



AFSCUS

AMERICAN
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COMPUTER
USER
SECTION

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President's Byte *Michael D. Porter*

The year 2000 has been a busy one for the Computer User Section. The Fisheries GIS Symposium at the Annual meeting in St. Louis was well attended. The papers comprising the symposium highlighted the breadth of GIS applications in fisheries science, and areas in need of further development. In the coming

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year, I want to continue emphasizing GIS, and increase the visibility of fisheries GIS within the section.

Several new fisheries software packages have come out this year. The reviews published in this newsletter indicate these programs are major advances in fisheries analyses. Mike Maceina provided members at the section business meeting a quick overview of the FAST program capabilities. Dave Fournier's AD Model Builder is a high-powered tool for creating non-linear computer models.

Another trend of interest to fisheries biologists and managers is the coalescence of "Environmental Informatics". By combining extensive computer databases with GIS and additional programs, biologists can evaluate biodiversity and environmental habitat (<http://biodi.sdsc.edu/>). Another project based at the University of Kansas involves networking of museum computer databases for fish collection (<http://habanero.nhm.ukans.edu/fishnet/partners.html>).

The section continues its role in advising AFS HQ on computer and technology issues. We are evaluating list-server software for installation on the fisheries.org mail server. The goal is to migrate the AFS-L to the society computer network and provide mailing list services to all AFS divisions, sections, chapters, and committees.

The monthly e-notes has generated interesting feedback from the membership. The proxy server was shifted to my personal email ISP due to increased security for the university computer. I expect member responses to the e-notes to increase again with the colder weather. Send suggestions, topics, or other information for e-notes to me at mdporter@cypress.mcsr.olemiss.edu. I particularly want to emphasize GIS and handheld computers, but any topic related to fisheries and computing will be included.

Lastly, I am asking for volunteers to help update and reorganize content on the Computer User Section website (www.fisheries.org/cus). This is an important function of the section, and requires the efforts of many members to maintain. I have received several calls recently requesting assistance in finding fisheries related software. Contact Joe Mion (joe.mion@dnr.state.oh.us) or myself, and we will direct volunteers toward particular sections to revise. Thank you.



Computer User Section Annual Meeting
August 23, 2000: 5-6:30 PM
Submitted by Stuart Shipman, AFS-CUS
Secretary/Treasurer

President's Report:

The Section business meeting was held immediately following a very successful GIS applications symposium hosted by CUS and moderated by President Porter.

Dirk Miller has retired as CUS webmaster with that role being assumed by Joe Mion with Ohio Division of Wildlife (joe.mion@dnr.state.oh.us). Under Joe's leadership the Section is attempting to make the website more dynamic and useful to both the membership and the Society. We are actively looking for members who would be willing to serve as associate web editors to help keep our site active and relevant. We are also constantly looking for new shareware or commercial software to add to our library. Developers should contact Gary Ash (gash@rll.ca) if they would like to submit their products to the Section for inclusion in the library.

A donation of \$250 was made to the Administrators Section in support of the World

Fisheries Congress being held this year in China. We also continued to support the AFS listserv and helped get publication of the Transactions back on track with a \$300 donation.

The Section poster was updated and displayed for the first time at the annual meeting. Stu Shipman will be taking the poster to the Midwest in December. Dirk Miller taught two workshops on Internet Use that were sponsored by the Section.

President Elect Report:

Beard reported that he is working on a grant through the International Association of Fish and Wildlife Agencies to host Fish Database Summit II. AFS-CUS will function as the lead agency for this grant and will handle arrangements, travel, agenda, and reporting requirements jointly with a hired consultant. Unfortunately, competition for USFWS administrative funds this year, limited the number of proposals that were approved for funding by the International and the Data Summit proposal was not included.

Beard also agreed to examine the Society's Strategic Plan and identify aspects that the Computer User Section could work to accomplish. Some discussion to host a second GIS symposium at next year's annual meeting was considered but no firm decision was made. If members feel this is a worthwhile idea that they would be willing to participate in, drop either Mick Porter (mdporter@cypress.mcsr.olemiss.edu) or Doug Beard (BeardT@mail01.dnr.state.wi.us) a line.

Secretary-Treasurer Report:

In compliance with IRS rules I prepared a financial statement for the period July 1, 1999 to June 30, 2000. This report was submitted along with the Section's annual report to the AFS Governing Board.

Presently we have about \$1,500 more dollars in comparison to Fall 1997 with a balance of \$6,673.47 as of October 17, 2000. This increase

came primarily from reduced travel expenses and cost of printing and distributing the newsletter. Presently only about 100 members are receiving printed copies of the newsletter with the remaining 300 accessing the material via the Internet. This action reduced the cost of distributing the newsletter from around \$900 per issue to an average of \$150 per issue.

We did collect a significant amount of money as co-sponsors of both the 4th Computer Applications in Fish and Wildlife Conference and two workshops presented at last year's Midwest Fish and Wildlife Conference. By handling registration through the Section's account we made a small amount of money in interest. Both the workshops and Computer Conference were pretty much break even projects for the Section.

