)

2.1.2 Regional Series Numbers (Check with Regional Office to confirm system)

NPS/xxx/yyyy/zzzz—2006/002

NPS - Agency

xxx – Region code: AKR, PWR, IMR, MWR, NER, NCR, or SER

yyyy – Park or network 4-character alpha code

zzzz – NRR or NRTR depending on which report series is used, followed by an em-dash

2006 - Year

2 - Sequential Number of report series

Examples:

NPS/IMR/SODN/NRR—2006/010 (report by an I&M network in the regional series)

NPS/NER/SHEN/NRTR—2005/002 (report by a park in the regional series)

NPS/NER/NRR—2005/012 (report originated by a regional office)

2.1.3 NPS (TIC) Reference Number

The NPS Reference Number is the system number for filing, archiving, and requesting natural resources national and regional series at the Technical Information Center (TIC), Denver. An example of an NPS reference number is D-233. Contributors will obtain this number along with the series number from the NRPC office in Fort Collins. The NPS Reference Number must appear on the back side of the title page, and on the inside back cover of national publications.

3 - General Format and Style Requirements

A full description of format and style requirements and the preferred spelling list for the Natural Resource Publication Series is available in the [Style Guide for Natural Resource Publications](#). A subset of information provided in the Style Guide is included here.

3.1 Typing

- Submit all reports double-sided on 8 1/2 " x 11 " white bond paper, as either a Microsoft Word or PDF file, as required by the contract or agreement.
- In Microsoft Word, use the template provided on the [NRPM website](#) to prepare the manuscript to ensure proper format and style. Adobe InDesign templates are also available and formatting standards are slightly more flexible.
- Maintain 1" margins top, bottom, left, and right throughout document.
- To facilitate the preparation and peer review of the draft report, use Times New Roman 12 pt font throughout, except for headings and some tables, and avoid bolding text except for headings.
- Start all First Order Heading sections on a new, right-hand, odd-numbered page, except in the case where the entire report (with covers, etc.) is less than 15 pages and it makes better sense to continue First Order Heading sections on the same page.
- Use Title Case (i.e., first letter of all words capitalized except articles, prepositions and conjunctions) for all section headings.
- Format paragraphs flush left with no left indentation on the first line.
- Paragraphs should be single-spaced; double space between paragraphs.
- Do not hyphenate whole words at the end of a line; instead use an unjustified (ragged) right margin.
- Use one space after periods and colons.
- Pagination: number all pages sequentially centered at the bottom of the page:
 - The initial sections (title page, Table of Contents, list of Figures, Tables, and/or Appendixes, Abstract, Summary, and Acknowledgments) should be numbered sequentially using lower case Roman numerals (i, ii, iii). Pagination begins on the title page, but actual page numbering first appears on the back of the title page with Roman numeral ii.
 - The main body of the report (beginning with the Introduction and including the Appendixes) must be numbered sequentially using Arabic numerals (1, 2, 3).
 - Blank, left-hand, pages are to be counted but are not to be numbered (blank pages are blank pages).
- The order of brackets and related symbols is: ([{}]).
- Hyphenation: generally, use a hyphen between two or more words combined to form a modifier preceding the word modified, except when the first word ends in "ly".
- In general, use the "-ic" not the "-ical" ending for adjectives (e.g., geologic, hydrologic). However, use "biological" and "nongovernmental," as well as U.S. "Geological" Survey.
- Use the following styles for section headings:

3.2 First Order Header

flush left, Arial 16 pt, bold, follow by double space

3.3 Second Order Header

flush left, Arial 12 pt, bold, text starts on next line, unless followed by Third Order Heading- then double space

3.4 Third Order Header

flush left, Arial 12 pt, bold, italics, text starts on next line, unless followed by Fourth Order Heading- then double space

Fourth Order Header: flush left, Times New Roman 12 pt, colon, two spaces, begin text on same line.

