GOVERNING BOARD FOR 2004–2005

President: Jerry M. Melillo, Marine Biological Laboratory, Woods Hole, MA 02543
President-Elect: Nancy B. Grimm, School of Life Sciences, Arizona State University, Tempe, AZ 85287-4501
Past-President: William H. Schlesinger, School of the Environment and Earth Sciences, Duke University, Durham, NC 27708
Vice President for Science: Gus R. Shaver, The Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA 02543
Vice President for Finance: Norman L. Christensen, School of the Environment and Earth Sciences, Duke University, Durham, NC 27708
Vice President for Public Affairs: Alison G. Power, Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, NY 14853-2701
Vice President for Education and Human Resources: Carol A. Brewer, Division of Biological Sciences, University of Montana, Missoula, MT 59812-0001
Secretary: David W. Inouye, Department of Biology, University of Maryland, College Park, MD 20742-4415
Member-at-Large: Dee Boersma, Department of Zoology, University of Washington, Seattle, WA 98195-1800
Member-at-Large: Shahid Naeem, Department of Biology, Columbia University, New York, NY 10027
Member-at-Large: Margaret A. Palmer, Department of Entomology, University of Maryland, College Park, MD 20742-0001

AIMS

The Ecological Society of America was founded in 1915 for the purpose of unifying the sciences of ecology, stimulating research in all aspects of the discipline, encouraging communication among ecologists, and promoting the responsible application of ecological data and principles to the solution of environmental problems. Ecology is the scientific discipline that is concerned with the relationships between organisms and their past, present, and future environments. These relationships include physiological responses of individuals, structure and dynamics of populations, interactions among species, organization of biological communities, and processing of energy and matter in ecosystems.

MEMBERSHIP

Membership is open to persons who are interested in the advancement of ecology or its applications, and to those who are engaged in any aspect of the study of organisms in relation to environment. The classes of membership and their annual dues for 2005 are as follows:

<table>
<thead>
<tr>
<th>Income level</th>
<th>Dues</th>
<th>Student member:</th>
<th>Dues</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;$40,000</td>
<td>$50.00</td>
<td>Life member:</td>
<td>$75.00</td>
</tr>
<tr>
<td>$40,000–60,000</td>
<td>$75.00</td>
<td>Emeritus member:</td>
<td>Free</td>
</tr>
<tr>
<td>&gt;$60,000</td>
<td>$95.00</td>
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</tbody>
</table>

Subscriptions to the journals are not included in the dues.

Special membership rates are available for individuals in developing countries. Contact Member and Subscriber Services (address below) for details.

PUBLICATIONS

The Society publishes a bulletin, four print journals, and an electronic data archive. The Bulletin of the Ecological Society of America, issued quarterly, contains announcements of meetings of the Society and related organizations, programs, awards, articles, and items of current interest to members. The journal Ecology, issued monthly, publishes essays and articles that report and interpret the results of original scientific research in basic and applied ecology. Ecological Monographs is a quarterly journal for longer ecological research articles. Ecological Applications, published six times per year, contains ecological research and discussion papers that have specific relevance to environmental management and policy. Frontiers in Ecology and the Environment, with 10 issues each year, focuses on current ecological issues and environmental challenges; it is international in scope and interdisciplinary in approach. Ecological Archives is published on the Internet at http://esapubs.org/Archive and contains supplemental material to ESA journal articles and data papers.

No responsibility for the views expressed by the authors in ESA publications is assumed by the editors or the publisher, the Ecological Society of America.

Subscriptions for 2005 are available to ESA members as follows:

<table>
<thead>
<tr>
<th>Publication</th>
<th>Regular</th>
<th>Student</th>
<th>Frontiers in Ecology</th>
<th>Society of America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology</td>
<td>$65.00</td>
<td>$50.00</td>
<td>Free to members</td>
<td></td>
</tr>
<tr>
<td>Ecological Monographs</td>
<td>$30.00</td>
<td>$25.00</td>
<td>Bulletin of the Ecological</td>
<td></td>
</tr>
<tr>
<td>Ecological Applications</td>
<td>$50.00</td>
<td>$40.00</td>
<td>Ecological Archives</td>
<td>Free</td>
</tr>
</tbody>
</table>

Application blanks for membership may be obtained from the Ecological Society of America, Member and Subscriber Services, 1707 H Street, N.W., Suite 400, Washington, DC 20006, to which all correspondence concerning membership should be addressed. Checks accompanying membership applications should be made payable to the Ecological Society of America.

