Scientific Publications Guideline

Shenandoah National Park

Natural Resources Branch
Division of Natural and Cultural Resources
Shenandoah National Park
19 April 2005

Table of Contents

Scientific Publications Guideline
Natural Resource Branch
Division of Natural and Cultural Resources
Shenandoah National Park

INTRODUCTION

Several types of reports or publications are associated with National Park Service natural and social science projects and activities. These reports and publications are: (1) Annual Progress Reports, (2) Draft Final Reports, (3) Final Reports, (4) Shenandoah Resource Management Newsletter articles, (5) Park Science articles, (6) Natural Resource Year in Review articles, (7) Investigator's Annual Reports (IAR), and (8) Project Management Information System (PMIS) accomplishment reports. Park staff members are expected to prepare many of these documents as they conduct resource management and science activities in Shenandoah National Park. In certain cases, some of these documents are specifically required in fulfillment of National Park Service (NPS) natural resource and social science research contracts or cooperative agreements. Reporting expectations may also apply to non-NPS funded research or scientific collection activities conducted in the park by independent researchers or those associated with colleges and universities, non-profit organizations, or private businesses. The Research Permit (and Collecting Permit, if needed) specifies the reporting requirements when an NPS contract or agreement is not necessary.

This guideline provides specific instructions regarding the preparation of each of these eight types of reports as they pertain to Shenandoah National Park.

Reporting documents can be logically grouped into three categories: Project Documentation, Information Sharing, and Project Tracking.

In addition to these standard publications, investigators are encouraged to publish the findings of their investigations in professional, scientific publications. If this occurs, the NPS desires and may require that a copy be forwarded to the park for inclusion in the park library.

1. PROJECT DOCUMENTATION REPORTS

Documents included within this category include 1) Annual Progress Reports, 2) Draft Final Reports, and 3) Final Reports.

The Annual Progress Report is a brief, informal, narrative statement of the status of all work accomplished during the period specified, and a summary of work to be performed during the following period. Annual Progress Reports are prepared for all years of a project except the final year.

The Draft Final Report is submitted at the completion of a project or study and includes progress made during the final year. This report summarizes methods, results, and conclusions of the entire project and is intended for review by NPS staff prior to completion of the Final Report. Upon submission of the Draft Final Report, the designated NPS Key Official will review the manuscript and seek additional management and scientific review comments from appropriate NPS regional and park personnel and peer members of the scientific community to ensure technical quality and accuracy of information.

Review comments and recommended changes will then be returned to the author(s) for consideration and preparation of the Final Report.

The Final Report incorporates or addresses all appropriate comments from Draft Final Report reviews. Before duplication, a copy of the Final Report must be sent to the designated NPS Key Official for final approval of review modifications and format. Upon approval, a letter-quality, reproducible-copy original of the final report and the specified number of copies (usually ten) must be submitted to the designated NPS Key Official on or before the date identified in the research permit, contract, or agreement.

All three of the reports included in the Project Documentation Category are to be written in a similar style, with similar content, and follow a similar format. The only differences involve line spacing, the form or number of reports delivered to the NPS, and the relative comprehensiveness of Draft Final Reports and Final Reports in relation to the Progress Reports. Following is a summary of those differences:

Annual Progress Reports – single spaced/electronic (MS WORD) or one hardcopy

Draft Final Reports – double spaced/electronic (MS WORD) and ten hard copies

Final Reports – single spaced/electronic (MS WORD and .pdf) and ten hard copies

The following instructions summarize the writing style, contents and formatting that should be used for all Project Documentation Reports.

Project Documentation Writing Style

Reports should be written to an "audience" of park managers who may lack training or exposure to the particular discipline. The report may also be distributed to other government agencies, the scientific community, politicians, reporters, and the public. Keep the main body of the report short and concise. This may be accomplished through the use of appendixes for extensive literature reviews, detailed explanations of the research design and methods, supplementary data, information which does not directly address the research objectives specified by park managers, and highly technical material (equations, statistical analyses, and testing). Write in a non-technical, jargon-free style, avoiding or clearly explaining any scientific terms or terms unique to a specific discipline. Your goal is to clearly and concisely convey study results and management implications to a nonscientist.

Project Documentation Report Content List

Example pages are included as Appendix A to demonstrate the proper application of many of these instructions.

- **Report Cover** [see Appendix A, Example 1]

- **Table of Contents** [see Appendix A, Example 2] - Include a table of contents listing all following first and second order section headings contained in the report.

- **List of Figures** [if applicable; see Appendix A, Example 3] - Include lists of figures, tables, and/or appendixes, as needed.

- **List of Tables** [if applicable; see Appendix A, Example 4]

- **List of Appendixes** [if applicable; see Appendix A, Example 5]

- **Key Project Data** – As a minimum the following should be included:
  - Start and End Dates (ongoing if program):
  - Principal Investigator(s):
  - Co-Investigator(s):
  - Field Personnel:
  - Funding Source(s):
  - Funding Amount for Year (by source):
  - Account Number (by source)

- **Abstract** - The abstract should briefly but concisely identify the authors' objectives, methods, principle results, and major conclusions. Use scientific names of major organisms. The recommended length is the shorter of 250 words or 3% of the length of the report. Abstracts will be extracted and used in the NatureBib bibliographic database.

- **Executive Summary** - The executive summary should summarize the prominent facts discussed in the report and the conclusions reached in relation to research objectives. It should be as brief as possible, yet cover the subject in a clearly written, non-technical style so that, standing alone, it tells the reader what the project was about and what conclusions were made. This section will often be 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.

- **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(s)and do not include professional titles or academic degrees.

- **Significant Findings** – List all key findings as bullet statements. Note that some readers may only read the report up to and/or through this and the next section (Management Recommendations).

- **Management Recommendations** – If applicable, list all management recommendations based on findings as bullet statements. Note that some readers may only read the report through to this section. It is anticipated that some studies will not result in management recommendations or applications. Management recommendations may include things such as needed research, monitoring programs, public education activities, as well as mitigation or resource management actions.

- **Introduction** - The introduction should include the following elements: purpose(s) or need(s) of the investigation, project objectives, conditions under which the project was conducted, the general plan of treatment of the subject, and summary of previous work accomplished (literature review) that relates to the project.

- **Study Area** - Provide a concise narrative description of and justification for the study area(s) for the project. Include a detailed map of the study area(s) for further clarity.

- **Methods** - Present a detailed explanation of the methods, materials, and analytical techniques that were used in the field, laboratory, and office during the project. Describe how, when, where, and by whom the data were acquired. 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.

- **Significant Findings or Results** – Build on bullet statements listed previously. 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.

- **Comparison with Previous Year's Results** – If this project builds on data collected in previous years, provide comparisons between each of those years. In some cases, cumulative data should be presented.