Fifth Order Header: flush left, italicize, colon, one space, unitalicize, begin text (same line)

3.5 Figures and Tables

- Figures should be self-explanatory (easy to understand or follow) when viewed in shades of gray (black and white); use color only when absolutely necessary to display detail.
- Figures and tables must have brief descriptive captions; font size should be the same as the text in the body of the report (Times New Roman 12 pt). See Exhibits A and B.
- Figure numbers and captions should be below the figure and left aligned.
- Table numbers and captions should be above the table and left aligned.
- Explanatory information and keys to symbols should be placed in the figure legend or as a table footnote at the bottom of the table.
- The caption, headings, legend, and footnotes must contain all the information the reader needs to understand a figure or table without referring to the text. If line drawings and artwork are necessary, they must be in high-contrast black and white and of a professional reproducible quality.
- Small figures and tables may be placed on the same page as the text that refers to them. Larger figures and tables should be on their own numbered page immediately following the page (double-sided) on which they are first referenced in the text.
- Use sentence case for all figure and table captions; begin entries with a capitalized label (Figure or Table) followed by a space, then a number, then a period, then a space, and then the caption, followed by a period (e.g., Figure 1. Map of survey area. [or] Table 21. Estimated larvae in survey area.). If the caption is more than one line, additional lines start flush left. See Exhibits A and B.
- Figures and tables, respectively, are numbered sequentially with Arabic numerals in the order of their presentation in the text, i.e., Figure 1., Figure 2., Table 1., Table 2., etc.
- Every figure and table must be cited in the text.
- For figures and tables which are more than one page, repeat the figure or table number and caption followed by "(continued)." in parentheses, for each additional page.

3.5.1 Tables:

- There should be one blank line space between the table caption and the body of the table / first heading row.
- Font size within the actual table is generally at least one font size smaller than the text in the body of the report; exact size depending on amount of information in table.
- Numerical data in columns should be aligned with decimal tabs at equivalent places.

Column headings:

- Horizontal lines are typically placed above and below the column headers and below the last table row.
- Column headings should be left-aligned over text columns, centered over numerical data.
- Include column headings on second and succeeding pages if a table runs onto more than one page. Header rows should be defined so that headers will repeat when tables break over more than one page.

Stub (or row) headings:

- Left-align, using sentence-style capitalization.
- Subcategories should be indented slightly.
- When the word "total" appears at the foot of a stub it is often indented more deeply than the greatest indentation or otherwise distinguished typographically.

3.6 Citing Literature within the Body of the Report

- Follow the style used by the journal *Ecology*, which uses the author and year system for citing literature references in the text. If you wish to mention the author in your discussion say, for example, "Wakeley (1954) reported that...". Otherwise, place the author and year [e.g., (Wakeley 1954)] within or at the end of your statement.
- Separate citations of works by different authors in one set of parentheses with semicolons [e.g., (Wakeley 1954; McManus 1957)]; multiple works within one set of parenthesis are to be listed chronological, not alphabetical.
- Separate several cited works by the same author with commas (Hackett 1970, 1972a, 1972b) and list them chronological.
- When a cited work has two authors, list both [e.g., (Yahner and Mahan 2003)].
- When a cited work has three or more authors, list the first author et al. and year [e.g., (Yahner et al. 2002)].
- In-text literature citations of personal communications should include the following, in order: agency or organization (if any), name of individual and job title, type of communication (phone conversation, interview, or use "pers. comm." if you don't know), and date. Personal communications should not be listed in the Literature Cited section of the report.

3.7 Measurement Units

- You may use English or metric (SI) units, but be consistent throughout the manuscript. Equivalents are not required but are helpful to many readers. In text, put the equivalents in parentheses immediately after the units. "The study area size was 3 ha (7.4 acres)."

- Use abbreviated standard units of measure when with a numeral; units of measure are to be spelled out if no quantity is given (e.g., “10 m” or “Tree height was measured in meters”).
- Retain only the final unit of measure in a series (e.g., 10 to 15 kg).
- Use “/” for ratios with numbers (8 deer/ha); use “per” without numbers (At Valley Forge National Park the number of deer per hectare was greater than ...).

3.8 Numbers

- Numbers from zero through nine are spelled out unless they accompany a unit of measure.
- Spell out a numeral at the beginning of a sentence regardless of any inconsistency this may create, or rewrite the sentence.
- Ordinal numbers follow the same rules as cardinal numbers (i.e., first, ninth, 10th, 11th).
- Physical measurements (length, width, distance, area, volume, decimals, percentages, degrees, symbols, latitude/longitude, fractions greater than one) and time (days, years) are always expressed as numerals.
- When two numerals appear together (usually in compound modifiers), spell out one or recast the sentence (e.g., We needed 30 eight-cent stamps, *not* 30 8-cent stamps).
- When using symbols (e.g., <, =, >, %, ≤, ≥), do not include a space between the symbol and the number (e.g., <22, ≤50, 98%).

