

## NORTH AMERICAN JOURNAL OF FISHERIES MANAGEMENT

### Guide for Authors

#### Editorial Policy

This journal's mission is to promote communication among managers at all levels in the fisheries field. We encourage submission of original papers on the management of finfish and exploitable shellfish in marine and fresh waters. Contributions should relate in some way to the means by which species, habitats, and harvests may be managed to protect and enhance fish and fishery resources for societal benefits. Well-constructed case histories of the successes, failures, and side effects of fisheries programs are invited as one means to convey practical management experience to others. Examples of other appropriate subjects are new techniques to monitor populations or allocate harvests; the economics of exploitation or the sociology of resource users; criteria for species protection or habitat manipulation; and management-related research, law, policy, or philosophy. Acceptance of a paper for publication is based on its potential service to managers from a broad range of perspectives. Papers concerning fisheries science may be submitted to *Transactions of the American Fisheries Society*; those that address the health of fishes and other aquatic organisms may be submitted to the Society's *Journal of Aquatic Animal Health*; and papers dealing with practical aquaculture may be sent to the Society's *North American Journal of Aquaculture*.

Authors should not republish their original data without full attribution and explicit permission; see "Dual Publication of Scientific Information" in the *Transactions of the American Fisheries Society* 110:573–574, 1981.

Authors are responsible for the statistical validity of their experiments; both the experimental design and the analyses of the results should receive critical review by a statistician *before* the paper is submitted to the journal.

Computer enhanced images should be identified as such in the figure captions.

#### Manuscript Submission and Review

##### Manuscript Categories

Manuscripts may be submitted to any of the following categories. (1) *Articles* comprise full reports, critical reviews, and occasional in-depth essays. Manuscripts in this category may be up to

100 pages long, including tables and figures, the equivalent of about 30 printed pages. (2) *Management Briefs* are short papers describing new techniques or observations, policy changes, management assessments, or the like. (3) *Comments* are critiques of papers already published in this journal, responses to which will be invited from the original authors. We also will publish corrections (errata) of papers previously published in this journal.

##### Submittal Procedures

Send new manuscripts and associated correspondence to: North American Journal of Fisheries Management, Attention Journals Manager, American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, Maryland 20814, USA. Submit five complete, high-quality copies of the manuscript, tables, and figures; include five sets of photomicrographs or other continuous-tone photographs, if they are used. If, after review, a revision of your paper is requested, be prepared to send an electronic copy (in a version of Word or WordPerfect, if possible) along with the paper copies of your revised manuscript. The editor will advise you about preparing your electronic file; you are encouraged to send an electronic file with your original submission.

Cover letters accompanying new submissions should convey the following: (1) intended category (article, management brief, or comment) for the paper; (2) a confirmation that the manuscript has not been published or submitted for publication elsewhere and a full disclosure of any other manuscripts and published papers that contain the same or similar information; (3) a statement that all authors have participated in the study; (4) a list of colleagues who have seen the manuscript in draft; (5) telephone numbers of all authors as well as fax and e-mail numbers (if available) of the corresponding author; (6) a statement regarding page charge acceptance; and (7) names, addresses, phone numbers, and e-mail addresses of three potential reviewers.

Publication charges are US\$75 per printed page and will be billed when the paper is in proof. Partial or full subsidy of page charges may be provided to voting members of the American Fisheries Society (only) who certify that grant or agency

funds are severely limited or unavailable. Manuscript reviews are unaffected by the need for subsidy; however, at least one author of a subsidized paper must be or must become a member of the Society *before* the paper can be published. Every paper published in the *North American Journal of Fisheries Management* is subject to a \$30 fee to offset handling costs associated with the proof. Authors may purchase reprints of their papers from the printer when they receive their proofs.

#### *Review Process*

Papers normally will be critically reviewed by at least two experts in the relevant disciplines and evaluated for publication by one of the journal's editors. However, a manuscript may be returned to its author without review if it is judged to be of low quality or simply inappropriate for this journal.