- **Discussion and Management Recommendations** – Build on bullet statements listed previously. This section and the "Conclusions " section are the most important parts of the report for park resource managers. 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 project is applicable to the park, and to other studies that have been conducted in the particular area of work. Other findings may be reported that would be of general interest to the scientific community. Recommendations concerning resource management, further research, monitoring, or public education may be appropriate and should be presented in this section.

- **Conclusions** – This section should focus on key "take home" messages.

- **Recommendations for Improving/Altering the Program or Project in Future Years** – Include a discussion of problems that were encountered and how those were or should be resolved. This section is used if the project is multi-year in duration.

- **Tables and Figures** [see Appendix A, Examples 6 and 7] – Consider including photographs as appropriate. Tables and figures are most logically included in the Significant Findings, Comparison, and Discussion sections but may appear elsewhere.

- **Maps** – Include maps showing general location, as well as transect and plot locations. Maps are most logically included in the Study Area section but may appear elsewhere.

- **Literature Cited** [see Appendix A, Example 8] - List all references cited in the report using the Council of Biology Editors (CBE) bibliographic style regardless of scientific discipline.

- **Appendixes** [if applicable] - Include supplementary materials (e.g., QA/QC procedures) that support the main body of the report. Other items that could be included in the Appendixes are lists of collections made, data sheet information, lists of related reports, publications, articles, abstracts completed, professional meeting talks or posters presented, outreach presentations made, and/or a breakdown of budget by type of expenditure

Project Documentation Report Formatting

Example pages are included as Appendix A to demonstrate the proper application of many of these instructions.

General

- 8 1/2"×11" white bond paper.
- Maintain 1" margins top, bottom, left, and right throughout the document.
- Use Times New Roman 12 pt font throughout.
- Format paragraphs flush left, no indent, no end-of-line hyphenation, and paragraphs separated from each other double-spaced.
- Commence pagination on the first page of text as a footer and centered.
- Use title case (i.e. first letter of all words capitalized except articles, prepositions, and conjunctions) for all section headings.
- Special attention is called to Appendixes D, E, F, and G for guidance on various detailed items
- If Shenandoah National Park is to be abbreviated the acronym "SHEN" should be used
- Use the following styles for section headings:

First Order Header [center, triple space, begin text]

Second Order Header [flush left, double space, begin text]

<u>Third Order Header</u> [flush left, underlined, double space, begin text]

Fourth Order Header: [flush left, colon, two spaces, begin text (same line)].

Fifth Order Header: [flush left, italicize, colon, one space, un-italicize, begin text (same line)]

Table of Contents (see Appendix A, Example 2)

- The Table of Contents will begin on a right-hand, odd-numbered page, beginning with Roman numeral i.
- Use Title Case on all Table of Contents entries.
- Double-space entries.

- Indent Second Order Headings from First Order Headings 0.33 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., Table of Contents] followed by "continued " in parentheses at the top and centered for each additional page of the Table of Contents.

Lists of Figures, Tables, and Appendixes **(see Appendix A, Examples 3,4,5)**

- Each of these lists must begin on a new, right-hand, odd-numbered (Roman numerals) page as a first order section.
- Double-space entries.
- Use sentence case (i.e., capitalize only the first letter of the first word and any proper nouns) for titles 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 title (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 titles to additional lines, making sure that each additional line of the title 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 title.
- 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.

Literature Cited **(see Appendix A, Example 8)**

- The Council of Biology Editors (CBE) bibliographic style should be used
- 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 state and others for the balance.
- Use abbreviations for states (Appendix F) in the Literature Cited section.

Appendixes

- Each Appendix must begin on a new, right-hand, odd-numbered page.

- Appendixes are labeled sequentially with capitalized letters and a following period (e.g., Appendix A., Appendix B., etcetera), two spaces, followed by a brief, concise title in sentence case at the top of the page, ending with a period, left-aligned.
- A single Appendix is labeled "Appendix".
- If possible, the title should appear on the same page with the appendix material; if not, the title can be placed centered on the top of the preceding right-hand page.
- For Appendixes that are more than one page, repeat the title at the top, followed by "(continued)." in parentheses, for each additional page:

> 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).

Project Documentation Report Deliverable Requirements

One hardcopy OR an electronic version (MS WORD97 or more recent version) is required for all Annual Progress Reports and shall be submitted to the NPS Key Official on or before the date identified in the research permit, cooperative agreement, or contract.

Ten hardcopies AND an electronic version (MS WORD97 or more recent version) of Draft Final Reports and Final Reports shall be submitted to the NPS Key Official on or before the date identified in the research permit, cooperative agreement, or contract.

A CD-ROM containing a Final Report in MS Word 97 (or more recent version) and as a pdf file, must also be submitted for posting on the science Web site for the Northeast Region at http://www.nps.gov/nero/science/. Park staff members should be consulted to agree on logical file names. Because large documents in this format take a long time to download, particularly on systems using dial-up modems, the ideal maximum size of a pdf file should be approximately 3 MB (megabytes). A report that has a large file size should be divided into smaller parts, each yielding a pdf file of approximately 3 MB. The divisions should be made a logical stopping points, such as at the end of major sections of the document, if possible. Where such sections (or appendixes) are themselves very large and must be divided into yet smaller files, the pdf files can be named, for example, "methods_part_1.pdf" and "methods_part_2.pdf" but names need to include identifiers that will tie them directly to the project.

Final Reports may be printed and distributed as part of an NPS Technical Report (NRTR) or Natural Resources Report (NRR) series. Reports printed in these series are not considered formal publications, and the information may be subsequently submitted by authors to peer-reviewed journals. The designated NPS Key Official will notify the author of the decision to print the final report in one of the series and will assign the series name and number and NPS Technical Information Center (TIC) document number.

2. INFORMATION SHARING

Development of scientific information and documentation of that information in relatively technical reports (Project Documentation Category) is important. Unfortunately those reports are frequently overlooked by those who could make use of the information contained in them. In an effort to overcome shortfalls in science information transfer, the NPS resource management community uses three principle outlets: the

Shenandoah Resource Management Newsletter, Park Science, and Natural Resources Year in Review. Park staff members and cooperators are encouraged to prepare material for each these forums. In some cases, cooperative agreements or contracts may require preparation of material for these publications. Descriptions of these publications and instructions for article preparation follow.

Shenandoah Resource Management Newsletter Articles

The Division of Natural and Cultural Resources produces a Newsletter annually. The Newsletter is used to communicate updates regarding park science, trends in resource conditions, staff changes, and other significant matters related to resource preservation at Shenandoah. Park staff members and cooperating investigators are invited to make contributions to this publication. The writing style is more oriented toward mass communication and is therefore less technical although articles should be scientifically based. The Newsletter is formatted for graphic reproduction, therefore, many of the formatting guidelines in this document do not apply. Authors should prepare their material as MS WORD documents, double spaced. General instructions regarding formats of citations, spelling, and so forth do apply. Draft articles are due from authors in early December each year.