3.9 Taxon Names

- The NPS has adopted ITIS (Integrated Taxonomic Information System) as its standard for taxonomy and nomenclature, and all scientific names should follow this standard. See <http://www.itis.usda.gov/index.html>.
- Use common species names of plants and animals, initially followed with scientific names parenthetically (beginning in the Introduction); thereafter, only the common name is necessary.
- If a large number of species are referred to in the text, a reference list of common and scientific names must be included as an Appendix.
- Common animal and plant names should be in lowercase except when a proper name is part of the common name (e.g., alpine forget-me-not, American dipper, golden-mantled squirrel, ponderosa pine, Douglas fir).
- Abbreviations for species: sp. is singular; spp. is plural.

3.10 Copyright

- Authors are responsible for obtaining written permission for use of any copyrighted figures, tables, graphs, and information.

3.11 Errors

- Authors are responsible for conducting an editorial review of the draft report to ensure: clarity; proper grammar, spelling, and punctuation; accuracy and completeness of all numbers, tables, figures, and references; and adherence to these format and content guidelines.

4 - Content Guidelines

The following list provides a general outline of first order headings for most reports in the Natural Resource Technical Report series, and the list provides a guide for other reports in which the text sections vary. Each first order heading must begin on a new right hand page, unless report is short (ca. 15 pages or fewer). These headings may vary or others may be added, but their order should approximate the following:

- Outside Front Cover [see Exhibit C]
- Inside Front Cover [see Exhibit D]
- Title Page (Front) [see Exhibit E]
- Title Page (Back) [see Exhibit F]
- Table of Contents [see Exhibit G]
- Figures [if applicable; see Exhibit H]
- Tables [if applicable; see Exhibit I]
- Appendixes [if applicable; see Exhibit J]
- Abstract or Executive Summary
- Acknowledgments [optional]
- Introduction
- Study Area
- Methods
- Results
- Discussion
- Conclusions
- Literature Cited [see Exhibit K]
- Appendixes [if applicable]
- Inside Back Cover [see actual inside back cover of this report]
- Outside Back Cover [see actual back cover of this report]

4.1 Front Cover

The investigator will be provided with an electronic template containing the front cover, title page, and back cover. The report title, report series and number, and a digital photograph representing some facet of the study must be inserted on the outside front cover. A photograph description and credit must be entered on the bottom of the inside front cover. These items must be located in the positions as shown in Exhibits C and D. The national series is published by the Natural Resource Program Center, and the banner on the front cover must follow the template and read Natural Resource Program Center to maintain consistency across reports in the series.

4.2 Title Page

The report title, report series and number, authors and affiliations, and final report date (month and year that the approved final report is submitted to the NPS) must be inserted in the proper locations on the front of the title page in the template provided by the NPS (Exhibit E). On the back of the title page, the contract or agreement numbers must be inserted in the fifth paragraph, the NPS Technical Information Center (TIC) reference number must be inserted in the sixth paragraph, the report's citation must be inserted at the end of the material, and the NPS TIC

reference number and final report date must be inserted (left aligned) in the bottom line of the page. Again, all entries must be located in the positions as shown in Exhibit F. Pagination begins on the title page, but actual page numbering first appears on the back of the title page with Roman numeral ii.

4.3 Table of Contents

Include a table of contents listing all following first and second order section headings (third order + optional) contained in the report (Exhibit G).

- The Table of Contents will begin on a right-hand, odd-numbered page, beginning with Roman numeral iii.
- Use Title Case on all Table of Contents entries.
- Double-space entries.
- Indent Second Order Headings from First Order Headings (either 0.33 or 0.5 inches).
- A space followed by a line of dots followed by a space should proceed from the last word of each entry to a right aligned page number.
- Allow page numbers to “stand alone” on the right side of the page by spreading longer entries to additional lines, making sure that each additional line of the entry is indented to the same starting point as the first word of the entry.
- Repeat the heading [i.e., Contents] followed by “(continued)” in parentheses at the top for each additional page of the Table of Contents.

4.4 Lists of Figures, Tables, and Appendixes

Include lists of Figures, Tables, and/or Appendixes, as needed. Note either Appendixes or Appendices is acceptable. Each of these lists must begin on a new, right-hand, odd-numbered (Roman numerals) page as a first order section (Exhibits H, I, and J), unless report is short or there are very few figures, tables, and appendixes.