Cover Photo: The mosquito *Wyeomyia smithii* completes its pre-adult development only in the water-filled leaves of the carnivorous purple pitcher plant, *Sarracenia purpurea*. The range of the mosquito follows its host plant from the Gulf of Mexico to northern Canada. Mosquito populations from 30° to 50° N subjected to heat or cold stress suffer >40% mortality but no decrease in fitness (*R*₀). Mortality observed as a direct consequence of environmental stress may therefore have little impact on the individuals actually destined to make the greatest contribution to the next generation. This photograph and others in the Photo Gallery were taken by W. E. Bradshaw during research for the article by P. A. Zani, S. E. T. Swanson, D. Corbin, L. W. Cohnstaedt, M. D. Agotsch, W. E. Bradshaw, and C. M. Holzapfel, “Geographic variation in tolerance of transient thermal stress in the mosquito *Wyeomyia smithii*,” to be published in *Ecology* Vol. 86 (5):1206–1211, May 2005.
ESA 2005 Election Results

The following ESA members have been elected to serve as Society officers, Governing Board members, and committee members.

President (President-Elect August 2005–August 2006, President August 2006–August 2007, Past-President August 2007–August 2008)
    Alan Covich

Vice President for Public Affairs (August 2005–August 2008)
    Rich Pouyat

Vice President for Finance (August 2005–August 2008)
    William Parton

Member-at Large (August 2005–August 2007)
    Dennis Ojima

Board of Professional Certification (January 2005–December 2007)
    William Michener
    Rebecca Sharitz

Nominations for Fall 2005 ESA Elections

The following individuals have agreed to appear on the 2005 ballot for a vote in the fall of 2005. Those elected will take office in 2006.

President:
    Norm Christensen
    Chris Field

Vice President for Education:
    Meg Lowman
    Michael Mappin

Member-at-Large:
    Jayne Belnap
    Robert Twilley

Member-at-Large:
    Juan J Armesto
    Godfrey Uzochukwu

Members of the Board of Professional Certification (vote for two):
    Carolyn Hunsaker
    Reed Noss
    Wayne Polley
    Garth Redfield
REQUEST FOR STUDENT AWARD JUDGES

Murray F. Buell Award
E. Lucy Braun Award

Judges are needed to evaluate candidates for the Murray F. Buell Award for the outstanding oral presentation by a student and the E. Lucy Braun Award for the outstanding poster presentation by a student at the Annual ESA Meeting at Montreal, Canada in 2005. We need to provide each candidate with at least four judges competent in the specific subject of the presentation. Each judge is asked to evaluate 3–5 papers and/or posters. Current graduate students are not eligible to judge. This is a great way to become involved in an important ESA activity. We desperately need your help!

Please complete and send this form by mail, fax, or e-mail to the Chair of the Student Awards Subcommittee: Christopher F. Sacchi, Department of Biology, Kutztown University, Kutztown, PA 19530 USA. Call (610) 683-4314; FAX: (610) 683-4854 or e-mail: sacchi@kutztown.edu

If you have judged in the past several years, this information is on file. If you do not have to update your information, simply send me an e-mail message, “Yes, I can judge this year.”

Name________________________________________

Current mailing address__________________________________________________________

June/July mailing address__________________________________________________________

Current telephone ___________________________ Summer telephone _________________________

E-mail __________________________________ Fax ___________________________

Year M.S. received ___________________________ Year Ph.D received _______________________

Areas of expertise (check all that apply):

**Discipline**

- Botany
- Zoology
- Microbiology
- Applied ecology

**Research approach (please rank)**

- Population ecology
- Community ecology
- Ecosystem ecology

**Organisms**

- Vertebrates
  - Types: ____________
- Invertebrates
  - Types: ____________

**Habitat**

- Physiological ecology
- Behavioral ecology
- Paleocology
- Theoretical ecology

- Plants
  - Types: ____________
- Fungi
  - Microbes


68 Bulletin of the Ecological Society of America
International Collaborations: Robert Whittaker Travel Fellowship

One to two awards annually of $1000–1500 are available to promote active collaboration and exchange of ideas between foreign and U.S.A. ecologists. Awards are given to foreign scientists to help defray the cost of travel to the United States for research collaboration with colleagues.

Requirements: The foreign ecologist must possess an earned doctorate, reside in a foreign country, and not be a U.S. citizen. Application for the fellowship may be made directly by the foreign ecologist or by a U.S. scientist on behalf of a foreign scientist. Either the foreign scientist or the U.S. ecologist must belong to the ESA. Applicants should submit a proposal describing the purpose of the travel, the nature of the research, travel itinerary, and costs. Proposals should not exceed four double-spaced pages for these materials. The foreign ecologist’s CV and a one-page letter of support from the U.S.A. collaborator should be appended; these items are not included in the page limit.

Please submit all materials in a single electronic document (either RTF or MS Word format) to wanderso@drury.edu no later than 30 April 2005.

Desert Ecology: Forrest Shreve Student Research Award

One to two awards annually of $1000–2000 are available to support research in the hot deserts of North America: Sonora, Mohave, Chihuahua, and Vizcaino. Projects should be clearly ecological and should increase our understanding of the patterns and processes of deserts and/or desert organisms. Proposals should not exceed five double-spaced pages for all material and should include objectives, importance, background, methods, literature cited, and justified budget. Proposals will be ranked based on the importance of the project to understanding desert ecology, feasibility, experimental design, and innovation.