Park Science Articles

Park Science is a resource management bulletin of the Natural Resource and Science Stewardship Directorate, National Park Service, U.S. Department of the Interior. It reports recent and ongoing natural and social science research, its implications for park planning and management, and its application to resource management. Published by the Natural Resource Information Division of the Natural Resource Program Center, it appears twice annually, usually in summer and fall. (Thematic issues that explore a topic in depth are published occasionally.) It is published in hard copy (ISSN 0735-9462) and on the World Wide Web (ISSN 1090-996) at www.nature.nps.gov/parksci. Semi-technical in nature, *Park Science* is edited for the lay reader.

Park Science articles are easy-to-understand, field-oriented accounts of general interest research and resource management topics. They typically describe the results of scientific research and its application to park planning and management.

The principal audience for *Park Science* comprises national park superintendents, resource managers, natural and social science researchers, interpreters, maintenance staff, visitor and resource protection rangers, and other technical and non-technical personnel of National Park System units. The secondary audience includes other federal agencies; state departments of fish and game, parks and recreation, and natural resources; international parks; private conservation organizations; the academic community; and interested public.

See Appendix B for details regarding preparation of articles for this document.

Natural Resource Year in Review Articles

The *Natural Resource Year in Review* (www2.nature.nps.gov/YearInReview) summarizes science and natural resource management issues and activities in the National Park System for the year. Published annually by the Natural Resource Stewardship and Science Directorate, National Park Service, U.S. Department of the Interior, it features articles of immediate interest from around the National Park System and national natural resource program offices. These stories reflect the complexity of resource

management in modern landscapes and present an honest appraisal of what the National Park Service is able to accomplish in the care of natural resources given current staffing and funding. Additionally, the report addresses the disconnect between the public's perception of natural resources in parks as pristine and the professional, human effort that actually goes into preserving those resources. Analytical in its approach, the report suggests where we are today, why this is, and where we need to go.

The report covers the calendar year. Articles that pertain to fiscal years should explain the period of coverage. Articles due in fall can usually be updated before going to press to incorporate the latest information for the year. The report is written for the public, Congress, and NPS partners such as researchers and technical assistance providers; also, staff of the National Park Service. The report is introduced by the NPS Associate Director for Natural Resource Stewardship and Science, who characterizes several of the year's issues and trends. Approximately 40 features (500-600 words) and 40 brief articles (250 words) follow in 7–8 chapters that explore a variety of resource stewardship themes.

See Appendix C for details regarding preparation of articles for this document.

3. PROJECT TRACKING

Large National Parks, like Shenandoah, often have complex research and resource management programs involving many projects and many staff members and cooperators. Project tracking can be difficult due to this complexity. Computer systems have been developed to help track various aspects of these projects including such things as permits and finances. The two primary systems that the NPS uses related to resource management are the Research Permitting and Report System and the Project Management Information System. Both systems have built in components related to reporting and accountability. When a project is entered into either of these systems, reports are required. Descriptions of these systems and their reporting requirements follow.

Investigator's Annual Reports

Each investigator is responsible for the submission of an Investigator's Annual Report (IAR) on or about December 31 of each year the study is in effect. An Investigator's Annual Report is also to be submitted at the completion of the research project with the Final Report. The IAR is entered into the web based Research and Reporting System found at **https://science1.nature.nps.gov/research/ac/ResearchIndex**. The IAR is a brief summary of the project including the objectives, major findings, and status.

An Investigator's Annual Report is required as a general condition of all permits issued. Investigator's Annual Reports are used to consistently document accomplishments of research conducted in parks. Principal investigators are responsible for the content of their reports. NPS staff will not modify reports received unless requested to do so by the principal investigator responsible for the report. Park staff members will, however, review IARs to assure that scientific standards and ethics are being met and that the writing is logical and understandable. If problems are encountered the investigator will be contacted.

Park staff use the automated permit system to search the servicewide Investigator's Annual Report database to determine the status of current research projects and to determine if a researcher that was previously issued a permit complied with the requirement to provide annual accomplishment reports. IARs for Shenandoah NP are printed in the Annual Report of the Regional Chief Scientist, Mid-Atlantic Region, National Park Service. Hard copies of the IARs are also maintained in park files.

PMIS Annual Accomplishment Reports and Completion Report

The National Park Service currently uses an automated system for developing and tracking project needs including needs associated with scientific investigations and resource management. This system, known as the Project Management Information System or PMIS includes the capacity to receive accomplishment and completion reports. These are always short, one paragraph to no more than a page in length. They are prepared as an MS WORD document by the investigator or project lead and are reviewed and input into PMIS by park staff. PMIS reports are only prepared for projects that actually appear in PMIS (many projects are never entered into PMIS). Investigators should consult with park staff to determine if these reports will be required. Accomplishment reports are prepared for each year that a project is funded, and the completion report is prepared at the time of project completion. These reports are a tool for accountability for expenditures and documentation of work accomplished.

Prepared: 19 April 2005
Branch of Natural Resources
Division of Natural and Cultural Resources
Shenandoah National Park

Appendix A.
Formatting Examples for Project Documentation Reports:

Page

Appendix A. (continued)
Example 1. Report Cover Layout

Program/Project Title
Annual Report for 200X (Year)

Space for Graphic if Desired

Author's Name
Position/Title
Natural Resources Branch (if prepared by park staff)
Division of Natural and Cultural Resources (if prepared by park staff)
Shenandoah National Park (if prepared by park staff)
Date

Appendix A. (continued)
Example 2. Table of Contents

Table of Contents

Appendix A. (continued)
Example 2. Table of Contents (continued)

Table of Contents (continued)