- Double-space entries.
- Use sentence case (i.e., capitalize only the first letter of the first word and any proper nouns) for captions of Figures, Tables, and Appendixes.
- Begin entries with a capitalized label (Figure, Table, or Appendix) followed by a space, then a number (for figures and tables) or capitalized letter (for Appendixes), then a period, then two spaces, then a caption (e.g., “Figure 1. Map of survey area”, “Table 21. Estimated larvae in survey area”, or “Appendix G. Checklist of butterfly species”).

A space followed by a line of dots followed by a space should proceed from the last word of each title to a right aligned page number.

- Allow page numbers to “stand alone” on the right side of the page by spreading longer captions to additional lines, making sure that each additional line of the caption is left aligned and maintains a right indent of one inch.
- If there is only one Appendix, do not include a list of Appendixes page; list it as the last entry in the Table of Contents as Appendix with no letter afterward, only the caption.
- Repeat the heading (e.g., List of Figures) followed by “(continued)” in parentheses at the top and centered for each additional page of the list.

4.5 Abstract or Executive Summary

Some reports contain both an Abstract and an Executive Summary, but the typical approach is for short reports to include an Abstract and long reports to include an Executive Summary.

The abstract should briefly but concisely identify the objectives, methods, principle results, and major conclusions. The purpose is to allow readers to determine whether the information is useful to them. Use scientific names of major organisms. The recommended length is the shorter of 250 words or 3% of the length of the report.

The Executive Summary should be a “stand alone” section that summarizes the prominent facts discussed in the report and the conclusions reached in relation to study objectives. It should be as brief as possible, yet cover the subject in a clearly written, non-technical style so that, on its own, this section tells the reader what the project was about and what conclusions were made. This section is often removed from the report and used by the park Superintendent to inform legislators, public individuals and organizations, and NPS park, regional, and Washington Office staff of the completion and results of the study.

4.6 Acknowledgments (optional)

Briefly acknowledge those who directly helped with research or writing. Acknowledgments of typists, illustrators, editors, and referees may be included, but generally are discouraged. Use only forename initials with surname and do not include professional titles or academic degrees.

4.7 Introduction

The introduction should include the hypotheses and purpose of the investigation, study objectives, conditions under which the study was conducted, the general plan of treatment of the subject, and summary of previous work accomplished (literature review) that relates to the project.

4.8 Study Area

Provide a concise narrative description and justification of the study area(s) for the research. Include a detailed map of the study area(s) for further clarity.

4.9 Methods

Present a detailed explanation of the methods, materials, and analytical techniques that were used in the field, laboratory, and office during the study. Describe how, when, where, and by whom the data were acquired for the investigation. The methods should be documented so that the investigation could be exactly repeated, if necessary. Be sure to include how data were analyzed and what statistical tests were employed. Describe the process used for determining whether the data met the data quality objectives and, if not, what corrective actions were taken. Detailed information about QA/QC procedures for data collection, verification, and validation should be placed in an appendix if it is too lengthy and detracts from the main body of the text.

4.10 Results

In a logical sequence, present, in detail, the findings of the study that either support or provide evidence against the hypotheses or that answer the question(s) presented in the “Introduction.”

Basic descriptive statistics (sample size, percentages, mean, median, maximum, and minimum) are appropriate when clearly presented. Avoid technical discussions of complex statistical testing; instead refer readers who may be interested in this type of information to an appendix.

4.11 Discussion

This section and the “Conclusions” section are the most important parts of the report. Present a clear interpretation of the data that addresses the hypotheses, objectives, or purpose for which the study was conducted. Be sure to include how this research is applicable to the park(s) where it took place, and to other studies that have been conducted in that area of research. Other findings may be reported that would be of general interest to the scientific community.

4.12 Conclusions

Provide a specific and detailed summation of the conclusions of the research. In some instances, this is one of the few parts of the report that park managers will read. If the research was initiated due to specific park management needs, management implications should be emphasized and thoroughly discussed.

Recommendations regarding policy positions of the agency should not be included. If desired, recommendations of this nature should be covered in a special supplementary report separate from the scientific report.

4.13 Literature Cited

List all references cited in the report using the style described in Exhibit K and used by the journal *Ecology*.

- When part of the citation information is missing, skip to the next element (using the correct formatting punctuation), but make sure there is enough information for the reader to locate the reference. For example, skip report number if it is not available.
- Titles are written sentence style: only capitalize the first word in the title, first word in the subtitle, and proper names.
- Scientific names (i.e., species-specific names) in the title should be written in *italics*.
- When there is more than one author, include the word "and" before the last author's name.
- When the list of authors exceeds ten, only list the first ten and write *and others* for the balance.