Reviewers and authors have the option of anonymity. Authors who wish to exercise this option should structure their manuscripts accordingly.

Manuscript review relies on volunteers and is occasionally a lengthy process; however, we strive to get evaluations of well-written papers back to authors within 8–12 weeks of submission. Authors should revise papers promptly, ideally within 3 months of the editor's evaluation. Papers that have not been returned within 6 months of that evaluation will be considered withdrawn, and a "revision" completed after that time should be sent to the Editorial Office as a new submission.

Authors are advised to have their drafts read critically by colleagues and to proofread their final typescripts carefully before submitting their manuscripts to the journal. The Editor will strive to assist inexperienced writers, but will be more inclined to do so if the manuscript has been carefully prepared. Authors can further help their cause with reviewers if they (1) write direct, unambiguous, grammatically correct prose and avoid redundancy and wordiness, (2) demonstrate the practical value of their work, (3) describe their methods fully enough that their results can be understood and interpreted by readers unfamiliar with the work, (4) avoid trivia and unwarranted speculation, and (5) follow this journal's style and format.

#### **Manuscript Preparation**

Our standard for word definition and spelling is *Webster's Third New International Dictionary*, as updated by the latest edition of *Merriam Webster's Collegiate Dictionary*.

For taxonomic and vernacular names of North

American fish species, we follow the American Fisheries Society's most recent edition of *Common and Scientific Names of Fishes from the United States and Canada*. For other fish and invertebrate species, we encourage readers to follow the Society's companion publications: *World Fishes Important to North Americans* and *Common and Scientific Names of Aquatic Invertebrates from the United States and Canada* (Mollusks, 2nd edition, *Decapod Crustaceans*, and *Cnidaria and Ctenophora* are currently available in the latter series). Common names sanctioned by these lists may be used freely in this journal, but they must be accompanied by their respective scientific names when first mentioned in the abstract and again in text. Always use full common names: "largemouth bass," not "bass." Some plural forms of common names differ from the singular forms; consult a dictionary.

For analyses of fish population dynamics, we prefer the notation as used by W. E. Ricker in his *Computation and Interpretation of Biological Statistics of Fish Populations* (Fisheries Research Board of Canada Bulletin 191, 1975). However, all such symbolism should be defined anew in each manuscript. Our standards for chemical names are the current editions of the *Merck Index* (Merck & Co., Rahway, New Jersey) and *Enzyme Nomenclature* (Academic Press, San Diego, California). Geneticists should use the "Gene Nomenclature for Protein-Coding Loci in Fish" by J. B. Shaklee et al. (*Transactions of the American Fisheries Society* 119:2–15, 1990).

*Writing for Fishery Journals*, edited by John Hunter (1990, American Fisheries Society), contains an excellent chapter on graphic and tabular display of data; other chapters provide advice about statistical and word usage. Several style manuals provide useful guidance for the preparation of manuscripts, among them are the latest editions of *Scientific Style and Format* (Council of Biological Editors, Chicago) and the *Chicago Manual of Style* (University of Chicago Press, Chicago). The *Elements of Style* by Strunk and White (Macmillan, New York) continues to be an excellent guide to English usage. Accuracy and precision in scientific writing are just as important as accuracy and precision in scientific measurement. Lapses in either context invite criticism.

#### *Format Conventions*

Whenever authors follow the style and format of the journal for which they write, they earn the appreciation of reviewers, editors, and typesetters,

and save themselves extra revisionary work. The following conventions apply to this journal.

(1) *Double-space all material*, including title, abstract, footnotes, references, tables, and table and figure legends.

(2) Print (on one side of the paper only) on paper approximately  $8.5 \times 11$  inches in size; leave a 1-inch margin on all sides. Number all pages sequentially, including title page, abstract, tables, and figure legends. Make sure that headers or footers will not be confused with the text.