Please submit all materials for either award in a single electronic document (either RTF or MS Word format) to wanderso@drury.edu no later than 30 April 2005. Contact:

Dr. Wendy B. Anderson
Department of Biology, Drury University
900 N. Benton
Springfield, MO 65802
(417) 873-7445
Fax: (417) 873-7278
E-mail: wanderso@drury.edu
Minutes of the ESA Governing Board  
25–26 October 2004  
Washington, D.C.

Members present:
Jerry Melillo (President), Bill Schlesinger (Past-President), Nancy Grimm (President-elect), Gus Shaver (Vice President for Science), Norm Christensen (Vice President for Finance), Alison Power (Vice President for Public Affairs), Carol Brewer (Vice President for Education and Human Resources), Shahid Naeem and Margaret Palmer (Members-at-Large).

Staff present:
Katherine McCarter (Executive Director), Cliff Duke (Director of Science), Nadine Lymn (Director of Public Affairs), David Baldwin (Managing Editor), Elizabeth Biggs (Director of Finance), Jason Taylor (Director of Education), Sue Silver (Editor)

I. ROLL CALL

A) The GB unanimously adopted the proposed agenda.

B) There were no votes to ratify.

• Brief discussion of what the last fiscal year’s profit (approximately $9000) represents, where it should be invested (Christensen suggested the rainy day fund, which currently has about $200,000), and how to respond to questions from ESA members about it.

• Margaret Palmer reminded the Board that strenuous efforts were made in 2004 by the nominating committee, chaired by Ann Bartuska, to find women to run, but they were unsuccessful. Bill Schlesinger, chair of the 2005 nominating committee, reported that the nomination process is well along and the slate is likely to include women.

C) The minutes from 31 July, 1 August, and 6 August 2004 were unanimously adopted.

II. REPORTS

A) Report of President Melillo

• Melillo has focused on two tasks since the August meeting—establishing rapid assessment teams in cooperation with Nadine Lymn, and developing a review of the Science Office in cooperation with Gus Shaver and Cliff Duke

• Rapid Assessment teams—41 of 58 people invited to join the rapid response teams have now responded, so there are three people on all but one of them now. Eighteen have been Leopold Fellows.

• Review of Science Office—focus will be on future activities of the Science Office and how they relate to ESA’s strategic plan; history and current activities will also be covered.
B) Report of Executive Director McCarter and the Office Staff

- David Baldwin reported that all publications are on track for publication timetables, and that starting in 2005 all authors will be getting proofs as PDF files. All ESA publications back to 1997 (the first year when publications were produced with SGML tagging) will soon have DOI tags and be in the CrossRef database. You will soon be able to do forward linking too (looking for papers that cited a particular paper). A new set of tools will soon be instituted for copy editors, which will speed up their work (and reduce its cost). Google will now start sending their web crawlers through ESA journals about every 6 weeks, which should generate a large number of hits from searches of our journals in the future.

- Sue Silver reported that, since Frontiers’ inception, authors have received PDF files of their proofs. Frontiers will have a booth at two scientific conferences in November, and the Special Libraries Association Conference (4–7 June, Toronto). The Visions articles will likely appear in the March issue.

- Jason Taylor reported that there is a November deadline for the third volume of TIEE. SEEDS will have a field trip to Louisiana soon, and will send a representative to three conferences this winter (American Indian Association of Science and Engineering (AISES), in Anchorage; Society for the Advancement of Chicanos and Native Americans in Science (SACNAS), in Austin, Texas; North American Association of Environmental Education (NAAEE), in Biloxi, Mississippi). A new employee will join the educational program in January.

- Liz Biggs: ESA had 8718 members at the end of the fiscal year (a big jump up—about 900 in 2 years). Participation in Chapters and Sections has also increased in most cases. The e-version of the iMIS database is being rolled out this week, for real-time updating by members of their membership information. The biggest issue relates to the future of journal subscriptions, especially institutional subscriptions. Member subscriptions have been declining over the past several years. (ESA’s budget anticipates a 4%/yr decline in personal subscriptions.)

- Nadine Lymn reported that the position of policy analyst has now been filled. A new initiative is to build a database of universities and other institutions with researchers who publish regularly in ESA journals, to create a news service for Public Information Officers that alerts them when someone from their institution publishes in a Society journal.

- Cliff Duke reported that there were about 50 applications for three positions in the National Parks Ecological Research fellowship program. Norm Christensen reported that the Mellon Foundation is likely to withdraw support for this program in about 2 years unless other major partners are found as donors. The fundraising is NPS’ responsibility and they have not yet begun to seek the needed resources.

C) Report of Vice President for Finance Christensen

1) First Quarter Financials look healthy, according to Katherine. The Annual Meeting did very well (might be the top meeting for income to date). This is due in part to a trial policy whereby the abstract submission fee was not refunded or credited toward the cost of registration (generating about $90,000). Next year, credit card numbers will be taken, but no charge will be made unless the submitter withdraws.
2) Norm Christensen reports that the Society investments are mostly flat.