Appendix A. (continued)
Example 3. List of Figures

Figures

Page

Appendix A. (continued)
Example 4. List of Tables

Tables

Page

Appendix A. (continued)
Example 5. List of Appendixes

Appendixes

Page

Appendix A. (continued)
Example 6. Figure or Map

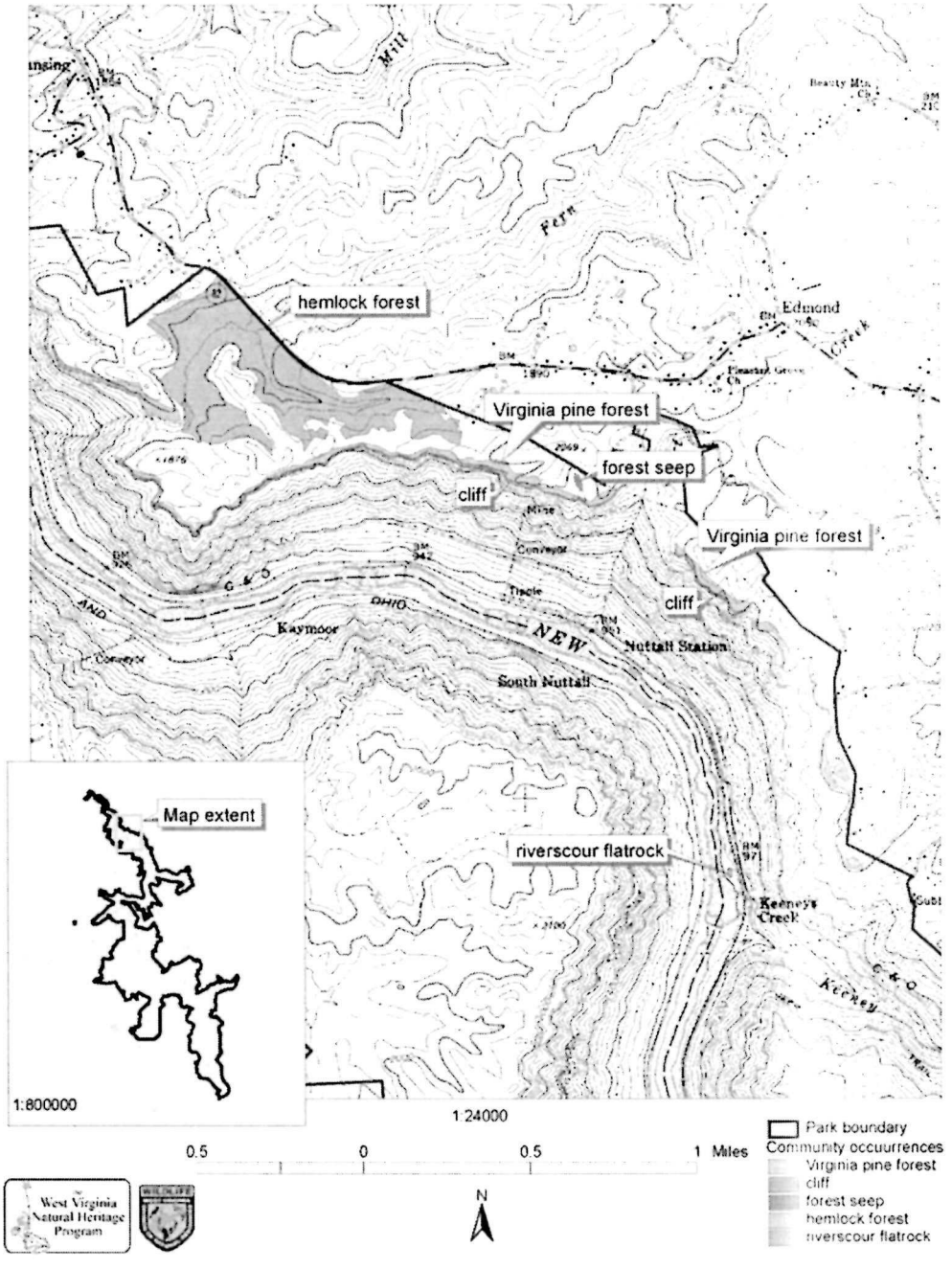

Figure 7. Map depicting the locations of cliffs, forest seep, hemlock forest, riverscour flatrock, and Virginia pine forests within the northern-most section of the park boundary.

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				
Ambystoma jeffersonianum	Jefferson salamander	S^3	G^4	
Desmognathus quadramaculatus	Black-bellied salamander	S^3	G^5	
Eurycea lucifuga	Cave salamander	S^3	G^5	
Pseudotriton ruber	Northern red salamander	S^3	G^5	
Fish				
Nocomis platyrhynchus	Bigmouth chub	S^3	G^4	
Notropis scabriceps	New river shiner	S^2	G^4	
Phoxinus oreas	Mountain redbelly dace	S^3	G^5	
Mammals				
Myotis sodalis	Indiana bat	S^1	G^2	endangered
Virginia big eared bat	Cornynorhinus townsendii	S^2	G^4	endangered
Myotis leibii	small footed myotis	S^1	G^3	
Eastern big-eared bat	C. rafinesque bat	S^1	G^3	
Sorex dispar	Long-tailed shrew	S^2	G^4	
Ochrotomys nuttalli	Golden mouse	S^2	G^5	
Neotoma magister	Allegheny woodrat	S^3	G^3	
Reptiles				
Eumeces laticeps	Broad-headed skink	S^2	G^5	
Opheodrys aestivus	Rough greensnake	S^3	G^5	
Pseudemys concinna	River cooter	S^2	G^5	
Carphophis amoenus	Eastern worm snake	S^3	G^5	
Graptemys geographica	Common map turtle	S^2	G^5	
Insects				
Cicindela ancocisconensis	A tiger beetle	S^3	G^3	
Speyeria diana	Diana fritillary	S^2	G^3	

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
Mussels				
Lasmigona subviridis	Green floater	S^2	G^3	
Alasmidonta marginata	Elktoe mussel	S^2	G^4	
Cyclonaias turberculata	Purple wartyback	S^1	G^5	
Elliptio dilatata	Spike mussel	S^2	G^5	
Lampsilis ovata	Pocketbook mussel	S^1	G^5	
Quadrula quadrula	maple leaf	S^2	G^5	

[1]State rankings:
S^1 Five or fewer documented occurrences, or very few remaining individuals within the state. Extremely rare and critically imperiled.
S^2 Six to 20 documented occurrences, or few remaining individuals within the state. Very rare and imperiled.
S^3 Twenty-one to 100 documented occurrences. May be somewhat vulnerable to extirpation.
S^A Rare in the state but an accidental occurrence.

[2]The Nature Conservancy Global Rankings (TNC STATUS):
These are global rankings assigned by the Nature Conservancy (now Nature Serve).
G^1 Five or fewer documented occurrences, or very few remaining individuals globally. Extremely rare and critically imperiled.
G^2 Six to 20 documented occurrences, or few remaining individuals globally. Very rare and imperiled.
G^3 Twenty-one to 100 documented occurrences. Either very rare and local throughout its range or found locally in a restricted range; vulnerable to extinction.
G^4 Common and apparently secure globally; though it may be rare in parts of its range, especially at the periphery.
G^5 Very common and demonstrably secure, though it may be rare in parts of its range, especially at the periphery.

Appendix A. (continued)
Example 8. Citing literature within the Literature Cited section of the report

- Agency as Author information: *Agency Name(s). Publication date. Title of document. Edition number. Publisher. City of Publication, State/Country of Publication.*

  Agency as Author example:

  U.S. Department of Transportation, Federal Highway Administration, and West Virginia Department of Transportation (US DOT, FAA, and WV DOT). 1998. Draft Environmental Impact Statement, New River Parkway, I-64 to Hinton. WV DOT, Roadway Design Division. Charleston, WV.