(3) Use a standard print font of a size that gives 10–12 characters per inch. Avoid fonts with compressed or expanded letter spacing and use a single font size throughout. Use boldface type only to indicate first-level heads and vectors. Use an italic font and not underlining to indicate italics.

(4) Turn off all hyphenation and justification routines. Delete all horizontal and vertical lines from tables, except the horizontal lines above and below the column heads and across the bottom of the table.

(5) Avoid solid capital letters except for acronyms, which, along with abbreviations and symbols (including numerals), should never begin a sentence. Use an italic font only for taxonomic binomials (other Latin words and phrases are *not* italic), second- and third-level subheadings, single-letter variables and constants in mathematics and statistics, and for *occasional* emphasis.

(6) Spell out one-digit numbers unless they are used with units of measure or are directly compared with a larger number: four anglers; 5 cm; 8 walleyes and 16 saugers. Use numerals for decimal fractions and numbers of two or more digits: 0.4 times; 17 tanks; 326 fish, but spell out any number that begins a sentence. Use commas in numbers of 1,000 and greater; use 0 before decimal fractions (0.05).

(7) Use the 24-hour clock for diel time (and spell out “hours”): 1435 hours, not 2:35 p.m. Calendar dates can follow either of two formats: day month year (17 July 1990) or month day, year (July 17, 1990); select one style and use it consistently throughout the paper, including tables and figures. “Julian day” does not mean day of the year, and it should not be used in fisheries writings.

(8) Follow the name-and-year system for literature citations (see References below).

(9) Keep text footnotes to a minimum and number them sequentially throughout the paper. Table footnotes take lowercase, superscript letters in alphabetical order, and the sequence starts anew with each table.

(10) Use either metric or English units of measure but not both. When one unit appears in a denominator, use a solidus (6 mg/L); use negative exponents and product dots for compound denominators ( $26.4 \text{ g}\cdot\text{m}^{-3}\cdot\text{h}^{-1}$ ).

(11) Indicate the national currency involved the first time a monetary value is given (e.g., Can\$6, US\$197).

(12) Give fish ages in Arabic, not Roman, numerals (age 3, not age III) and avoid plus (+) signs in the age notation. A fish is age 0 during its first year of life, which is assumed to end December 31 unless otherwise indicated. Define any specialized age notations such as those used for anadromous species.

(13) Symbols and abbreviations that may be used without definition in this journal are listed at the end of this “Guide for Authors.” All others must be defined when they are introduced in each paper; for example, “1,000  $\times$  gravity (g)” at first use, and “1,000 g” thereafter. To facilitate communication with readers, avoid excessive use of abbreviations and acronyms.

#### *Manuscript Components*

Manuscripts normally should be assembled in this order: title, authors, addresses, a short (40–50 characters) running title, and at least five keywords (on one page); abstract (on the second page); introduction, study site, methods, results, discussion, acknowledgments (run-in on successive pages); references; all text footnotes (including address changes); appendixes; tables; figure captions; figures. The following notes expand on these items.

*Title.*—The title should accurately reflect a paper’s content. The best titles—those that attract a reader’s attention and interest—are usually short (a dozen words or fewer) and crisp. Latin binomials covered in the latest edition of the Society’s *Common and Scientific Names of Fishes from the United States and Canada* should not be included in the title. Authors of scientific taxa also should be omitted from the title except when their names are absolutely needed for clarification.

*Abstract.*—All articles and management briefs require abstracts, but comments do not. The abstract should be a single paragraph that concisely states (in 300 words or fewer for an article, in 75–200 words for other papers) why you did your study, what you did, what you found, and what your results mean. Abstracts should neither list the contents (this is presented; that is discussed) nor review the methods. Literature citations and foot-

notes are not allowed in abstracts. Limit the use of abbreviations. Abstracts obviate the need for formal text summaries. Because they are widely circulated by abstracting services, abstracts have much larger readerships than do full papers and should represent the texts fairly and accurately.