4.14 Appendixes

Include supplementary materials (e.g., QA/QC procedures) that support the main body of the report.

- Each Appendix must begin on a new, right-hand, odd-numbered page.
- A single Appendix is labeled “Appendix”.
- If possible, the caption should appear on the same page(s) with the Appendix material.
- Appendixes are labeled sequentially with capitalized letters and a following period (e.g., Appendix A., Appendix B., et cetera), one space, followed by a brief, concise caption in sentence case at the top of the page, ending with a period, left-aligned.

- There should be one blank line space between the Appendix caption and the body of the Appendix.
- For Appendixes that are more than one page, repeat the caption at the top, followed by "(continued)." in parentheses, for each additional page.

Example:

Appendix A. Common and scientific names of herbaceous (forbs and grasses), shrub, tree and vine species identified during the study and presented in this report (continued).

4.15 Back Cover

The electronic template provided to the contributor also includes the back cover (Exhibits L and M). The only entry that needs to be made is the NPS TIC reference number and final report date (month and year) in the last line (left aligned) of the inside back cover page. The series is published by the Natural Resource Program Center in Fort Collins, Colorado, and the name, address, and website url listed on the template should be used to provide consistency across reports in the series.

5 - Layout, Design, and Publication of Final Reports

To facilitate the preparation and peer review of draft manuscripts, and the timely publishing of routine scientific reports over the Internet, the minimum style/formatting standards and templates described in these Instructions to Authors use readily-available fonts and minimal formatting that do not require desktop-publishing skills. For reports that will be printed and distributed by hardcopy, however, or for which a large readership is expected, contributors should produce a final report using Frutiger and NPS Rawlinson fonts that is consistent with the “Communicating the National Park Service Mission” design standards and Director’s Order 52 after they have been approved for publication and dissemination by the NPS Key Official. Consistent use of the arrowhead, black band, the “Experience Your America” tagline, and typography will give the final reports a clearly recognizable NPS identity.

Step-by-step instructions, templates, and examples of professional-looking final reports are available on the NRPM Web site at (<http://www.nature.nps.gov/publications/NRPM>). Instructions for downloading and installing the NPS Rawlinson and Frutiger typefaces to be used in final reports are also available on the Web site. The preferred layout for final reports uses a two and one half-column layout with NPS Rawlinson and Frutiger fonts as shown in the examples, although for some reports a two-column layout may be appropriate.

Exhibit A. Example of a figure and figure caption, which is placed on a separate page from the text.