Travel assistance to the 2000 AFS annual meeting was provided to both Stuart Shipman (\$259.10) and Gary Ash (\$500.00). All other officers in attendance had agency funding for travel.

Software Librarian Report:

Software sales were reported to sustain themselves at about 3-5 packages per month. Interestingly, many of the packages currently being sold are available free at the ftp site. Revenue from software sales has varied from about \$550 in 1999 to \$1,160 in 1998. New additions to the library could boost sales in the coming years.

Software Review:

Reviews Completed

- *Principles and Techniques of Electrofishing* (April 1999) - Presently negotiating for inclusion in Software Library.
- *Fish Bioenergetics 3.0* (August 1999) - Agreement reached for inclusion in Library. Whelan is checking on when this product will be available.
- *Fish Math* - Problems Identified; Program withdrawn.
- *Simulating Aquaculture Production (SAP)*

written by M. Spratt (August 2000) - Accepted; Currently in negotiations for inclusion in Library.

Reviews in Progress

- *WinBugs*
- *Fisheries Analysis and Simulation Tools (FAST)* - Submitted by Jeffrey Slipke and Mike Maceina.
- *AD Model Builder* - David Fournier
- *FISHWARE 1.0.3* - Craig Treat

New Software

- *FishXing* - fish passage through culverts - M. Furniss
- *CSAGES* - Calcified Structure Age-Growth Extraction Software - John Casselman

No new Business was offered from the floor and the meeting was adjourned.



Computer User Section Financial Report

Stuart T. Shipman

July 1, 1999 to July 5, 2000

Balance on 7/01/99 \$5,606.31

INCOME

AFS dues allotment \$2,685.00
 Interest on account (7/5/00) 78.77
 Software sales 1,039.00
 4th Microcomputer App. Conference
 Registration 22,090.00
 Continued Education workshop-
 Midwest F & W Conference 2,600.00
 Total Income \$28,492.77

SUBTOTAL \$34,099.08

DISBURSEMENTS

Newsletters (two) 524.53
 World Fish Conf. contrib. 250.00
 EXCOM Travel (Whelan) 95.63
 AFS Listserve 300.00
 Transactions AFS contrib. 300.00
 Software upgrades 116.00
 Software mailing supplies 77.28
 AFS computer storage space 80.00
 4th Microcomputer Conf. 21,895.00
 Continued Ed Workshop 2,600.00

Total Disbursements \$26,238.44

CURRENT BALANCE \$7,860.64

ASPIC Modeling Program Available

Michael Prager

For those who are interested in surplus-production modeling, my software ASPIC for fitting the logistic (Schaefer) production model is available on the Web at

<http://shrimp.ccfhrb.noaa.gov/~mprager/>

The program runs on Windows NT and Windows 9x, and a Linux version could be provided. A user's manual and other related resources are available on the Web site.

I am revising the software to fit the generalized (Pella-Tomlinson) model, and I am looking for one or two testers of the revised version. A tester would need a fast PC, a reliable Internet connection, some data to analyze, and basic familiarity with surplus-production modeling. Anyone interested should drop me an email.

Michael Prager, Ph.D.
 <Mike.Prager@noaa.gov>
 Population Dynamics Team
 NOAA Beaufort Laboratory
 101 Pivers Island Road
 Beaufort, North Carolina 28516 USA

Practical Approaches for Conserving Native Inland Fishes of the West

June 6-8, 2001

Brad Shepard

The Montana Chapter and Western Division of the American Fisheries Society are hosting this symposium at the University of Montana in Missoula, Montana. This symposium will emphasize knowledge on implementation and evaluation of field techniques. For more information or to find out about registration contact the University of Montana at <http://www.umt.edu/afs>.



CANOCO Version 4 Announcement

Douglas Nieman

dnieman@normandeau.com

CANOCO Version 4 is now available from Microcomputer Power of Ithaca, NY (www.microcomputerpower.com). CANOCO performs a variety of indirect and direct gradient analyses via ordination techniques (PCA, RDA, CA, DCA, CCA, with options for detrending and partial ordination). The new manual carries a 1998 publication date, so it's been out for a while, but it is not widely known. Even recent papers using CANOCO are still citing v. 3.1, and although I had a licensed copy of 3.1, I never got a notice about 4. It has a WINDOWS GUI and runs on Win95/98 or NT 4.0 or higher. A Mac version is advertised as well. It comes with utilities and a full version of the CANODRAW graphics package. One nice utility allows reading of input data from a spreadsheet, eliminating the

need to fiddle directly with finicky FORTRAN input statements and text files.

How to Manage Data Badly

Stephen Hale

Lists of rules on how to manage data are often good prescriptions for insomnia. More interesting is a look at the ways people have gone about managing data badly and the consequences. This article gives a set of "rules" and examples illustrating things that people have done with environmental and fisheries data but probably should not have. An epilogue sorts things out and makes a pitch for a few simple things that would lead to better data management.