*Introduction.*—An introduction should set the context for the work to be reported and establish the purpose and importance of that work. It also should demonstrate the author's awareness of the most pertinent literature, including review articles. However, a comprehensive literature survey may be deferred to the discussion section if this is more appropriate. No heading is required.

*Study site.*—A report of field studies may need a detailed site description, which can be given in a separate section of the manuscript. Limit the information to that needed for an understanding and interpretation of the results. If only a few words are needed to locate and describe the study site, include them in the introduction or methods. Maps are unnecessary if they only give information contained in standard atlases.

*Methods.*—Methodologies can be tedious to read, but it is better to be overly explicit than to omit details needed by a reader to evaluate the data or repeat the study. Previously published descriptions of equipment and procedures may be cited by reference, unless they are in theses, dissertations, agency reports, or other sources of limited availability. Clarity of expression is as important in the methods section as it is elsewhere in the paper. If the experimental protocol and equipment are particularly complex, they can be displayed in a table or figure. Similarly, the numerous variables needed for some mathematical developments may be listed and defined in a table.

Long papers that report diverse research may benefit if methodological details are split up and regrouped together with the respective results. This can help the reader to associate the data with the respective procedures. In such cases, a formal methods section can be restricted to matters common to all or most of the experiments: sources of fish, equipment, chemical analyses, or statistical tests, for example.

Some papers, such as those concerned wholly with techniques or models, may not need a separate methods section.

*Results.*—Results traditionally follow methods, but whenever possible use a more descriptive heading. If results are presented in tables or figures, it is pointless to describe them exhaustively in prose as well; the text can be devoted to sum-

mary statements and analyses. Display data in tables if precision is important, in figures if trends are paramount. Although long lists of raw data are undesirable, basic data should not be refined to the degree that a reader can neither verify the analyses nor use the information for other purposes. Statistical testing is an important part of some analyses, but it should not obscure biological insight. Most importantly, the statistical designs and models used should be appropriate for the study. Many criticisms of fishery work address statistical flaws; consult experts as necessary. Although most scientific decisions are based on a statistical probability of error of 5% or less, we have no requirements regarding significance levels. Decision probabilities should balance the sacrifice of biological information against the consequences of being wrong. Use biological terms rather than statistical jargon to describe the results of statistical tests. For each statistical test, report the statistic, the degrees of freedom, and the probability, either parenthetically or in a table.

*Discussion.*—The value of a paper can be greatly enhanced by a good discussion. This is the place to relate what has been learned to what is known, create new syntheses, search for generalities, and establish basic principles. The weakest discussions are brief literature surveys appended to mechanical restatements of the results; these usually should be integrated with the results in a single section of the paper. The strongest discussions are true essays that materially advance the science of fishery management. Most discussions fall between these extremes because they are founded on limited research objectives, but a thoughtful discussion can transform a pedestrian paper into a remarkable one.

The quality of a discussion is inversely related to redundancy, wordiness, and unfounded speculation. It is better not to make a point than to burden it with a paragraph of qualifications. The work of others, when cited, should be attributed carefully and accurately. Transitions from evidence to intuition need explicit identifications.

*Acknowledgments.*—Place disclaimers and grant and contribution numbers in the acknowledgments. Acknowledge only people and institutions that contributed directly to the project, research, or the manuscript's quality. The psychic support of spouse, family, and friends can be rewarded in other ways.

*References.*—Select references with caution. We discourage reference to progress reports and disallow reference to unpublished papers or abstracts

of papers given at conferences, or to manuscripts in preparation or under review—except to acknowledge (in the acknowledgments section) intellectual debt. Although theses, dissertations, final reports, and institutional documents of limited or no circulation often contain useful data and may be cited, such sources rarely have been subjected to external review and should be cited sparingly. Authors may be requested to provide unpublished reports if they are required by the referees; however, reliance on unpublished reports reduces an author's credibility. If unpublished data or personal communications must be cited, do so parenthetically in the text, giving initials, surname, and affiliation (not address) of the source, for example: (A. B. Jones, Institute for Aquatics, personal communication). Obtain written permissions from the appropriate people to cite unpublished data and personal communications, and be prepared to show such letters to the editor.