- Book Information: *First author/editor Surname, Forename initial, Middle initial(s)., and Second author/editor Forename initial, Middle initial(s)., Surname, editors [if applicable]. Publication date. Title of book. Edition number. Publisher. City of Publication, State/Country of Publication.*

  Book Information example:

  Knight, S. V., and V. N. Darkbloom, editors. 1998. Butterfly identification in our National Parks. Second edition. Blackwell Scientific Publications. Ithaca, New York.

- Chapter in Book or Paper in Conference Proceedings Information: *First author Surname, Forename initial, Middle initial(s) and Second author Forename initial, Middle initial(s), and Surname. Publication date. Title of chapter or paper. Pages page number-page number in First editor Forename initial, Middle initial(s), Surname and Second editor Forename, initial Middle initial(s), Surname, editors. Title of book or conference proceedings. Publisher. City of Publication, State/Country of Publication.*

  Chapter in Book example:

  Pnin, P. V. and H. N. Humbert. 1999. Yesterday 's caterpillar: A re-examination of Lepidoptera morphology at Hopewell Furnace National Historic Site. Pages 131-313 in S. V. Odon and K. N. Krug, editors. Insect Studies in National Parks of the Eastern United States. University Park, Pennsylvania.

  Paper in Conference Proceedings example:

  Pnin, P. V. and H. N. Humbert. 1999. Yesterday 's caterpillar: A re-examination of Lepidoptera morphology at Hopewell Furnace National Historic Site. Pages 131-313 in .S. V. Odon and K. N. Krug, editors. Insect Studies 1998-1999. American Society of Entomologists. University Park, Pennsylvania.

Appendix A. (continued)
Example 8. Citing literature within the Literature Cited section of the report (continued)

- Journal Article Information: *First author Surname, Forename initial, Middle initial(s)., and Second author Forename initial, Middle initial(s), Surname. Publication date. Article title. Journal title Volume Number (Issue number).*

  Journal Article examples:

  Balcom, B. J. and R. H. Yahner. 1996. Microhabitat and landscape characteristics associated with the threatened Allegheny woodrat. Conservation Biology 10.

  Kinbote, C. V., and D. N. Haze. 1948. A new species of Cyclarus Nabokov. The Entomologist 81(1027).

- Report Information: *First author Surname, Forename initial, Middle initial(s), and Second author Forename initial, Middle initial(s), Surname. Publication date. Title of report. Report Identification Number. Publisher. City of Publication, State/Country of Publication.*

  Report examples:

  Quilty, C. V. and A. N. Vokoban. 1961. A study of *lepidoptera* at Shenandoah National Park. Technical Report NPS/SHEN/NRTR-91/016. National Park Service. Luray, VA.

  Yuill, A. A. 1988. An abandoned mine land survey of the New River Gorge National River. Final Report. National Park Service. Glen Jean, WV.

  Yahner, R. H., B. D. Ross, and J. E. Kubel. April 2004. Comprehensive inventory of birds and mammals at Fort Necessity National Battlefield and Friendship Hill National Historic Site. Technical Report NPS/NERCHAL/NRTR-04/093. National Park Service. Philadelphia, PA.

- Web site example:

  U.S. Environmental Protection Agency (US EPA). 2002. Overview of the human health and environmental effects of power generation: focus on sulfur dioxide, nitrogen oxides and mercury. Washington, DC. www.epa.gov/clearskies.

Example 8. Citing literature within the Literature Cited section of the report (continued)

- Software example:

  Ritland, K. 1996. Multilocus mating system program (MLTR) Version 1.1. Department of Botany. University of Toronto, Toronto.

- Thesis Information: *Author Surname, Forename initial, Middle initial(s). Date of thesis. Title of thesis. Type of thesis. University.*

  Thesis examples:

  Zembla, V. N. 1997. A comparative ecological study of Madeleinea mashenka and Madeleinea lolita in Northeastern National Parks. M.S. thesis. Cornell University.

  Karish, J. F. 1973. Parameter correlation effects in non-linear mathematical models for biological growth. M.S. thesis. The Pennsylvania State University, University Park.

Appendix B

PARK SCIENCE: A RESOURCES MANAGEMENT BULLETIN

General guidelines

Articles should emphasize the utility of natural or social science research in park planning and management. Moreover, they should describe a scientific process, technique, or development that is of substantial novelty, practicality, or refinement. Research findings should be described in such a way that generalists can grasp their significance and understand their application. Articles should be written primarily in the active voice and in the first person, using nontechnical language; sexist language, provincialism, jargon, and acronyms should be avoided. Measurements should be reported in English units followed by metric in parentheses. Citations should be given in the text using the author- date method followed at the end of the article by a brief reference list giving complete information for the author- date citation. *Park Science* style (including citations) is based on *The Chicago Manual of Style,* 15th edition.

Article content and organization

Articles should clearly demonstrate the application of science to park resource management. Authors may wish to consider: (1) describing the resource management problem(s) that prompted the need for a scientific investigation for a solution; (2) discussing the complexity and management considerations related to the issue(s), such as relevant legislation (enabling, NEPA, ARPA, Endangered Species Act, etc.), pertinent park planning documents, planning procedures, and political realities; (3) briefly explaining the investigation methodology; (4) sharing the research findings and their implications for park management; (5) describing how findings were applied in the field; (6) detailing costs for materials and staffing related to the research and any resulting resource management field projects; (7) explaining the role of NPS funding, grants, or other sources of non- NPS funds and partners in carrying out the research or resource management project; (8) briefly appraising the applicability of the findings to other park areas; and (9) acknowledging the study sponsors and participants.

Length

The table addresses the length of manuscripts for various article types.

Author Information

Complete contact information for each author should be included with each manuscript submission: name, position, park area or other affiliation, mailing address, phone number, and e- mail address.

Deadlines

Park Science typically has a backlog of articles in the publication queue. Articles are normally published one or two issues after being submitted. Check with the editor about pertinent deadlines as they vary. Upon receipt, all articles are reviewed by the *Park Science* editorial board. Approved articles not published in the upcoming issue will be considered for inclusion in subsequent issues on a space- available basis.

Form of submission
Manuscripts and related illustrations should be e- mailed to the editor as digital file attachments. (Please use multiple e- mails to send file attachments that total more than 10 MB.) Illustrations and text should be saved to separate digital files (i.e., no graphics embedded in the word- processing document). Alternatively, you can mail, fax, or ship (e.g., Fed Ex) a double- spaced, laser- printed manuscript (11- point type) to the editor along with the digital file of the article on a 3½" floppy disk, Zip disk, or CD- ROM.