This article was published in two parts in the Bulletin of the Ecological Society of America--Vol 80 (4):265-268 and Vol 81(1):101-103. These are on the ESA Web site (<http://esa.sdsc.edu>). Direct URL is:

<http://www.esajournals.org/esaonline/?request=get-archive>

Look for Vol 80, Issue 4 and Vol 81, Issue 1. The articles are in the Commentary section.

Japanese Windows Errors Messages

Bern Megrey

In Japan, they have replaced the impersonal and unhelpful Microsoft error messages with their own Japanese haiku poetry, each only seventeen syllables, five syllables in the first line, seven in the second, five in the third...

Yesterday it worked.
Today it is not working.
Windows is like that.

A file that big?
It might be very useful.
But now it is gone.

The Web site you seek
Can not be located but
Countless more exist.

Chaos reigns within.
Reflect, repent, and reboot.
Order shall return.

Aborted effort:
Close all that you have worked on.
You ask far too much.

Windows NT crashed.
I am the Blue Screen of Death.
No one hears your screams.

First snow, then silence.
This thousand dollar screen dies
So beautifully.

With searching comes loss
And the presence of absence:
My Novel? not found.

The Tao that is seen
Is not the true Tao until
You bring fresh toner.

Stay the patient course.
Of little worth is your ire.
The network is down.

A crash reduces
Your expensive computer
To a simple stone.

Three things are certain:
Death, taxes, and lost data.
Guess which has occurred.

You step in the stream,
But the water has moved on.
This page is not here.

Out of memory.
We wish to hold the whole sky,

But we never will.

Having been erased,
The document you're seeking
Must now be retyped.

Serious error.
All shortcuts have disappeared.
Screen. Mind. Both are blank.



A Review of Four Palm Computer Books *Michael D. Porter*

The Palm computer as a portable computer offers the advantages of size, flexibility, and price for field biologists. The memo pad and calendar are usable for logging basic information. Loading on a calculator and spreadsheet expands its usefulness. The untapped potential of the Palm computer lies in programming data collection programs for specific projects like conducting a creel census or collecting environmental data. The following four books take different perspectives in examining the Palm handheld computer. All books contain a CD-ROM with CodeWarrior Lite, third-party software, and example code. The complete CodeWarrior software is available from www.metroworks.com and various retailers.

Palm Pilot - The Ultimate Guide (1st edition) by Darrell Pogue provides an overview of the Palm series personal digital assistants (PDA). This is useful for someone who hasn't seen a PDA demonstrated or wants more comprehensive user's guide than the owners manual. It surveys

the potential uses for the Palm computers, including interfacing with a GPS. The book introduces programming custom applications in one chapter. The appendix has an extensive listing of shareware and freeware web sites. Additional links to Palm software sites are listed on the Computer User Section (www.fisheries.org/cus) website.

Palm Programming: The Developer's Guide by Neil Rhodes and Julie McKeenan is more a hackers guide for writing applications on the Palm computer. It has in-depth coverage of the C program modules that are essential in creating Palm applications. The book is aimed at C programmers, with lots of example code. The book is less useful for novice programmers looking to incorporate examples into development of new applications. The CD has a demo version of Satellite forms, and gcc compilers for Windows and Linux. The book is more useful as a reference guide than for learning to program Palm applications.

Palm Programming: The Authoritative Solution by Glenn Bachmann has a more concise style illustrating the tools that are available for applications development. The author takes a tutorial approach in this book, with stand alone chapters on specific topics. While some examples appear contrived, they show basic techniques for using tables, scrolling, buttons, and databases. The book emphasizes using CodeWarrior Palm Pro as the software to expedite application development in C/C++. Bachmann's highly structured approach with many functions can be confusing to programmers new to C/C++.

Palm OS Programming from the Ground Up by Robert Mykland provides a more organized format than Bachmann. This book has the clearest examples, with step-by-step explanations, which makes developing Palm applications a realistic goal for novice programmers using CodeWarrior. The author's discussion of the examples is straightforward and informative. Of

the four books, I recommend Mykland's book for novice developers programming new applications for the Palm.



**AIMS, New Database Created by Indiana
Dept. of Environmental Management
(IDEM)**

Jim Stahl and Chuck Bell

The Assessment Branch of Water Quality at IDEM is developing a centralized data storage and retrieval system that will provide an easily accessible database of surface water resources information. The Assessment and Information Management System (AIMS) will contain information regarding biological, chemical and physical aspects of streams, rivers and lakes. It will include macroinvertebrate and fish communities, fish tissue contaminants, water chemistry, sediment contaminants, qualitative habitat assessments, and stream characteristics. AIMS is being designed to assist staff with the water quality survey process beginning with planning and ending with report generation. For stakeholders outside of the agency, the goal is to have timely access to current data through a user friendly interface. Information in AIMS will be accessible to other IDEM offices over the IDEM intranet and will be made available to stakeholders outside of the agency over the Internet. Full implementation outside the agency is still a few months away, but water chemistry data is currently available to Assessment Branch staff.