3) The staff and VP for Finance recommend pursuing the idea of hiring a development professional to work with ESA. This idea will be pursued with the goal of making a presentation to the Board at the spring meeting. There is general support for the idea of a professional fund-raiser.

III. DISCUSSION/ACTION ITEMS

A) Publications issues

1) Data sharing

a) Data sharing statement (Baldwin/Duke)

The meeting of 12 scientific societies hosted by ESA went very well and included representatives from Chile and England. Bill Michener and David Baldwin were ESA representatives. Clarification of terms was an important achievement (e.g., What is a data set? Are herbarium sheets and soil samples data? What is a data registry?—like a phone book. What is a data center?—a place where metadata and data are stored). A near-term strategy will be to establish an editorial policy for scientific journals. The meeting attendees proposed a statement to be considered by each group’s governing body: “It is the expectation of the editors and publisher of this journal that authors will make the data underlying published articles available. Any impediments to data sharing should be brought to the attention of the editors at the time of submission.” The ESA Governing Board developed a revision of this statement that will be reviewed by the Publications Committee before being placed in ESA journals. “The editors and publisher of this journal expect authors to make the data underlying published articles available.”

NSF may be the driving force behind this, at least for grantees, but editors could also carry a big stick by eventually enforcing a data-sharing policy for authors.

b) Data registry proposal

Jim Reichman asked the Board to begin discussion about creating a data registry for ESA members and for contributors to ESA journals, using technology currently being developed. The Board, after extensive discussion of Reichman’s proposal, concluded that they were not yet ready to endorse a specific proposal for a data registry. Several groups are pursuing related initiatives and ESA sees the need to bring these groups together to discuss strategy and ensure that any ESA effort is inclusive. Nancy Grimm, David Inouye, and Margaret Palmer, working with David Baldwin and Cliff Duke, will form an ad hoc committee to coordinate ESA activities related to the data sharing. Jim Reichman will be invited to join that group.

2) Publications task force

Jim Reichman has contacted the Board already about issues related to online publications and the impact of open access, and recommends that a group be named to provide background material for the Board. He has asked the Board for some funding to facilitate this, and the Board approves unanimously the idea of using the contingency funding from the budget for this purpose. President Melillo will work with Jim to appoint the task force.

3) Frontiers program review

- Katherine reported on the history (dating
from 1998) of the Publications Visions Committee (which presented a report to the Board in January 1999). That “Brown Report” was discussed at each Board meeting for the next few years, evolving into something more compatible with the Board’s goals of increasing membership and reaching out to audiences that might not be attracted by current publications.

• Sue Silver reported on current status and management of *Frontiers*. It has met the original criteria of being international, interdisciplinary, and accessible. It has almost certainly played a role in the significant increase in membership over the past two years. (*Frontiers* comes free of charge to ESA members.) *Frontiers* faces two major challenges in the near term: (1) attracting new readers from government and business; and (2) becoming self-supporting.

• Liz Biggs reported on finances. After 2 years of publication, and 3 years of funding, we are in good shape. The Publications Fund balance was ahead of budget by about $117,000 and will be close to $1,200,000 at the end of December, with a new Mellon Foundation grant of $750,000 just received. The business plan for *Frontiers* requires that an additional $750,000 be raised for the fund in support of *Frontiers* to cover costs until the journal becomes self-supporting through a mix of library subscriptions and advertising. Currently we have a $250,000 grant request before the Packard Foundation and we are beginning the planning to raise an additional $500,000. Based on our current business plan for *Frontiers*, the projection is that *Frontiers* will be self-supporting in 2011, or 10 years into its life. Norm Christensen reported that Packard might be willing to make a long-term low-interest loan if we have difficulty in raising the $500,000. The marketing goals seem to be on track for advertising and classified ads. Library subscriptions (70 so far) continue to be the biggest challenge. ESA is currently putting $50,000/yr into the Publications Fund that supports the project.

4) Journal mission statements

The Editors-in-Chief were asked by the Board to provide mission statements that might be a first step toward the upcoming review of publications. The Publications Committee has reviewed them and suggests that a uniform format would be useful. The Board agrees, and will ask (via a memo to be drafted by Jerry Melillo) that the EICs revise their statements for the next Board meeting. One alternative is that there be an overall umbrella statement about the Society’s suite of journals, followed by more detailed information about individual publications.

5) Pease letter response

Jerry has drafted a response to the letter sent to Board members by Dr. Craig Pease concerning editorial practices and policies of *Frontiers*. Sue will contact Mr. Rohrman asking him to remain as a columnist, but to resign as a member of the advisory board in order to remove any perception of a conflict of interest.