Literature citations in the text take either of two forms, depending on the context. Note the punctuation in the following examples.

(1) Johnson (1995), Jones and Smith (1996, 1998), Rice et al. (1997), and Berger (in press) found walleyes in Lake Pollock.

(2) Walleyes occur in Lake Pollock (Johnson 1995; Jones and Smith 1996, 1998; Rice et al. 1997; Berger, in press).

Cite both of two authors, but for three or more give only the first author plus "et al." Arrange multiple citations chronologically (oldest first) in a text sentence.

If their names are long, institutional authors may be cited as acronyms in the text, but such acronyms must be defined in the references. For example, "APHA et al. (1992)" cited in the text appears in the reference list as "APHA (American Public Health Association), American Water Works Association, and Water Environment Federation. 1992."

In the reference list, alphabetize entries first by the surnames of first authors and the first word or acronym of corporate authors, then by the initials of first authors with the same surname, and finally by the surnames of coauthors. List multiple papers by the same author(s) chronologically by year of publication. Distinguish papers by the same author(s) in the same year by lowercase letters after the year (1998a, 1998b). Substitute "in press" for the year if a paper has been accepted for publication but page numbers are not yet available.

Completely spell out all bibliographic infor-

mation, *including serial titles*. We allow only these abbreviations:

(1) first and middle initials of authors and editors;

(2) abbreviations that occur in the titles of articles and books and in the names of authors;

(3) ordinal numbers (2nd edition, 4th congress) other than those spelled out in titles.

Examples of common bibliographic formats follow. *Remember to double-space all references.*

(1) Articles in journals and other periodicals listed in *Biosis Serial Sources* (Biosis, Philadelphia): author(s); year; title; serial; volume; issue (if needed); inclusive pages. Include the issue number only when each issue starts with page 1.

Brousseau, C. S., and E. R. Armstrong. 1987. The role of size limits in walleye management. *Fisheries* 12(1):2–5.

Carpenter, S. R., P. Cunningham, S. Gafny, A. Muñozdel-Río, N. Nibbelink, M. Olson, T. Pellett, C. Storlie, and A. Trebitz. 1995. Responses of bluegill to habitat manipulations: power to detect effects. *North American Journal of Fisheries Management* 15:519–527.

Crawshaw, L. I., D. E. Lemons, M. Palmer, and J. M. Messing. 1982. Behavioral and metabolic aspects of low-temperature dormancy in the brown bullhead, *Ictalurus nebulosus*. *Journal of Comparative Physiology B* 148:41–47.

Rosgen, D. L. 1985. A stream classification system. U.S. Forest Service General Technical Report RM-120:91–95.

Wilde, G. R., and R. K. Riechers. 1994. Demographic and social characteristics and management preferences of Texas freshwater catfish anglers. *Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies* 46(1992): 393–401. [Note: For this serial only, the meeting year follows the volume number; the year of publication follows the authors' names.]

(2) Book: author(s); year; title; edition (other than 1st) or volume (if part of a series); publisher; city; state, province, or country (only if needed to locate city). Omit the number of pages.

APHA (American Public Health Association), American Water Works Association, and Water Environment Federation. 1992. *Standard methods for the examination of water and wastewater*, 18th edition. APHA, Washington, D.C.

Hoar, W. S., and D. J. Randall, editors. 1988. *Fish physiology*, volume 11, part B. Academic Press, New York.

Sokal, R. R., and F. J. Rohlf. 1981. *Biometry*, 2nd edition. Freeman, San Francisco.

Summerfelt, R. C., and G. E. Hall, editors. 1987. *Age and growth in fish*. Iowa State University Press, Ames.

Waters, T. F. 1995. Sediment in streams: sources, biological effects, and control. American Fisheries Society, Monograph 7, Bethesda, Maryland.