AFSCUS SOFTWARE REVIEW

Date: 13-07-2000

Program Title: Simulating Aquaculture Production

Developers: Company: N/A

Contact: Michael Spratt e-mail: mspratt@crit.univ-montp2.fr

Program Description: Three spreadsheet models (Lotus 123) of cultured fish dynamics and economics, based on the user's input of key biological, environmental, and economic variables. Specifically, the models were developed for simulating the production of sea bass (*D. labrax*) in cages in the open sea.

Program Strengths: Successfully encapsulates the complex interaction of biological & economic features of fish culture needed to generate commercial production scenarios.

Program Weaknesses: The spreadsheet format limits the app's ease-of-use and portability.

Computer OS: See "Program Requirements"

Program Requirements: A spreadsheet application that reads (or translates) the .wk1 file format.

Hardware Requirements: N/A

Configuration Used: Mac PowerPC, Windows 98, Windows 2000, all with MS Excel

Subject Area: (Y) Management (Y) Population Dynamics (Y) Modeling
(Y) Culture (Y) Age and Growth (Y) Education
() Systematics (Y) Population Estimation (Y) Administration
() Habitat (Y) Economics
() Other

Availability: (Y) Public Domain () Proprietary

Compatibility: () IBM Compatible () Macintosh () Apple () Other ____

Accuracy of Calculations: () Good () Bad (Y) Untested () Not Applicable

Documentation: Rate 1 to 10*: 7

User Friendliness: Rate 1 to 10*: 4

Education Value: Rate 1 to 10*: 6

Productivity Potential: Rate 1 to 10*: 8

Overall Rating: Rate 1 to 10*: 6

* For 1 to 10 rating scales: 1 = bad; 5 = average or acceptable; 10 = great.

Incorporate into AFSCUS Library: (Y) Yes () No

General Comments: Spratt's program, available in French and English versions, is ambitious in scope and rich in practical information. Both it and the accompanying online documentation demonstrate a lot of thought and effort. It will prove useful to those undaunted by its complexity, much of which is owed to the nature of the problem the application addresses. SAP would be accessible to a much wider audience if, instead of being implemented as a large spreadsheet, the underlying logic were wrapped in the UI of a 'traditional' application: one in which navigation is accomplished via menus & toolbars; and data are entered & reported using familiar controls (e.g., text boxes, radio buttons, list controls) in dialogue boxes and frame windows. Making the SAP tutorial guide available online for downloading would contribute to flattening the learning curve.

Editor's Note: Dr. Spratt indicated that he has been working on a program AIM which takes most of SAP and puts it into a database (written in Foxpro) which has a standard user interface (windows, radio buttons, pull-down and pop-up menus, etc). He has yet to finalize and test the program before he can release and support it.

Selling Price (if applicable): N/A

Download at http://www.geocities.com/michael_spratt/Downloads/Default.htm

American Fisheries Society Website

Hannelore Quigley

hquigley@fisheries.org

The AFS Internet site is an extremely helpful site to our members. You can catch up on the latest national AFS scene or see what's happening in your local chapter at www.fisheries.org. Additionally, here are some of the extensive set of resource links at the AFS site:

Publications, including the AFS Online Bookstore: <http://www.fisheries.org/Publications.shtml>

Certification: <http://www.fisheries.org/Certification.shtml>

AFS Mailing List Rental: <http://www.fisheries.org/Marketplace.shtml>

Public Policy, including AFS Policy Statements: <http://www.fisheries.org/PublicPolicy.shtml>

Meetings and Events: <http://www.fisheries.org/Calendar.shtml>

The AFS Jobs Center Online has become the resource for fisheries-related employment. If you are looking for a job, or have one to post, this site should be your first stop. Check it out at www.fisheries.org/jobs.html. Also, you can browse featured articles from the latest issue of FISHERIES magazine at <http://www.fisheries.org/fisheries/fishery.shtml>.



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SOFTWARE REVIEW

Reviewed By: **Mark Maunder^{1,2}** Date: **11 September**

Program Title:	AD Model Builder
Version:	3.10

2000

Developers: **Company:** **Otter Research Ltd**
Contact: **Dave Fournier**
e-mail: otter@otter-rsch.com
Web: <http://otter-rsch.com/>

Program Description:

AD Model Builder (ADMB) is a computer programming template and a set of C++ libraries that aid in the development and parameter estimation of non-linear models, particularly models that include a large number of parameters to be estimated. ADMB is not a general model (like **Stock Synthesis**) or a tool for making modeling simple (like **Stella**). Instead ADMB is a tool for estimating model parameters within an efficient and stable estimation procedure. Therefore, the user does not have to program their own non-linear parameter estimation routine, but the user is required to program all the main aspects of the model using C++. This provides a flexible framework for model development. Knowing how to program in C or C++ (or any other language and quick tutorial in C or C++) is a prerequisite for using ADMB. (Note that most of the coding is done using C and very little if any C++ knowledge is needed.) The user also needs to have a coherent model and a data set in mind before beginning programming.