B) Visions priorities

1) Public information campaign

The ESA staff had a meeting on this topic. Nadine Lynn reported on some specific actions the Society might take, how to assess those efforts, and suggestions for people the Society might ask to become involved. The goal (#2) that seems to best match the Board’s intentions is (slightly modified): “Increase within 5 years public understanding of the essential role of ecological systems to the well-being of all people.” The Board will seek advice from some organizations that have run public information campaigns related to the environment; candidate organizations
include Environmental Defense, WWF, SeaWeb, NASA, British Petroleum, Toyota, Weyerhauser, and UCS. Staff and a subset of Board members will organize a half-day meeting in late February with about five of these organizations to learn from their experiences. Questions to ask these organizations might include the following:

How to identify a target audience? What is the best topic area to begin with? What are the elements of a campaign? What are creative ideas for addressing the audience? Are there examples of successful campaigns such as this? What advertising firms would you use? What would it cost and how might we raise the resources needed for the campaign? How do you measure success?

2) Rapid response teams

Nadine Lynn reported on the roster of ESA members who have been invited (most of whom have accepted). Roll-out will be early in the spring, with two Congressional luncheon meetings.

3) International actions

Our next annual meeting in Montreal will be international in perspective, as will our special meeting in Merida, Mexico in January of 2006. The theme of the Mexico meeting is “Ecology in an Era of Globalization: Challenges and Opportunities for Environmental Scientists in the Americas,” and the planning committee is being led by Dr. Jose Sarukhan and Dr. Jeff Herrick. Cliff and Ellen will go to Merida this winter to look at hotels and venues for the meeting. Possible funding sources for meeting support are being contacted. Some SEEDS students would be a logical addition to that meeting. Osvaldo is working with Katherine to pursue support for ESA of a Federation of the Americas group of ecological societies. The Federation should play an important role in the Mexico meeting. Katherine met in August with the Vice President of the Ecological Society of Australia to explore possible cooperation in the future.

C. Education issues

1) Leveraging SEEDS

There are 4 more years of Mellon funding remaining, and efforts are needed to start planning for how to replace it (currently $500,000/yr). Ideas were discussed for how to find additional opportunities for SEEDS students and for the program. This seems like a logical program for work by an ESA development officer. SEEDS may play a (no-cost) role in a future IGERT program with the University of Maryland, which would fund three workshops for SEEDS students.

2) Women and Minorities in Ecology (WAMIE) update

Carol Brewer reports that the final report is on schedule for November. A survey will occur next year to generate a new Profiles of Society members (following up on the 1992 publication).

D. Issues for future annual meetings; 2006 Annual Meeting theme

The proposal, “Icons and Upstarts: Maintaining an Ecological Balance,” is innovative. The Board suggests dropping or replacing the part of the title after the colon. The Program Chair and Meetings Committee will be asked to consider these comments and bring back a final recommendation.

E. NEON update

Carol Brewer reported on progress, which includes AIBS having received funding from NSF to serve in an organizational role.
F. Science Program review (Shaver/Duke)

1) Vice-President for Science Gus Shaver presented an outline of his vision for the Science Office during his tenure, and questions for the Governing Board to consider in its review.

- Science Office mission and niche within ESA
  - Are they well-defined?
  - Are they appropriate?

- How well do activities reflect the mission and niche, as well as the environment in which it must work?

- Interactions with Policy and Education

- Committees: Merge Research and SBI?

- 3-year goals for Science Office:
  - Support Visions initiatives
  - Maintain responsiveness to the ecological science community
  - Develop a new sustainability science agenda.

2) Cliff Duke presented information on the history of the office (initiated in 1992 in the form of the SBI Project Office, then became the Science Programs Office in 1997). The existing structure and goals are outlined in the Bylaws; in short, the Office promotes the integration of ecological science into management and decision-making by government agencies and the private sector at all levels. Although the Science Office produces educational publications (e.g., Issues in Ecology, the regional climate change reports) it does not engage with students and educators in the way Education does. Nor does it engage with legislators and Congressional staff in the way that Public Affairs does. Current projects include:

   i) providing support for ESA activities (e.g., Annual Meetings, the Ecological Information Network, publications);
   ii) planning and organizing scientific conferences (e.g., the invasive plants conference, the Mexico meeting);
   iii) providing support to science, policy, and management (e.g., peer reviews, the conference on data sharing, JSTOR, Sustainable Water Resources Roundtable, National Parks Ecological Research Fellowship program);
   iv) generating publications (e.g., Issues in Ecology, the regional climate change reports with UCS).

Projects in development include:

   i) an Agricultural Air Quality workshop;
   ii) a cooperative agreement with NBII;
   iii) workshops for the Army Corps of Engineers;
   iv) potential collaboration with UNEP and UNESCO;
   v) developing communication training programs for federal scientists;
   vi) a follow-up proposal to NSF for a joint working group on Data Sharing and Archiving.

As noted previously, the proposed new agenda for the Science Office has three components:

1) Support Visions initiatives
2) Maintain responsiveness to the ecological science community
3) Develop a new Sustainability Science Agenda

A high-priority item for action on this agenda is combining and reforming the SBI and Research committees into a single Science Committee to advise and support Science Office projects. Others include leading international outreach activities, and developing activities to examine and articulate the intellectual
foundations for a new sustainability science.

Based on the discussions, Gus and Cliff will complete the following tasks before the next Board meeting:

1) Draft a new Bylaw statement about the Science Office, and prepare a proposal to delete the existing SBI office Bylaw, to be voted on at the Council meeting next summer.