(3) Article in a book (including those in the AFS “serial” books—Special Publications, Symposia, and Monographs): author(s); year; title; inclusive pages; editor(s); book title; publisher; series name (if appropriate); city; state, province, or country (only if needed to locate city). Identify conference proceedings by year of publication, *not* by the year of the meeting, and give the publisher’s name and location (i.e., where the proceedings may be obtained), *not* the location of the meeting.

Campton, D. E. 1995. Genetic effects of hatchery fish on wild populations of Pacific salmon and steelhead: what do we really know? Pages 337–353 in H. L. Schramm, Jr., and R. G. Piper, editors. Uses and effects of cultured fishes in aquatic ecosystems. American Fisheries Society, Symposium 15, Bethesda, Maryland.

Livingstone, A. C., and C. F. Rabeni. 1991. Food-habitat relations of underyearling smallmouth bass in an Ozark stream. Pages 76–83 in D. C. Jackson, editor. The first international smallmouth bass symposium. Mississippi Agriculture and Forestry Experiment Station, Mississippi State University, Mississippi State.

Zuckerman, L. D., and R. J. Behnke. 1986. Introduced fishes in the San Luis Valley, Colorado. Pages 435–454 in R. H. Stroud, editor. Fish culture in fisheries management. American Fisheries Society, Fish Culture Section and Fisheries Management Section, Bethesda, Maryland.

(4) Dissertation or thesis: author; year; title; dissertation; university; city; state, province, or country (only if needed to locate city).

Hartman, K. J. 1993. Striped bass, bluefish, and weakfish in the Chesapeake Bay: energetics, trophic linkages, and bioenergetics model applications. Doctoral dissertation. University of Maryland, College Park.

Wismer, D. A. 1982. The impact of thermal effluents on smallmouth bass reproductive success at Baie du Dore, Lake Huron. Master’s thesis. University of Toronto, Toronto.

(5) Government publication: author(s); or agency; year; title; agency; type and number of publication; city; state, province, or country (only if needed to locate city).

Beamesderfer, R. C. 1988. MOCPOP: a flexible simulator for analysis of age-structured populations and stock-related functions. Oregon Department of Fish and Wildlife, Information Report 88-3, Portland.

EPA (U.S. Environmental Protection Agency). 1986. Quality criteria for water. EPA, Report 440/5-86-001, Washington, D.C.

(6) Contract report: author(s); year; title; organization that issued the report (if different from the author); organization that received the report; receiver’s city; state, province, or country (only if needed to locate city).

Smith, A. B. 1986. Turbine-induced fish mortality at Highrise Dam, 1985. Report of Robertson Consultants to Prairie Utilities, Jonesville, Alberta.

(7) Internet: author or agency; year; title; publisher; URL; month and year accessed.

Baldwin, N. A., R. W. Saalfeld, M. R. Dochoda, H. J. Buettner, and R. L. Eshenroder. 2000. Commercial fish production in the Great Lakes, 1867–1996. Great Lakes Fishery Commission. Available: [www.glfrc.org/databases/commercial/commerc.asp](http://www.glfrc.org/databases/commercial/commerc.asp). (September 2000).

Note that only the first words and proper nouns of English titles are capitalized. In German titles, all nouns are capitalized. Retain italics when they are used in the titles cited.

*Footnotes.*—Bring all text footnotes together after the references. Keep them to a minimum. Typical footnotes give address changes for authors and availability of supplementary data. Most other material, including personal communications (which also should be minimized), can be included in the text or the acknowledgments.

*Tables.*—Organize tables to convey the greatest amount of coherent information with the least amount of wasted space and redundancy. One practical constraint is the width of a journal’s printed column or page (69 mm and 143 mm, respectively, in this journal). If necessary, we will split wide tables across facing pages. We do not print tables broadside (landscape) on a page; however, wide tables may be printed in landscape format for review purposes. In most cases, problems of space can be minimized if a table is oriented such that the number of columns is less than the number of rows. Even within these constraints, it frequently is possible to combine small but related tables into a single concise and definitive statement.