The user creates a model within ADMB by following a template, adding program lines using both C++ and ADMB conventions. An ADMB proprietary executable file is then used to convert the template into a C++ file which contains all declarations, references to include files, and other requirements of the C++ language. The C++ code is compiled (using either a commercial or free C++ compiler) and then linked to the ADMB library using a standard C++ linker. An executable file is thus produced which can be used to run the model. The template provides the environment where the estimation routine is set up and simplifies implementing the input and output processes. The C++ code can be loaded and used in a debugger environment (like MS Developer Studio) to aid in code debugging.

History:

In the early 1990s, Otter Research developed AUTODIF, a C++ library for automatic differentiation and matrix calculations.

AUTODIF automatically calculates the exact derivatives of each calculation, allowing the use of the exact derivatives within the minimization procedure and in the calculation of standard deviations for estimated and derived parameters. AUTODIF has precompiled adjoint code for the derivatives of commonly used array and matrix operations and uses the reverse mode of automatic differentiation for other operations. Non-linear optimization routines require the derivatives of the function being minimized to solve the problems commonly encountered in statistical modelling. However, most modern statistical modelling packages use finite difference approximations for these derivatives, leading to two major limitations. First, the inaccuracy of the derivative approximations causes instability in the minimization process, and produces unreliable results for ill-conditioned problems. Secondly, finite difference approximations take $n+1$ function evaluations to obtain difference approximation for a function with n independent variables. In contrast AUTODIF can compute exact values for the derivatives at the same time it evaluates the function. This additional computation requires only about four times as much time as it takes to calculate the function itself (compare to $n+1$ times), resulting in a substantial saving of time when using AUTODIF relative to the approaches which use the finite difference approximation.

Given this power, AUTODIF is a useful tool for parameter estimation in non-linear models. However, some users had difficulties in programming more complex models in C++. This was particularly true for implementing a non-linear function minimizer and managing the interface between the model parameters and the function minimizer. So Otter Research developed AD Model Builder, a programming template for developing models in C++ using AUTODIF for parameter estimation. Although AUTODIF remains at its core, AD Model Builder has added functionality in a number of areas used by modelers.

ADMB provides a flexible stepwise process to sequentially estimate the parameters and also allows the placing of bounds on all estimated parameters which restrict the range of possible parameter values. The stepwise procedure (called phases) allows for the preliminary estimation of the parameters which have a large influence on the overall results before estimating the parameters which only have a small influence on the model. This technique is similar to producing good starting values for the estimation process which can avoid having the estimation procedure move away from the best estimate and getting stuck in a local minimum. This process can also be used to convert parameters from fixed parameters to estimable parameters or vice versa simplifying hypothesis testing using AIC, BIC, or similar criteria. Bounds on the estimated parameters stop parameter values from going outside a realistic range and again avoids having the estimation procedure getting stuck in local minima which are associated with unrealistic parameter values.

ADMB also has a number of additional features including, but not limited to, the calculation of the variance-covariance matrix, confidence interval calculation using the normal approximation and likelihood profile methods, Bayesian integration using a Markov Chain Monte Carlo method, a non-linear programming solver, a numerical integration routine, and random number generation. ADMB supports high dimensional and ragged arrays allowing for clean and efficient programming. ADMB also has the facility to create dynamic link libraries (DLL's) with other software products (e.g. Splus, Excel, Visual Basic). For example, an ADMB program can be created and called from S-plus as though it were part of the Splus language. ADMB does not produce any graphical output, but the output files can be easily brought into standard packages like Excel or S-plus for analysis. ADMB allows maximum and minimum bounds for array indices to be any integer values. This allows for more informative and descriptive use of array indices. For example, an array that holds temporal data can have a minimum index of 1950 and a maximum index of 1999.

ADMB is often associated with Bayesian analysis, process error estimation, robust estimation, and random walks in model parameters. ADMB makes these modeling techniques computationally possible, but they are not strictly part of ADMB and there is no requirement for models developed with ADMB to include these concepts (the AUTODIF library has the functions that implement some of these techniques). It should be noted that the developer of ADMB, Dave Fournier, is at the forefront of using these techniques in fisheries stock assessment (Fournier et al. 1998).

Program Strengths:

ADMB is the best software package known to the reviewer, for the estimation of non-linear models that include a large number of estimable parameters or use large data sets. The estimation procedure is both fast and stable. Schnute et al. (1998) showed that AD Model Builder was significantly superior to the statistics packages GAUSS, MATLAB and S-Plus for estimating the parameters of a catch-at-age model. ADMB took only 3% of the time of the next best package for a 37 parameter model and less than 1% of the time for a model with one hundred parameters. The other products approximated the gradient numerically by making small

changes in each parameter and therefore required $n+1$ calculations to evaluate the function, as mentioned above. ADMB is also very useful in simulation analysis, even with models which only include a few parameters. In simulation analysis, the parameters of the model are estimated a large number of times using different data sets. Therefore, the reduced estimation time provided by ADMB can significantly reduce the amount of time required to evaluate the simulation, often resulting in making the simulation analysis practical in situations where it otherwise would not be. ADMB is also useful in situations for models which may only have a few parameters, but are analyzing a large amount of data. For example, the standardisation of CPUE data using a general linear model (GLM) is very common in fisheries. This procedure usually incorporates a large amount of data, but assumes linear relationships between the explanatory variables to make the estimation process possible. If it is thought that the relationship of the explanatory variables to CPUE is non-linear, then a non-linear estimation procedure is required but which is usually impractical in most statistical packages due to the large amount of data. However ADMB can make these types of analyses possible, freeing up the dependence on simplifying assumptions and data transformations.