2) Write a Bylaw about the new Science committee that reflects the merging of the Research and SBI committees, also for presentation at the Council meeting in Montreal, and discussion at the May Governing Board meeting.

3) Go through the list of people on the two current committees (Research and SBI), write to the individuals to see who is willing to stay on, and identify a few new members who will be useful in implementing the new SO agenda.

4) Prepare a Supplementary Session proposal on sustainability science for the Montreal meeting by 1 Dec.

5) Prepare proposals to NBII and NSF, as described previously, and move forward on planning and implementation of support for Visions initiatives and international outreach efforts.

IV. NEW BUSINESS

1) Nominations for ESA awards are due soon and suggestions should be sent to the Awards Committee.

2) Bill Schlesinger provided an update on nominations for Board members, officers, and committees for fall 2005.
An Unusual Nest
Photographs by William Bradshaw

The mosquito *Wyeomyia smithii* within a water-filled leaf of the carnivorous purple pitcher plant, *Sarracenia purpurea*. For populations of this mosquito, latitude of origin had a greater effect on cold than on heat tolerance as measured by survivorship.
The purple pitcher plant, *Sarracenia purpurea*, has a range that extends in wetlands from the United States Gulf Coast to Canada.
In a study of the flexibility and creativity of corvid behavior, carried out at Jackson Hole, Wyoming, Common Ravens were found to fly toward the sound of gunshots, presumably in order to locate an important food source, the gut piles left behind by successful hunters. The ravens responded to the shots only when guns were fired within forested habitat. Raven behaviors suggest that the birds may be using gunshots as a substitute for other sounds already used to locate food in the wild.

These photographs were taken in connection with research for an article by Crow White, “Hunters ring dinner bell for ravens: experimental evidence of a unique foraging strategy,” to be published in Ecology 86(4), April 2005.
Telemetry tracking ravens in Grand Teton National Park.

Raven caching hunter-killed elk gutpile meat in Grand Teton National Park.
Human alteration of natural flood cycles is an important perturbation to floodplain plants. We report a demographic analysis of *Boltonia decurrens*, an endangered plant in the floodplains of the Illinois River. Navigation dams and levees have drastically altered the timing and severity of flooding over the past century. These changes reduce the population growth rate (deterministic and stochastic) of *Boltonia* and change the life history pathways responsible for its population growth.

This photo shows U.S. 67 west of Alton, Illinois, in July 1993 during a flood that affected a third of the United States and caused $18$ billion in damages. Historical data shows that the stochastic growth rate of *Boltonia* has declined in the last 100 years because the regulation of the river has increased the frequency of these late-receding floods. The photograph, by Nancy Parker, is associated with the article by M. Smith, H. Caswell, and P. Mettler-Cherry, “Stochastic flood and precipitation regimes and the population dynamics of a threatened floodplain plant,” to be published in *Ecological Applications* 15(3), June 2005.

Complex Dynamics
Photographs by Kailen Mooney

The ant *Formica podzolica* tending the aphid *Cinara schwarzii* on ponderosa pine (*Pinus ponderosa*) in Colorado, USA. Ants receive carbohydrate-rich honeydew from aphids in exchange for providing protection to the aphids from arthropod predators.
Many ants are effective predators of herbivores, but ants also frequently protect homopteran herbivores from their arthropod predators in return for carbohydrate-rich exudates. Ants thus can simultaneously exhibit multiple trophic roles as primary predators (via feeding upon herbivores), secondary predators (via feeding on predatory arthropods), and as facilitators of mutualist herbivores. We examined the spatial and temporal dynamics of pine (Pinus ponderosa) food webs that included the omnivorous ant Formica podzolica, using direct observation and stable isotopes. Formica podzolica is a predator of herbivorous and predatory arthropods, and a mutualist with the aphid Cinara schwarzi. Over the course of a single season, ant diet, and thus trophic position, shifted from being midway between that of a primary and secondary predator in early summer, to that of a primary predator by late summer. There was also significant spatial variation among trees in ant trophic position. Our results thus document that this ant fed at, or slightly above, the trophic position of primary predator, but that this trophic positioning varied both temporally and spatially. To the extent the spatial and temporal variation in F. podzolica diet is similar to other ants or generalist predators, future food web models must accommodate these complex dynamics.
An adult aphid (*Cinara schwarzi*) moving across a ponderosa (*Pinus ponderosa*) branch.

Look for the article by Kailen A. Mooney and Chadwick V. Tillberg, “Temporal and spatial variation to ant omnivory in pine forests,” in the May 2005 issue of *Ecology* 86(5).
An Introduction to Ecological Archives

Progress in the ecological sciences results when researchers build on well-documented data, and with relatively recent advances in technology it is now possible to preserve and make available a wide range of data, metadata, and other supplemental materials associated with research in ecology. In 1997, acting on recommendations of the Special Committee on Data Archiving and Sharing, the Ecological Society of America (ESA) established a fully electronic data archive, Ecological Archives, as a means for contributing and exchanging data as well as for data preservation. Shortly thereafter the online publishing of appendices, supplements, and data papers associated with ESA journals began. By January 2005, well over 600 published articles in Ecology, Ecological Monographs, or Ecological Applications included digital archives. In 2004 alone, among the three journals a total of 382 appendices and 24 supplements were posted.