*Double space* the captions and entries and continue the table on additional pages as necessary. Use at least a 10-point font for tables. Horizontal rules seldom are used in the body of a table, and vertical lines are *never* allowed; please delete them.

Use table captions or footnotes to identify non-standard symbols and abbreviations. Footnotes take lower case superscript letters, which occur in alphabetical order beginning anew with each table. List footnotes below the table. In column and row

headings, capitalize only the first word, proper nouns, and appropriate symbols. To indicate statistical differences, use lowercase letters beginning with “z” and work backward through the alphabet; set the letters on line, not as superscripts.

Place a zero to the left of the decimal point for fractions smaller than one. Pay attention to the number of significant digits, regardless of what a computer may have printed out. Although fractions of a percent may be statistically justified in some cases, they rarely convey more meaning in fisheries work than do rounded, whole percentages.

*Figure captions.*—List all figure captions sequentially on one or more pages, *double-spaced*. Identify in the captions all symbols that are not standard or defined on the figures, and include full disclosure whenever digital images have been electronically manipulated or enhanced. Nearly all figures are reduced for publication, so magnifications of photomicrographs will be wrong if given in the captions. Place a scale directly on each photo or electron micrograph, and give its equivalent length there or in the caption.

*Figures.*—Submit clear, high-quality figures with the revised manuscript. Place the author’s name and the figure number at the upper edge of the back side of each figure. Original artwork gives the best printing fidelity; photographs of drawings often are slightly out of focus at the edges. When feasible, we prefer line drawings to halftone illustrations. Graphics should be output through a high-quality laser printer or drawn in dense black ink with mechanical drafting equipment. We will not accept xerographic copies of figures or type-written figure labels for publication. Do not use transparent tape on the surface of figures.

Most line drawings can be adequately reproduced in a single column of this journal (69 mm wide) if the lettering and data symbols are of sufficient size and lines are of sufficient thickness.

Lettering should be 6–9 points after the figure is reduced. A figure that is 20 cm wide when drawn can reduce to one column if the smallest original lettering is at least 4.5 mm high (18 point type). Letter sizes on a figure should vary by no more than 2–4 points. Avoid bold type which tends to fill in when reduced and italic type which tends to have very thin lines. Figure reduction can cause symbols and shadings to look alike, dashed lines to become continuous, and dotted lines to disappear, so choose elements that will retain their clarity and contrast when reduced and published. Lines, including *x*- and *y*-axis lines, should be thick enough to withstand reduction, but not so thick as to dominate the figure.

Keep graphics simple and uncluttered. Avoid unnecessary use of three-dimensional charts, black borders, and shaded fill. If shaded fill is used, keep it in the range of 30–70% of black for best reproduction. Labels should describe the *x*- and *y*-axes clearly. Place the *y*-axis label to the left of the axis and orient it to read sideways from bottom to top of the graph. Keep blank space to a minimum by placing axis labels near the axes, multiple panels close together, and ‘outlier’ words (compass directions, scale bars, keys) within the margins of the figure. Carefully planned figures enhance a paper’s message and can reduce authors’ publication costs.

Print photographs on glossy paper with good contrast and mount photos on lightweight flexible card or paper. There may be an extra charge if the editorial office or the printer has to assemble several panels of a figure or to correct errors. Add scale bars to photomicrographs and give the equivalent length either on the bar or in the figure caption. Place any bars, labels, or symbols at least 4 mm inside the outer edges of a photograph. Color photos will be printed in black and white unless the author has made specific arrangements with the Journals Manager to cover the additional cost of color printing.

### Symbols and Abbreviations

The following symbols and abbreviations, as well as others approved for the *Système International d'Unités* (SI), are used in the *North American Journal of Fisheries Management* without definition. All others must be defined at first mention.