Review and acceptance
All articles about a park unit should be reviewed and approved by the area manager (superintendent) and the appropriate associate regional director (natural resources) before submission. Articles primarily concerning technical support programs of the Natural Resource Program Center (NRPC) are reviewed and approved by the appropriate NRPC division chief before submission. After submission, the *Park Science* editorial board reviews submissions for final approval. Acceptance for publication is based on peer review and editorial criteria that include article appeal, contribution to the field of resource management, completeness, clarity, scientific soundness, policy considerations, and merit. Accepted manuscripts are edited for grammar and clarity. Authors are contacted if substantive revisions to content are necessary.

Illustrations
Please submit several illustrations that reinforce the article's main points by showing personnel at work, project equipment in use, techniques, locator maps, species portraits, data, etc. Photographs, line art, maps, charts, and technical drawings are all acceptable formats. The table provides further guidance on illustrations.

Captions
Please include a caption for each illustration that describes the relationship of the image to the subject of the article. Consult recent editions of *Park Science* for guidance in preparing captions. Please provide any necessary credits for illustrations and secure and forward copyright permissions as needed.

Format for illustrations
Original color slides are best, but color prints (with negatives, if possible) and black- and- white prints (also with negatives) are also acceptable. Digital photographs are also acceptable, but only the highest- resolution images are reproducible in the print edition. Ideally, digital images will have been made at 300 pixels per inch resolution and saved in TIF format, which does not degrade image quality. (If a digital photo is saved as a JPG, its quality will be degraded noticeably unless it is saved in the camera initially at the highest- quality JPG setting.)

Drawings, such as line art, should be forwarded in their original format or a high- quality photostat or photocopy.

Computer- generated illustrations, such as charts and graphs, should be transmitted in their native file format (e.g., Microsoft Excel), accompanied by an original laser- printed

printout (approximately 8" x 10" in size). The data for charts and graphs should also be transmitted so that the illustration can be redrawn in- house, if needed.

Other digital drawings, including GIS maps, should be forwarded in both digital (Adobe EPS format, if possible) and hard- copy (high- quality laser- printed original) formats. GIS maps should be exported in color at 600 pixel- per- inch resolution at a size of approximately 8"x10". Color information should be saved with the file (i.e., not converted to grayscale).

Delivery of illustrations

Digital files can be sent as attachments to e- mail as long as they are less than 10MB in size. Alternatively, they can be forwarded on CD- ROM, Zip disc, or by FTP. (Digital files can be sent as attachments to e- mail as long as they are less than 10MB in size. Alternatively, they can be forwarded on CD- ROM, Zip disc, or by FTP. (NPS authors who wish to transfer files by FTP should contact the editor for instructions on this option.) Overnight or second- day delivery allows tracking of materials. Label the electronic transfer medium with the article title and park name; label illustrations (sticky notes work well) with article title, park name, and placement information (e.g., figure 1). Indicate whether materials should be returned.

Contact the Editor

General/Mail
Jeff Selleck
National Park Service
WASO- NRID
P.O. Box 25287
Denver, CO 80225- 0287

Phone: (303) 969- 2147
Fax: (303) 969- 2822
jeff_selleck@nps.gov

Street Address—Deliveries
Jeff Selleck
National Park Service
WASO—NRID
12795 W. Alameda Parkway
Lakewood, CO 80228
303- 969- 2147

Appendix C

NATURAL RESOURCES IN REVIEW

Your article should present a concise, objective, and analytical report of the issue, trend, or activity you wish to examine. The title and introductory paragraph should quickly identify the issue and how it relates to the calendar year (i.e., what happened during the year?). Try to generate interest in your subject immediately. You may use, for example, a description of your dilemma or problem, a result that came from your efforts in 2004, a future condition anticipated as a result of 2004 work, a universal truth in natural resource management, a relevant quotation from a researcher or resource manager that shares insight, or perhaps a relevant statistic, rhetorical question, or description of something ironic in the situation. If your article reports FY 2004 GPRA results for natural resources, please mention this. Likewise, please explain any connection your issue or activity has to the Natural Resource Challenge or other funding sources such as the DOI Cooperative Conservation Initiative. You may need to share a little background of the issue, but the article should largely focus on the events that took place this year and their meaning for the future of visitor enjoyment of park resources.

In the body of the article you may want to briefly mention how the problem came about and assess its complexity. Describe the approach taken to rectify it and mention who was involved. Discuss progress achieved or setbacks experienced and the current status of the situation. Concentrate on the events that took place this year.

The conclusion should provide analysis and answer the question, "What is the significance of this issue, event, or trend for natural resource management in the NPS?" Eke out any connection to a national trend or larger meaning for the National Park Service.

Length

Feature articles
500–600 words. This equates to approximately 3/4 of a typed page using Courier New 10- point type; another measure is 3–5 paragraphs (any font) of 100–120 words each.

Sidebars or short articles
Approximately 250 words

Calendar items
Two to three sentences or 25–60 words

Epigraphs (quotations apt for the introduction of a chapter's theme)
20–50 words

Captions
Two to three sentences or up to 75 words

Grammar

Write primarily in the active voice. Refer to your park, project, or agency in the third person (i.e., the National Park Service, Everglades National Park, the park, park staff, resource managers, etc.).

Byline
A byline will accompany your article. Provide your name, position title, employer, and email address.

Data
If you share data, limit yourself to easily understandable materials that illustrate a central concept you want to communicate.

Illustrations
If possible, submit five or more sharp and attractive color illustrations with captions, in a mix of horizontal and vertical formats for consideration by the editor. One or two will accompany most articles. Whether photographs, drawings, or charts, each illustration must be in the public domain, properly exposed, and feature a strong center of interest. If an illustration is not in the public domain, discuss with the editor the possibility of getting a signed release for use of the illustration from the copyright holder. The editor will track incoming illustrations and return them after the report is published.

Color slides, prints, and negatives
Send photographs or hard- copy illustrations by Federal Express (see address below).

Digital images
Digital images are acceptable if they are scanned in RGB (red, green, blue) at 300 pixels per inch resolution at a size of approximately 4x5 inches and saved preferably as TIF files. JPG files are acceptable only if they are saved at the highest image quality setting (i.e., 10–12). Digital image files are large, but can often be transmitted individually by email (up to around 9MB total per email). Individual images that are larger than 9MB should be transmitted on a CD- ROM or ZIP disk (send by FedEx), or by FTP (file transfer protocol).

FTP
Images larger than 9MB in size can be digitally transferred to the editor by FTP from an NPS computer. Use your Web browser to visit ftp://ftp.den.nps.gov/incoming/YIR2004/ and drag files from your computer to the browser window. Please alert the editor by email to their presence. Contact the editor if you have trouble making the file transfer.

Graphs, charts, maps
Email charts and graphs in their native application formats (e.g., Excel) along with the data used to create the illustration. GIS- generated maps should be exported as EPS files and as TIF files saved at 600 pixels per inch resolution.