The archives currently reside on a server in ESA’s Publications Office in Ithaca, New York. Detailed instructions for creating and submitting the files as well as citation and usage information may be found at esapubs.org/archive. The archives are indexed by first-author name and by the journal issue where the “parent” paper was published (Fig. 1). Each appendix, supplement, and data paper has a unique accession number by which the associated print article or abstract in the journals is linked to the archive materials (see Fig. 2). Thus, one click of the mouse can take you from the online versions of the journal articles directly to the associated archives. Or, one can access the archives directly with a web browser at http://esapubs.org/archive and use the accession number at the end of the articles in the print journals to find particular files.

Ecological Archives offer several benefits to our readership and to authors:
1) They can enrich the published papers with supporting data or details;
2) They can facilitate the sharing of data;
3) They enable ESA to publish more concise papers in journals, thereby allowing more papers to be published within the annual budget;
4) They can save on page charges for authors;
5) They preserve the data under the ESA imprimatur; and
6) They can take advantage of multimedia technology to enhance data display and the sharing and development of software.
Fig. 1. An index page by journal issue in Ecological Archives.

Appendices

To date, the most frequently published archive files are appendices. These are similar in content to those that have appeared in the print journals, but are self-contained and directly viewable with a standard web browser. If an appendix includes sound or video, then those files are directly executable. The appendices can comprise tables, figures, and photographs, as well as descriptions of statistical analyses. Examples of appendices include ANOVA tables and details of sampling methodology and model development. See Fig. 3 for a sample appendix page or browse the Ecological Archives web pages. We require that the bulk of appendices be in HTML in order
to guarantee universal availability. Templates in HTML are available for downloading to assist authors with appendix preparation. Judicious use of digital appendices helps authors meet the requirement for concise papers (see http://esapubs.org/esapubs/EICNote1.htm).

APPENDIX A
Proofs showing the relationship of the trial swap to the Metropolis algorithm and the Hastings ratio are available in ESA's Electronic Data Archive: Ecological Archives E085-001-A1.

APPENDIX B
Proofs that the sum-of-squares reduction never falls into an infinite cycle are given in ESA's Electronic Data Archive: Ecological Archives E085-001-A2.

APPENDIX C
The Havel-Hakimi theorem is described in ESA's Electronic Data Archive: Ecological Archives E085-001-A3.

SUPPLEMENT
The C source code containing the algorithms described in this paper, and a short description of the program and its options are available online in ESA's Electronic Data Archive: Ecological Archives E085-001-S1.

Fig. 2. An example of accession number links in the print journals.

Supplements

Supplements are distinguished from appendices in that these are more likely to be downloaded and used rather than viewed. Supplements cover a range of file types, including original raw data, derived data sets, model source code, and statistical software. By submitting supplements to Ecological Archives, authors facilitate new analyses of their data, data validation, and development of critical software. Appropriate metadata (information about the data) are required in order to understand and re-use the data correctly and must be provided in a standard format. Data files should be submitted as delimited ASCII files and software must include the source code. Templates are available to help authors in submitting supplements (http://www.esapubs.org/archive/archive_templates.htm). The file list section on supplement pages provides direct links to the various data or software files for downloading. Fig. 4 shows an example of a supplement page.
Data papers constitute a third category of archives. These are compilations and syntheses of data sets and associated metadata that are peer-reviewed and considered valuable to the scientific community. For example, the Data Paper by Smith et al. (2003) is a compilation of body mass data for mammals worldwide for the purpose of investigating patterns of body mass across geographic and taxonomic space and evolutionary time. After passing peer review, data papers are announced in abstract form in *Ecology*. The accession number printed with the abstract is directly linked to the data paper in *Ecological Archives*. 

---

**Fig. 3.** Example of a single appendix posted in *Ecological Archives*. 

Data papers

Supplement 2

WinBUGS code required to fit the meta-analytic SSM presented in the second example in the paper. *Ecological Archives* E084-080-S2.

Copyright

Authors

File list (downloads)

Description

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File list

WinBugs_meta_code.zip (all files at once) -- a zip containing WinBUGS code including required data.

WinBUGS_meta_code.txt

readme.txt

Description

The file WinBugs_meta_code.zip contains the WinBUGS code required to fit the meta-analytic state-space models to multiple movement pathways. A readme.txt file explains the code.
The data for data papers should be logically and consistently formatted. Fixed-format, tab-delimited, comma-delimited, or space-delimited ASCII is the preferred format for tabular data. Rasterized digital geospatial data should be submitted in IDRISI- or ERDAS-compatible formats; vectorized geospatial data should be submitted in ARC/INFO export format. For other types of data, consult the Ecological Archives Data Editor. Multiple files should be compressed and submitted together as self-extracting .ZIP or .TAR files. Synthetic data (e.g., figures) are allowed but may not substitute for raw data in data papers; such synthetic results normally should be placed within the accompanying metadata text.