Program Weaknesses:

The main weaknesses of ADMB are the lack of user friendliness in the software and the incomplete nature of the documentation. ADMB is not intended to be a traditional software package for statistical data analysis and does not include menus, tool bars, or graphics. The lack of this type of user interface is due to a trade-off made by ADMB to provide the maximum flexibility for model construction. The software is difficult to install and can require some knowledge of the C++ compiler to ensure that the included files and libraries are correctly addressed or in the correct directories. There are often some small compatibility problems between versions (earlier and latter versions for the same compiler and simpler versions for different compilers). It is also difficult to set up the compiler's debugger for an ADMB C++ file. The documentation is divided into two components: a manual that describes ADMB, and a manual describing AUTODIF. Often it is difficult to determine how the AUTODIF documentation relates to its use within the ADMB context. In addition, a number of features in the software are not documented in either manual. The ADMB Manual includes a number of examples, including fisheries applications (the code for the examples comes on the CD). These examples show different aspects of ADMB and give detailed explanations of the computer code used. Unfortunately, the jump from the simple growth curve example to a complex engineering model may cause difficulties for the person attempting to learn how to use this software. There is no index for the ADMB manual. The AUTODIF manual, which includes most of the programming details, includes a comprehensive index. The documentation for the MCMC option, memory management, and for debugging procedures is completely inadequate. The user will often encounter a number of cryptic compiler or runtime messages that can be confusing, however with experience these become less of a problem. The underlying code used to generate ADMB or the AUTODIF libraries does not come with the software package (note that the examples in the documentation do), therefore this code cannot be used to determine the methods used for the supplied functions or to provide examples about how to program using ADMB. Anyone interested in learning ADMB will almost certainly require tutoring by an experienced user (Otter Research Ltd. provides workshops on demand).

Computer OS:

DOS, Windows, Linux, UNIX

Program Requirements:

Requires a C++ compiler (MSVC++, Borland C++, gcc2.95-mingw32 C++). It is recommended that you contact the provider before purchasing a compiler. Not all compilers or versions of compilers are supported and some have more support than others.

Hardware Requirements:

Memory requirements dependent on size of model.

Hard disk requirements depend on the C++ compiler used, ADMB includes about 4 MB of C++ libraries.

Subject Area:

- | | | |
|-------------------------------------|--|--|
| <input type="checkbox"/> Management | <input type="checkbox"/> Population Dynamics | <input checked="" type="checkbox"/> Modeling |
| <input type="checkbox"/> Culture | <input type="checkbox"/> Age and Growth | <input type="checkbox"/> Education |
| <input type="checkbox"/> Systematic | <input type="checkbox"/> Population Estimation | <input type="checkbox"/> Administration |
| <input type="checkbox"/> Habitat | <input type="checkbox"/> Economics | <input type="checkbox"/> Other |

Availability:

- | | |
|--|---|
| <input type="checkbox"/> Public Domain | <input checked="" type="checkbox"/> Proprietary |
|--|---|

An evaluation copy, including a free C++ compiler, is available at: <http://otter-rsch.com/>

Compatibility: IBM Compatible Macintosh Apple Other Unix

Accuracy of Calculations: Good Bad Untested Not Applicable

General Comments:

For its intended use, the estimation of non-linear models with a large number of parameters, ADMB is by far the most productive software package available known to the reviewer. However, at present ADMB is not particularly user friendly and is not completely documented. We hope that these aspects of the software package are improved in the near future. ADMB is an essential software package for any fisheries scientist who is serious about producing models that are at the forefront of fisheries science and for the development of new modelling techniques. This modelling environment would also be extremely beneficial to practitioners in other fields who are required to solve complex non-linear estimation problems.

Relevant websites:

- <http://otter-rsch.com/> (Otter Research Home Page)
- <http://www.refm.noaa.gov/stocks/modeling.htm> (NOAA Alaska Fisheries Science Center modeling page)
- <http://www.spc.org.nc/OceanFish/> (Secretariat of the Pacific Community, information on MULTIFAN-CL)
- <http://www.dnr.cornell.edu/afpr/sawk/> (Great Lakes Fishery Commission Stock Assessment Workshop Series)
- <http://www.pfeg.noaa.gov/tib/staff/erikwill.htm> (Erik Williams home page with ADMB examples)
- <http://www.fish.washington.edu/research/coleraine/> (University of Washington's general age-structured model programmed in ADMB)

Review Scores:

User Interface	5	Dependent on the compiler used
Help Facility	3	No help available within software, help via e-mail or from other uses
Documentation	6	
Learning Curve	5	Equivalent to any programming language
Ease of Use	3	
Education Value	N/A	
Productivity Potential	10	
Examples	9	
Usefulness to Fisheries Scientists	10	
OVERALL RATING	9	Productivity potential greatly outweighs lack of user friendliness

* 1 to 10 rating scales: 1 = bad; 5 = average or acceptable; 10 = great.