Article Review
Please submit a copy of your draft article to the appropriate manager (i.e., park superintendent, associate regional director for natural resources, or national program

office chief) for his or her consideration. Please address any comments in the final draft that you submit to the editor.

Deadlines
Articles and illustrations are due to the editor by September 17.

Delivery
Email
Forward manuscript and digital images by email to jeff_selleck@nps.gov.

Fed Ex
Send photos, CD- ROMs, and ZIP disks overnight or second- day to:

Jeff Selleck
WASO- NRID
National Park Service
12795 W. Alameda Parkway
Denver, CO 80225- 0287

Phone: 303- 969- 2147
FAX: 303- 987- 6704

Contacting the Editor
If you have questions or need clarification, please contact the editor for guidance.

Jeff Selleck
Jeff_selleck@nps.gov
303- 969- 2147 phone
303- 998- 6704 fax

Appendix D

Miscellaneous Guidelines

Measurement Units

- All measurement units must be metric.
- Include U.S. equivalent measurements parenthetically.
- Use abbreviated standard units of measure (Appendix E.) when with a numeral, whereas, 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 ... ...).

Numbers

- Numbers from one through nine are written out; numbers above nine are expressed as numerals except when first word of sentence. Ordinal numbers (e.g., second, 23rd) are treated the same.
- Physical measurements (length, width, distance, area, volume, decimals, percentages, degrees, symbols, latitude/longitude, fractions over 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 (i.e., <, =, >, %, ≤, ≥) do not include space between symbol and number (e.g., <22, ≤50, 98%).

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.

Copyrighting

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

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.

Appendix E

Preferred Spelling Guidelines

A dash preceding a word indicates that the word is used as the last part of a compound.
A dash following a word indicates that the word is used as the first part of a compound

Abbreviations:

adv.	adverb
n.	noun
u.m.	unit modifier (adjective)
p.a.	predicate adjective
v.	verb
H	house rule (NPS adopted use; may contradict or not be listed in a dictionary)
*	*Merriam-Webster's Collegiate Dictionary, 10th ed.* or *Microsoft Encarta College Dictionary*

above-average (u.m.)

aboveground *

affect/effect
use affect as a verb meaning "to produce an effect upon."
use effect as a noun meaning "something that inevitably follows an antecedent (as a cause)"

age-specific

a.m.

appendixes H (not appendices)

archeology H (not archaeology)

backwater (n., u.m.)

-bank
- riverbank *
- streambank

bay-
- bayfront
- bayshore

beach-
- beach grass *
- beachside *

bear-proof

-bed
- coalbed
- railbed *
- riverbed *
- streambed *

belowground

bio-
- biocontrol
- biodiversity
- bioindicator

boat launch (n.) (preferred over boat ramp)

base-
baseline

battle-
battlefield *
battleground *
cannot

Celsius (use °C)

check-
checklist

cleanup (n.)
clean up (v.)

clearcut (u.m., v., n.)*

co-
coauthor*
coevolve*
coexist*
cohabit*
co-hosted*
co-op * (n.)

coal-
coalbed
coalfield
coal seam

controlled
controlling

cost-
cost-effective *
cost sharing (n., p.a.)
cost-sharing (u.m.)

countywide

criteria (plural)
criterion (singular)

cross-
cross-check (n., v.)*

camp-
campground
campstove

Canada goose (not Canadian goose)
data (plural)
database (n., u.m.)
datalogger
data set (n.); dataset (u.m.)

day-use (u.m.); **day use** (n.)

disabled (avoid "handicapped" or "the disabled" put the "person" before the disability; write "persons or visitors with disabilities."

discernible (not discernable)

Douglas fir (not Douglas-fir) (opinions vary; use the park's preference)

down-
downgrade *
downriver (u.m.); down river (adv.)
downsize *
downslope
downstream *
downtime *
downwind

-down
breakdown *
drawdown *
run-down (u.m.)

drainageway *

dropoff

e-mail (hyphenated)

en route

ensure/assure/insure

cross-country (u.m., adv., n.)
crosscut * (v., n., u.m.); crosscutting * (n.)
crossover * (n., u.m.)
cross-reference *
cross section * (n.); cross-section * (v.)

Fahrenheit (use °F)

fax (not FAX; fax is "short for facsimile"
fax is not an acronym

fence-
fenceline
fencepost

fewer/less
use fewer to refer to a number and to individual items
use less with quantity and bulk

field-
field hand *
fieldhouse
field trip
fieldwork *

-field
coalfield
leachfield
oilfield

fire-
fire pit
fireproof
fire ring
firewood

fish (both singular and plural)

flood-
flood control
flood-affected
flood-impacted
floodgate *
flood-prone (u.m.)

use ensure as a verb to "make certain something will happen"
use assure to inform positively
use insure for providing or obtaining insurance

flowchart

-flow
debris flow
lava flow
mudflow *
riverflow
springflow
streamflow
waterflow

foot-
footbridge
footpath
footprint
foot trail

forestland/forest land
use forestland as a descriptive term
use forest land for land designated as a national forest

-form
free-form
landform

freshwater (n., u.m.) *

-front
forefront
lakefront
riverfront

full-time (u.m., adv.) *

furbearer

GIS (u.m., n.)

floodprone (p.a.)
floodplain *
floodproof
floodproofing
flood stage
floodwater(s)
floodway

handicap access Change to "universal access," but "handicap parking" is acceptable

handicapped people Change to visitors (or people) with disabilities

handicap ramp Change to wheelchair ramp

hearing-impaired

high-
highcountry
high-use (u.m.)
high-water (u.m.)

hillside

-house
powerhouse
pumphouse

ice-
icefishing*
ice-skate; ice-skating (u.m.)

in-depth (u.m.)

indexes (not indices)

industrywide

in hand (prepositional phrase)

instream

Internet

grassland

ground-
ground cover (n.); groundcover (u.m.)
ground level (n.); groundlevel (u.m.)
groundwater (n., u.m.)
groundwork *

labeled

lake-
lakefront *
lakeshore *
lakeside *

land-
land classification (u.m.)
landfill(s)(ing)
landform
landholding (u.m., n.); landholder (n.)
land-management (u.m.
land-managing (u.m.)
landowner, landownership
land protection (u.m.)
land use (u.m.)