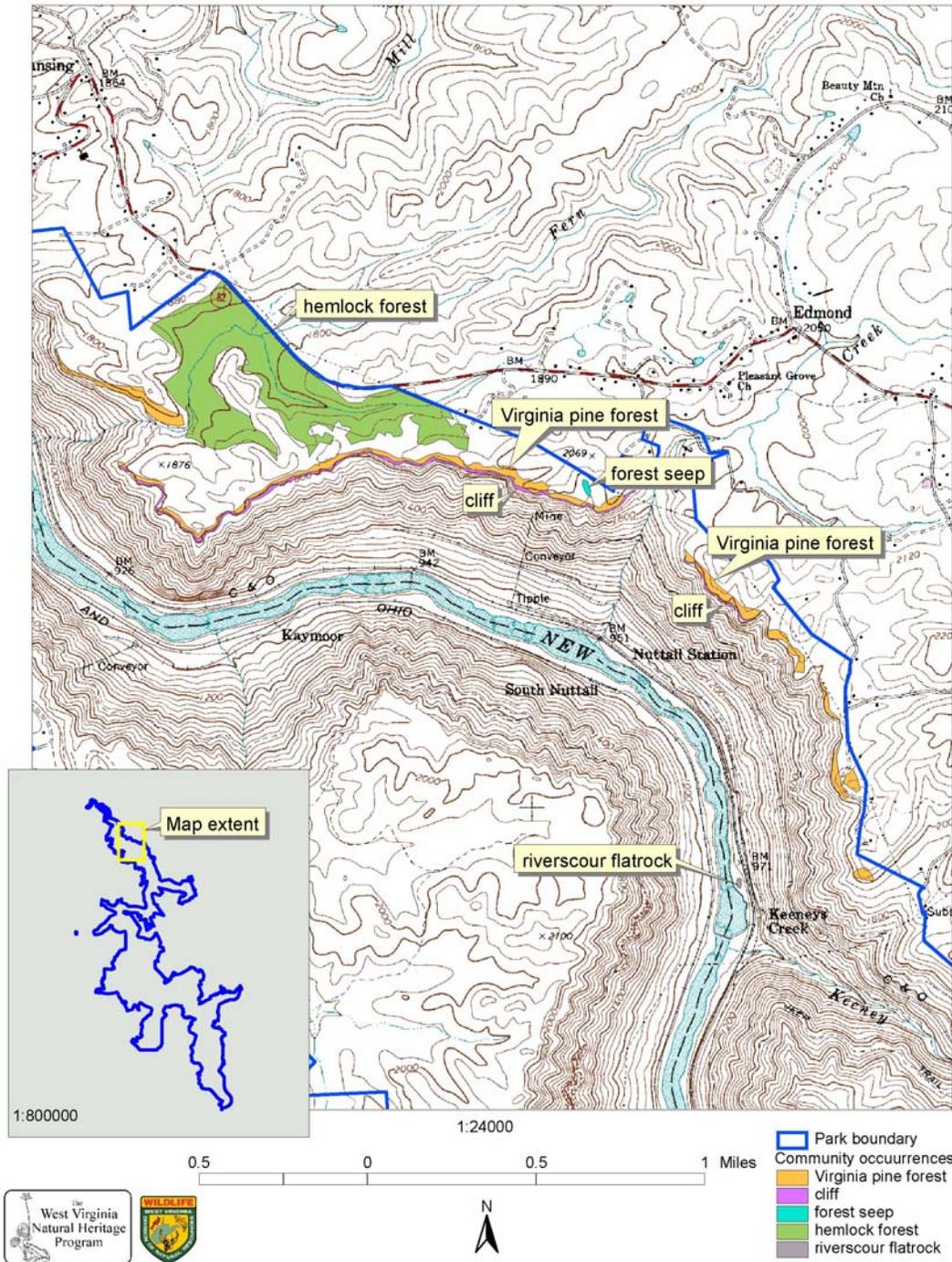


Figure 1. Map depicting the locations of cliffs, forest seep, hemlock forest, riverscour flatrock, and Virginia pine forests within the northern-most section of the park boundary.

Exhibit B. Example of a table and table caption, showing how to format a table that continues onto a second page.

Table 8. Vertebrates (excluding birds) and invertebrates that have special concern conservation status in West Virginia and are known to occur in NERI.

Scientific Name	Common Name	State Rank ¹	Global Rank ²	Federal Rank
Amphibians				
<i>Ambystoma jeffersonianum</i>	Jefferson salamander	S ³	G ⁴	
<i>Desmognathus quadramaculatus</i>	Black-bellied salamander	S ³	G ⁵	
<i>Eurycea lucifuga</i>	Cave salamander	S ³	G ⁵	
<i>Pseudotriton ruber</i>	Northern red salamander	S ³	G ⁵	
Fish				
<i>Nocomis platyrhynchus</i>	Bigmouth chub	S ³	G ⁴	
<i>Notropis scabriceps</i>	New river shiner	S ²	G ⁴	
<i>Phoxinus oreas</i>	Mountain redbelly dace	S ³	G ⁵	
Mammals				
<i>Myotis sodalis</i>	Indiana bat	S ¹	G ²	endangered
<i>Corynorhinus townsendii</i>	Virginia big eared bat	S ²	G ⁴	endangered
<i>Myotis leibii</i>	small footed myotis	S ¹	G ³	
<i>Corynorhinus rafinesque</i>	Eastern big-eared bat	S ¹	G ³	
<i>Sorex dispar</i>	Long-tailed shrew	S ²	G ⁴	
<i>Ochrotomys nuttalli</i>	Golden mouse	S ²	G ⁵	
<i>Neotoma magister</i>	Allegheny woodrat	S ³	G ³	
Reptiles				
<i>Eumeces laticeps</i>	Broad-headed skink	S ²	G ⁵	
<i>Opheodrys aestivus</i>	Rough greensnake	S ³	G ⁵	
<i>Pseudemys concinna</i>	River cooter	S ²	G ⁵	
<i>Carphophis amoenus</i>	Eastern worm snake	S ³	G ⁵	
<i>Graptemys geographica</i>	Common map turtle	S ²	G ⁵	

Table 8. Vertebrates (excluding birds) and invertebrates that have special concern conservation status in West Virginia and are known to occur in NERI (continued).