<i>Prefixes</i>		common test statistics	hydrogen ion activity	pH
giga (10 <sup>9</sup> )	G	( <i>F</i> , <i>t</i> , etc.)	(negative log of)	
mega (10 <sup>6</sup> )	M	correlation or regression	joule	J
kilo (10 <sup>3</sup> )	k	coefficient (multiple)	levo configuration	L
milli (10 <sup>-3</sup> )	m	correlation or regression	levorotatory	<i>l</i>
micro (10 <sup>-6</sup> )	μ	coefficient (simple)	lumen	lm
nano (10 <sup>-9</sup> )	n	covariance	lux (10.8 fc)	lx
pico (10 <sup>-12</sup> )	p	degree (angular)	molar	M
		degrees of freedom	mole	mol
<i>Time and Temperature</i>		expected value	newton	N
day	d	logarithm (specify base)	normal	N
degrees Celsius	°C	minute (angular)	ohm	Ω
([°F - 32]/1.8)		not significant	ortho	<i>o</i>
degrees Fahrenheit	°F	percent	para	<i>p</i>
([1.8 × °C] + 32)		probability	pascal	Pa
hour (spell out for diel	h	probability of type I	parts per million	ppm
time)		error (false rejection	(per 10 <sup>6</sup> ; in the	
minute	min	of null hypothesis)	metric system, use	
second	s	probability of type II	mg/L, mg/kg, etc.)	
		error (false acceptance	parts per thousand	ppt, ‰
Spell out year, month, week.		of null hypothesis)	(per mille, per 10 <sup>3</sup> )	
		radian	siemens (=mho, Ω <sup>-1</sup> )	S
<i>Weights and Measures (Metric)</i>		sample size	tesla	T
centimeter (0.394 in)	cm	population	tris(hydroxymethyl)-	tris
deciliter	dL	sample	aminomethane	
gram (0.0353 oz)	g	second (angular)	volt	V
hectare (2.47 acres)	ha	standard deviation	watt	W
kilogram (2.20 lb)	kg	standard error	weber	Wb
kilometer (0.622 mi)	km	steradian		
liter (0.264 gal, 1.06 qt)	L	variance	<i>General (Some Are Restricted)</i>	
meter (1.09 yd, 3.28 ft,	m	population	compass directions (maps	
39.4 in)		sample	and coordinates):	
Spell out metric ton (1,000			east	E
kg, 2,200 lb).			north	N
			south	S
			west	W
		<i>Physics and Chemistry</i>	corporate suffixes:	
<i>Weights and Measures (English)</i>		all atomic symbols	Company	Co.
cubic feet per second	ft <sup>3</sup> /s	alternating current	Corporation	Corp.
(0.0283 m <sup>3</sup> /s)		ampere	Incorporated	Inc.
foot (30.5 cm)	ft	becquerel	Limited	Ltd.
gallon (3.79 L)	gal	calorie (joule is preferred)	District of Columbia	D.C.
inch (2.54 cm)	in	candela	et alii	et al.
mile (1.61 km)	mi	chemical acronyms listed	et cetera	etc.
ounce (28.4 g)	oz	in Webster's dictionaries	filial generation	F
pound (0.454 kg, 454 g)	lb	(DDT, EDTA, etc.)	for example	e.g.,
quart (0.946 L)	qt	coulomb	international unit	IU
yard (0.914 m, 91.4 cm)	yd	dextro configuration	months (tables, figures):	
Spell out acre (0.405 ha) and		dextrorotatory	first three letters	
ton (2,000 lb, 907 kg).		direct current	(e.g., Feb, Jun, Sep)	
		electron volt	ploidy	n
<i>Mathematics and Statistics</i>		equivalent	sex (tables, figures, hybrid	
all standard mathematical		farad	crosses): female	♀
signs, symbols, and ab-		footcandle (0.0929 lx)	male	♂
brevisions		gray	that is	i.e.,
base of natural logarithm	<i>e</i>	hertz	United Kingdom	UK
		horsepower (746 W)	United States (adjective)	U.S.
			United States of	USA
			America (noun)	