-land
forestland (see note for forestland)
grassland
parkland (as a descriptive term; but use park land for land designated as a park)
rangeland
shrubland
swampland
wildland

-latitude
high latitudes (n.); high-latitude (u.m.)
low latitude (n.); low-latitude (u.m.)
midlatitudes (n.); midlatitude (u.m.; *)
33° north latitude (lowercase)

-less Always insert a hyphen between a root word that ends in double l's (ll) and less (e.g., shell-less); however, generally insert a hyphen between a root word and less; some exceptions include:

-impaired
hearing-impaired (n., u.m., p.a.) *
sight-impaired (n., u.m., p.a.)
visually impaired (n., u.m., p.a.)

judgment

-life
plant life
wildlife

-line
coastline
electrical line
fenceline
gas line
pipeline
powerline
rail line
ridgeline
sewerline
shoreline
sight line
telephone line
timberline
transmission line
tree line
waterline

live-
live-capture
livetrap

long-
long-distance (adj., adv.) *
long distance (n) *
long-lived (adj) *
long-range (adj.) *
long-term (adj.) *

low-
low-cost
low-energy *
low-impact (u.m.); low impact (n.)

macroinvertebrate (n.)
bottomless
faultless
seasonless

leveling

life span
mid-
midbasin
midcoast
midday
midlatitude (n.; u.m.)
midstream
midsummer
midwinter
midyear
mid-19th century

modeled

mountaintop
mountainside

mud-
mudflow *
mudslide (AGI)

multi-
multiaccess
multiagency
multiresource
multiyear

natural resource (u.m.)
natural resources (n.)

non-
nondestructive
nonessential *
nonexistent *
nonfederal
nonforest
nongame (adj.)
nongovernment
nonhazardous
nonmigratory *

micro-
microenvironmental *
microhabitat *
microorganism *

occur Most species live in or inhabit a place; they don't "occur"

old growth (n.); old-growth (u.m.)

on-
ongoing *
online
on-ramp *
onshore *
on-site

open space

over-
overbrowse, overbrowsing
overemphasis
overfishing *
overpopulate *
oversized
overuse *
overwinter, overwintering

parkwide

part-time (u.m., adv.) *

passageway

photocopy (n., v.) *

p.m.

policy-
policy maker
policyholder

pre-
prearrange

nonnative *
non-point (u.m.) (source pollution)
nonporous
nonprofit
nonspecific
nontoxic

printout

pull-
pull-in (n., u.m.)
pulloff
pullout *
pullover

preventive (not preventative)

radio-
radio collar (n., v.)
radio-collared (u.m.)
radiotelemetry (n.) *
radio-tracking (u.m., n.)
radio transmitter (n.)

rail-
railbed
railcar
railhead
rail line
railroad
railworker
railyard

rain-
raindrop
rain fall
rain forest
rainwater

re-
re-create (to create again)
recreate (to take recreation)
reengineer *
reexamine *
reestablish *
reevaluate *

prebreeding
preconditioned
preconstruction
predetermine
predisturbance
predominate

recreation/recreational
Use recreation when referring to facilities, as a recreation facility, resource, area, potential, trail;
Use recreational when referring to the experience or to an activity that is a form of recreation (e.g., recreational program, opportunity, driving, visits)

river-
riverbank *
riverfront *
riverside *

roadway Avoid; use road(s)

road-
roadblock
road map
roadside
road trip

-road
offroad

rock-
rock-climbing (n., u.m.)
rockfall (n., u.m.)
rockslide

salt-
salt marsh (n.); saltmarsh (u.m.)
saltwater (n., u.m.) *

sand-
sandbag
sandbar
sand dollar
sand flea

reinstall
reintroduce
re-present (to present again)
represent (to stand for)
rerouting
resurvey

sea-
seabird
sea grass
sea level
sea life
sea scape
seashore
seaside
seawall
seawater

seasonless

self-guiding trail not self-guided; avoid writing "nature" trail (most trails are nature trails in some way) and avoid writing "interpretive" trail (visitors may expect a ranger-led tour)

semi-
semiannual
seminatural

sewage treatment

short-term (u.m.)

shrubland

-side
eastside *
hillside *
lakeside *
mountainside *
northside *
riverside *
roadside *
southside (u.m.)
streamside *

sand fly
sandblast
sand dune
sandstone

wetland

white-tailed deer

whitewater (n., u.m.)

-wide
coastwide
communitywide
countywide
districtwide
industrywide
nationwide
parkwide
regionwide
servicewide
statewide
trailwide
worldwide

wild-
wildfire
wildland
wildlife

wind-
windblown (u.m.)
windbreak *
windswept
windsurfing

workshop

workup (n.; an intensive diagnostic study)

-work
fieldwork *
groundwork *
teamwork

topside *
trailside *
waterside *
westside (u.m.)

sight-impaired (p.m., n., u.m.)

ZIP code; in addresses use ZIP + 4 when possible

Appendix F

Units of Measure Abbreviations

Note: use one space between numerals and abbreviations; however, not when when using K for kilobytes and not when using temperature degrees (36°C).

cm	centimeter
cu	cubic
cc	cubic centimeter
cm^3	cubic centimeter (in scientific contexts; see also cc)
ft^3	cubic foot
in^3	cubic inch
yd^3	cubic yard
d	day
°C	degree Celsius (symbol immediately precedes letter)
°F	degree Fahrenheit (symbol immediately precedes letter)
ft	foot
GIS	geographic information system
GPS	global positioning system
g	gram
GIF	graphic interchange format
ha	hectare
h or hr	hour
html	hypertext markup language
http	hypertext transfer protocol
in	inch
IP	Internet protocol
kB	kilobyte (in scientific contexts)
kg	kilogram
km	kilometer
km/h	kilometers per hour
kW	kilowatt
kWh	kilowatt-hour
L	liter (capitalized to avoid confusion with number 1)
m	meter
te	metric ton
mi	mile
mpg	miles per gallon
mph	miles per hour
mg	milligram
mL	milliliter
min	minute
mo	month
pH	negative log of hydrogen ion concentration
rpm	revolutions per minute
sec	second
sq	square
ft^2	square foot
in^2	square inch
mi^2	square mile
yd^2	square yard
wt	weight
yd	yard
yr	year

Appendix G

State Abbreviations

AL	Alabama	LA	Louisiana	OH	Ohio
AK	Alaska	ME	Maine	OK	Oklahoma
AZ	Arizona	MD	Maryland	OR	Oregon
AR	Arkansas	MA	Massachusetts	PA	Pennsylvania
CA	California	MI	Michigan	RI	Rhode Island
CO	Colorado	MN	Minnesota	SC	South Carolina
CT	Connecticut	MS	Mississippi	SD	South Dakota
DE	Delaware	MO	Missouri	TN	Tennessee
FL	Florida	MT	Montana	TX	Texas
GA	Georgia	NE	Nebraska	UT	Utah
HI	Hawaii	NV	Nevada	VT	Vermont
ID	Idaho	NH	New Hampshire	VA	Virginia
IL	Illinois	NJ	New Jersey	WA	Washington
IN	Indiana	NM	New Mexico	DC	Washington, DC
IA	Iowa	NY	New York	WV	West Virginia
KS	Kansas	NC	North Carolina	WI	Wisconsin
KY	Kentucky	ND	North Dakota	WY	Wyoming