Scientific Name	Common Name	State Rank ¹	Global Rank ²	Federal Rank
Insects				
<i>Cicindela ancocisconensis</i>	A tiger beetle	S ³	G ³	
<i>Speyeria diana</i>	Diana fritillary	S ²	G ³	
Mussels				
<i>Lasmigona subviridis</i>	Green floater	S ²	G ³	
<i>Alasmidonta marginata</i>	Elktoe mussel	S ²	G ⁴	
<i>Cyclonaias turberculata</i>	Purple wartyback	S ¹	G ⁵	
<i>Elliptio dilatata</i>	Spike mussel	S ²	G ⁵	
<i>Lampsilis ovata</i>	Pocketbook mussel	S ¹	G ⁵	
<i>Quadrula quadrula</i>	maple leaf	S ²	G ⁵	

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¹State rankings:

S¹ Five or fewer documented occurrences, or very few remaining individuals within the state. Extremely rare and critically imperiled.

S² Six to 20 documented occurrences, or few remaining individuals within the state. Very rare and imperiled.

S³ Twenty-one to 100 documented occurrences. May be somewhat vulnerable to extirpation.

²The Nature Conservancy Global Rankings (TNC_STATUS): global rankings assigned by NatureServe.

G1 Five or fewer documented occurrences, or very few remaining individuals globally. Extremely rare and critically imperiled.

G2 Six to 20 documented occurrences, or few remaining individuals globally. Very rare and imperiled.

G3 Twenty-one to 100 documented occurrences. Either very rare and local throughout its range or found locally in a restricted range; vulnerable to extinction.

G4 Common and apparently secure globally; though it may be rare in parts of its range, especially at the periphery.

G5 Very common and demonstrably secure, though it may be rare in parts of its range, especially at the periphery.

Exhibit C. Example of an Outside Front Cover.

National Park Service
U.S. Department of the Interior



Natural Resource Program Center

Title of Report Here in Times New Roman 20 pt Font
Report Subtitle Here in Times New Roman 18 pt Italics

Natural Resource Report NPS/NRPC/NRR—2006/001



Exhibit D. Example of an Inside Front Cover

ON THE COVER

(replace this text: Description of image/photo used on front cover [Times New Roman 9-point font])

Photograph by: (replace this text: name of person or courtesy of name of park [Times New Roman 9-point font])

Exhibit E. Example of a Title Page (Front).

Natural Resource Report

Instructions to Authors

Natural Resource Report NPS/NRPC/NRR—2006/001

Name of Author or Names of Co-authors Here (Times New Roman 12 pt font)
Address(es) of Author (Co-authors) at time work was performed
Second Line of Address
City, State, and Zip Code

Current address(es): (if applicable, use superscript after author's name above and here)
Second Line of Address
City, State and Zip Code

June 2006

U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

Exhibit F. Example of a Title Page (Back).

The Natural Resource Publication series addresses Natural Resource topics that are of interest and applicability to a broad readership in the National Park Service and to others in the management of natural resources, including the scientific community, the public, and the NPS conservation and environmental constituencies. Manuscripts are peer-reviewed to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and is designed and published in a professional manner.

[include one of the following two paragraphs, depending on whether it is an NRR or NRTR report]

Natural Resource Reports are the designated medium for disseminating high priority, current Natural Resource management information with managerial application. The series targets a general, diverse audience, and may contain NPS policy considerations or address sensitive issues of management applicability. Examples of the diverse array of reports published in this series include vital signs monitoring plans; "how to" resource management papers; proceedings of resource management workshops or conferences; annual reports of resource programs or divisions of the Natural Resource Program Center; resource action plans; fact sheets; and regularly-published newsletters.

The Natural Resource Technical Reports series is used to disseminate the peer-reviewed results of scientific studies in the physical, biological, and social sciences for both the advancement of science and the achievement of the National Park Service's mission. The reports provide contributors with a forum for displaying comprehensive data that are often deleted from journals because of page limitations. Current examples of such reports include the results of research that addresses natural resource management issues; natural resource inventory and monitoring activities; resource assessment reports; scientific literature reviews; and peer reviewed proceedings of technical workshops, conferences, or symposia.

Views, statements, findings, conclusions, recommendations and data in this report are solely those of the author(s) and do not necessarily reflect views and policies of the U.S. Department of the Interior, NPS. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the National Park Service.

Printed copies of reports in these series may be produced in a limited quantity and they are only available as long as the supply lasts. This report is also available from the Natural Resource Publications Management Web site (<http://www.nature.nps.gov/publications/NRPM>) on the Internet, or by sending a request to the address on the back cover.