Incorporate into AFSCUS Library: Yes No

Selling Price (if applicable):

The cost for a single user license is US\$698.00 for DOS and LINUX versions, and US\$998.00 for supported UNIX workstations.

Acknowledgements:

I take full responsibility for the opinions contained in this review, however the following ADMB users provided advice: Carlos Alvarez, Nokome Bentley, Martin Bernstein, Paul Breen, Billy Ernst, Shelton Harley, Jim Ianelli, Dale Kolody, Paul Starr, Pat Sullivan, and George Watters.

References:

Fournier, D.A., Hampton, J., and Sibert, J.R. 1998. MULTIFAN-CL: a length-based, age-structured model for fisheries stock assessment, with application to South Pacific albacore, *Thunnus alalunga*. Can. J. Fish. Aquat. Sci. 55: 2105-2116.

Schnute, J.T. Richards, L.J. and Olsen, N. 1998. Statistics, software, and fish stock assessment. In fishery stock assessment models, edited by F. Funk, T.J. Quinn II, J. Heifetz, J.N. Ianelli, J.E. Powers, J.F. Schweigert, P.J. Sullivan, and C.I. Zhang, Alaska Sea Grant College Program Report No. AK-SG-98-01, University of Alaska Fairbanks, 1998.

¹Mark Maunder, Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography, 8604 La Jolla Shores Drive, La Jolla, CA 92037-1508, USA. E-mail: [mmaunder@iattc.org](mailto:mmmaunder@iattc.org).

²A more extensive version of this review by Mark Maunder will be made available on the CUS Web site: www.fisheries.org/cus .

SOFTWARE REVIEW

Reviewed in November 2000

Program Title:	Fishery Analyses and Simulation Tools (FAST)
Version: 1.4 BETA	Program Date: July 2000
Program Description: Analytical tools for computation of stock density and relative weight, growth statistics, mortality, and recruitment, and for modelling populations and fisheries using these parameters.	

Developers: Company: Department of Fisheries and Allied Aquaculture, Auburn University, Alabama
Contact/Author(s): Jeffrey Slipke and Michael Maceina
e-mail: Mike Maceina [mmaceina@acesag.auburn.edu]

Program Strengths:

A user-friendly population modeling program. Greatest utility will be as an educational tool. Can be used by fishery managers to provide a standardized format for common analyses. These analyses include the utilities for calculating PSD, RSD and Von Bertalanfy growth parameters. The authors might consider pulling those components out and writing a second program to calculate "routine" fishery statistics (similar to the older FishCalc program available from AFSCUS). They've got the hard part built already and such a program would be attractive to a much wider audience.

Other strengths include the CD which includes installation routines, user manual, example files and publications on the subject. This is very thorough and simplifies use of the program significantly.

Program Weaknesses:

The greatest difficulty I had with the program was remembering all the parameters. While I was sitting in their class it made sense. The longer it was since the class, the more difficulty I had recalling the various inputs. It would really help if the program had some context-sensitive help (i.e., right click on any input box and it pops up a message box with a description of that variable, how it fits into the model and possibly reference a page in the users manual for more information).

The user manual is nice but it really isn't a "how-to" run the program. Instead it is a step through of some examples. It would benefit from a simple flow chart of how the program works and how to run it. Pretty easy to start with one of their examples and walk through it. It is harder to start from scratch with your own data. I would suggest a "plain English" description of each screen, sequence to run through that screen and the options available (i.e., sometimes you can get to the same point a couple different ways and sometimes it is very important to do step a before step b). An index with reference to the terms and parameters sprinkled throughout the program would help, also. This would make it faster to use the program and manual together.

Computer OS Compatibility:

Operated on Windows 95 and 2000 platforms with no problems. An incompatibility with Windows NT has been addressed and fixed, according to the software authors.

Program Requirements:

The only requirement is Adobe Acrobat Reader, since this is necessary to read some of the supporting documents provided on the CD-ROM.

Hardware Compatibility: IBM Compatible Macintosh Apple Other ____

Hardware Requirements :

Manual specifies 10MB free on hard disk. Comes on a CD-ROM, thus a CD-ROM drive is required.

Configuration Used by Reviewers:

- 1) Win 2000, 650 Mhz Pentium III, 128 MB ram, Gateway solo laptop.
- 2) Win 95 system

Documentation: Printed (130 pgs) pdf On-Line

Subject Area:	<input checked="" type="checkbox"/> Management	<input checked="" type="checkbox"/> Population Dynamics	<input checked="" type="checkbox"/> Modelling
	<input type="checkbox"/> Culture	<input checked="" type="checkbox"/> Age and Growth	<input checked="" type="checkbox"/> Education
	<input type="checkbox"/> Systematics	<input type="checkbox"/> Population Estimation	<input type="checkbox"/> Administration
	<input type="checkbox"/> Habitat	<input type="checkbox"/> Economics	
	<input type="checkbox"/> Other _____		

Availability: Public Domain Proprietary/Commercial

Accuracy of Calculations: Good Bad Untested Not Applicable

Review Scores:

CATEGORY	SCORE	COMMENTS
Ease of Installation	9	Very nice, easy to install.
Operating System Environment	5	Win 9x and 2000, but beta crashed with NT4.0. (Editor's note: This has been fixed by authors.)
User Interface	6	Excellent, very user friendly, easy to move around. Biggest difficulty was knowing where to move to. The interface is not always intuitive and can be hard to follow.
Help Facility	0	It needs one. That would make an already good program into a top-notch program by any measure.
Documentation	8	Very good manual, see earlier comments about user potential improvements.
Learning Curve	4	Not bad when you go to a class. But hard once you get back into the office to remember all those

		parameters. They provide the information but some is hard or time consuming to digest. Will be particularly difficult for managers who have never modeled or those who have been away from college for a while.
Ease of Use	6	The point and click interface is great. But sometimes hard to know which sequence or what to do next. The manual helps but could be better and built-in help is also needed.
Education Value	10	An excellent learning tool. I think most educators teaching fishery science would appreciate this tool. Other modeling programs may be better for comparing options.
Productivity Potential	7	The inclusion in a single program of standard parameter calculations (PSD, RSD, VB, etc. is a definite time saver.
Examples	9	Excellent, one of the strengths of the package. Not only do they include data and worked out examples, they also include publications to support the examples.
Usefulness to Fisheries Scientists	8	Incredibly useful for those relatively few individuals who want to do this sort of modeling. Should also really be useful for those teaching fishery science and management at the university level. Could be more useful with more fisheries parameters.
OVERALL RATING	7	

* Use 1 to 10 rating scales: 1 = bad; 5 = average or acceptable; 10 = great.

Incorporate into AFSCUS Library: (✓) Yes () No

General Comments:

This is an excellent program that will be well received by those interested in modelling. For those folks it will be greatly appreciated.

Another reviewer noted it could become a standard analysis package for fisheries parameters used by managers, taking the place of various macros and programs now used. A single package such as this would eliminate problems of credibility and ease comparisons.

Selling Price: \$75 US. Available from AFSCUS.

FOR SOFTWARE DESCRIPTIONS AND INTERNET DOWNLOAD OPTIONS:

<http://www.fisheries.org/cus/cuslib.htm>

Ordering information is presented and the \$10 software can be downloaded at no charge, although a request for donation will be asked of non-members.

DISKETTE ORDER FORM IBM-PC COMPATIBLE SOFTWARE

(March 2000 listing)

Ship To: _____ Phone: _____

Order must be prepaid or accompanied by a written purchase order. Please provide a street address for package service delivery.

Check the desired disk size. Low density 5 1/4" or high density 3 1/2" disks are available except where indicated. The following packages are \$10.00 each. An asterisk indicates that printed documentation is supplied with the package; "N/A" indicates software not available for selected disk size.

<u>3.5</u>	<u>5.25</u>	<u>3.5</u>	<u>5.25</u>
___	___ AFSCUS-10 PREFER	___	___ AFSCUS-28 Habitat Suit. Indices for Lotus 1,2,3
___	___ AFSCUS-13 CAGEAN	___	___ AFSCUS-30 MOCPOP Version 2.0*
___	___ AFSCUS-16 GENMOD	___	___ AFSCUS-31 GRASCARP Version 1.0*
___	___ AFSCUS-19 FISHPARM*	___	___ AFSCUS-32 FISHPROG*
___	___ AFSCUS-20 Microfish Electrofishing*	___	___ AFSCUS-33 TROUT 4X4*
___	___ AFSCUS-25 Stream Temp/Shade/Solar ¹	___	___ AFSCUS-35 SUNRISE
___	___ AFSCUS-26 Trout Dynamics	___	___ <u>N/A</u> AFSCUS-36 OPCPLOT
___	___ AFSCUS-27 Fish Hatchery Math.	___	___ <u>N/A</u> AFSCUS-38 Early Life History Bibliography
___	___ AFSCUS-39 ASPIC*		

¹For free revised Stream Temp/Shade/Solar, go to Web site www.mesc.usgs.gov/rsm/rsm_software.html

The following package is \$30.00:

___ N/A AFSCUS-37 Marine Fish Images*

The following package is \$5.00:

___ ___ AFSCUS-21 Sebastes bibliography

COMMERCIAL SOFTWARE:

<u>N/A</u>	___ M1 FishCalc89-DisBCal89*	\$ 40.00
___	___ M2 AbaSim*	\$ 53.00
___	___ M3 Aquafic* 1.10	\$249.99 Non-AFS members
		\$199.00 AFS members