Please cite this publication as:

Lastname, F. M., and J. W. Lastname of Co-Author. 2006. Full title of report in sentence case, including subtitle. Natural Resource Report NPS/NRPC/NRR—2006/001. National Park Service, Fort Collins, Colorado

NPS D-1775, June 2006

Exhibit G. Example of a Table of Contents.

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Exhibit K. Examples for citing literature within the Literature Cited section of the report (using the style of the journal *Ecology*).

Agency as Author:

National Park Service. 1988. Management policies. U.S. Department of Interior, National Park Service, Washington, D.C.

U.S. Forest Service (USFS). 1993. ECOMAP. National hierarchical framework of ecological units. USFS, Washington, D.C.

Journal Article:

Aller, A. R. 1960. The composition of the Lake McDonald Forest, Glacier National Park. *Ecology* **41**:29-33.

Bradbury, J. W., S. L. Vehrencamp, K. E. Clifton, and L. M. Clifton. 1996. The relationship between bite rate and local forage abundance in wild Thompson's gazelles. *Ecology* **77**:2237-2255.

Smith, J., and J. Davis. 1990. Cougars and people. *Science* **4**:12-56.
(www.science.com/smith1990). Accessed 2004 March 30.

Book:

Harvill, A. M., Jr., T. R. Bradley, C. E. Stevens, T. F. Wieboldt, D. M. E. Ware, D. W. Ogle, and G. W. Ramsey. 1992. Atlas of the Virginia Flora, 3rd edition. Virginia Botanical Associates, Farmville, VA.

Edwards, E. W. F. 1992. Likelihood. Johns Hopkins University Press, Baltimore.

Book Chapter:

Watson, P. J. n.d. Of caves and shell mounds in west-central Kentucky. Pages 159-164 *in* Of caves and shell mounds. The University of Alabama Press, Tuscaloosa.

McCauly, E. 1984. The estimation of abundance and biomass of zooplankton in samples. Pages 228-265 *in* J. A. Dowling and F. H. Rigler, editors. A manual on methods for the assessment of secondary productivity in fresh waters. Blackwell Scientific, Oxford, UK.

Report:

Holthausen, R. S., M. G. Raphael, K. S. McKelvey, E. D. Forsman, E. E. Starkey, and D. E. Seaman. 1994. The contribution of federal and nonfederal habitats to the persistence of the northern spotted owl on the Olympic Peninsula, Washington. General Technical Report PNW-GTR-352. U.S. Forest Service, Corvallis, Oregon.

Bass, S., R. E. Gallipeau, Jr., M. Van Stappen, J. Kumer, M. Wessner, S. Petersburg, L. L. Hays, J. Milstone, M. Soukup, M. Fletcher, L. G. Adams, and others. 1988. Highlights of natural resource management 1987. National Park Service, Denver.

Jackson, L. L., and L. P. Gough. 1991. Seasonal and spatial biogeochemical trends for chaparral vegetation and soil geochemistry in the Santa Monica Mountains National Recreation Area. US Geological Survey, Denver. Open File Report 91-0005.

Thesis/Dissertation:

Diong, C. H. 1982. Population and biology of the feral pig (*Sus scrofa L*) in Kipahula Valley, Mau'i. Dissertation. University of Hawai'i, Honolulu.

McTigue, K. M. 1992. Nutrient pulses and herbivory: Integrative control of primary producers in lakes. Thesis. University of Wisconsin, Madison, WI.

Conference Proceedings:

Gunther, K. A. 1994. Changing problems in bear management, Yellowstone National Park twenty-plus years after the dumps. Ninth International Conference on Bear Research and Management. Missoula, MT, International Association for Bear Research and Management, Bozeman, MT, February 1992:549-560.

Webb, J. R., and J. N. Galloway. 1991. Potential acidification of streams in Mid-Appalachian Highlands: A problem with generalized assessments. Southern Appalachian Man and Biosphere Conference. Gaitlinburg, 1991.

Internet Citations:

Cane, J. H. 2001. Habitat fragmentation and native bees: A premature verdict? Conservation Ecology 5:3. Online. (<http://www.consecol.org/vol5/iss1/art3>). Accessed 1 April 2004.

Colwell, R. K. 1997. Estimates: statistical estimation of species richness and shared species from samples. Version 5. User's guide and application available from <http://viceroy.eeb.uconn.edu/estimates> (accessed 7 March 2001)

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS D-1775, June 2006

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U.S. Department of the Interior



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