The metadata for data papers fully describe the content, context, quality, and structure of the data. The metadata ideally should be submitted in a single HTML file, and the content should adhere strictly to the Ecological Archives metadata content standards derived from Michener et al. (1997). Although formal metadata content standards for Ecological Archives will continue to evolve, useful examples are available at http://esapubs.org/archives. Text portions of the metadata should generally adhere to ESA print journal guidelines.

Data papers are peer-reviewed and are evaluated with respect to their contribution to ecological science, originality, quality of the metadata, soundness of the database, consistency, and completeness. It is especially important that the metadata be clear and comprehensive, enabling those that did not create the database to understand, interpret, and re-use the data. See http://www.esapubs.org/archive/archive_D.htm for examples.

Conclusion
With mechanisms for electronic data storage and dissemination advancing, and with the call from funding agencies for making research data widely available, it makes sense to take advantage of digital archives. I encourage readers to browse the Ecological Archives web pages at http://esapubs.org/archive/default.htm to see the possibilities these three digital publication categories offer to authors and readers alike. Questions about preparation of files not covered in the instructions can be directed to me at jlb40@cornell.edu, and suggestions are welcome. The Data Editor, William Michener, can answer questions about data paper submissions.

Literature cited

Acknowledgments
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environment • reviews of the latest websites • resident columnist

Not Just a Must-Read but a Want-to-Read

Although the versatile Robert Hooke (1635–1703) was not an “early ecologist,” he made enough innovations and discoveries essential for the prehistory of ecology to merit our consideration. For too long, he was overshadowed by his formidable rival, Isaac Newton, but now there are four excellent biographies of Hooke: ‘Espinasse (1956) provides a brief overview, Drake (1996) provides a geological perspective on his life and career, and Inwood (2002) and Jardine (2004) provide detailed account of all aspects of his life. Another volume written by Bennett, Cooper, Hunter, and Jardine (2003) celebrates Hooke’s life and work on the 300th anniversary of his death. Finally, Nichols’ is a pleasant, brief study of Hooke’s relations with the Royal Society (1999), but it lacks the sophistication of Pumfrey’s article on the subject (1991). All of these books are well illustrated. A useful biographical article provides additional references (Pugliese 2004).

Hooke was born on the scenic Isle of Wight, two miles south of England’s mainland, and as a child he was fascinated by both its geological formations and its fossil shells. His preacher father died when he was 13, and he was apprenticed to a London artist. He had the talent to become an artist, but paint fumes affected him adversely, and so he was sent to Westminster School, where the headmaster, Dr. Richard Busby, recognized his genius and provided him not only with a solid academic education, but also had him trained as an instrument maker (Jardine 2004:63).

In 1653 Hooke entered Oxford University and soon became Robert Boyle’s laboratory assistant. He built an air pump for Boyle, and Hooke used it himself to demonstrate the hypothesis that became known as Boyle’s Law (1662). The Royal Society of London for Promoting Natural Knowledge was founded in 1660 and received a royal charter (but no money) from Charles II. The Society soon had 115 members (Stimson 1948:51), although only about 20 were active (Inwood 2002). It was inspired by and organized with the writings of Sir Francis Bacon in mind (Purver 1967:235–236). In 1662 Hooke became its curator, responsible for three or four experiments or demonstrations at each weekly meeting. This was an unrealistic expectation, but he came closer than anyone else could have done. By 1664 the Royal Society decided to pay him a modest annual stipend. In 1665 he became Professor of Geometry at Gresham College, and the Royal Society met often in his rooms there.

His book, Micrographia: or Some Physiological Descriptions of Minute Bodies made by Magnifying Glasses (1665) contains 9 months of his experiments and demonstrations. He used a commercial microscope, probably from instrument-maker Richard Reeve (Simpson 1989:37–41). His most famous observations and illustrations in it are of plant cells, which he discovered and named (Hooke 1961:112–116).

Fig. 1. Hooke’s compound microscope. Micrographia (Hooke 1961: facing p.1).
He illustrated cells in cork and charcoal and said he had also seen them in at least eight other kinds of plants, possibly including moss, since his illustration of it shows cells in the leaves (Hooke 1961:facing p.131, Richards 1981:141, Harris 1999:4–7). Equally important, if less well known, was his discovery of microorganisms (Bardell 1988). He put some grains of sand under his microscope and discovered that one of them resembled a minute water snail shell, and he concluded it was a fossil shell (Hooke 1961:80–81, illustration facing p.44). He did not name what are now called foraminifera. Hooke intentionally investigated two familiar substances that turned out to be plant growths (at a time when fungi were considered plants). For several summers he had observed that the green leaves of damask roses became “all bespecked with yellow stains, and the undersides…have small black spots in the midst of these yellow ones, which to the naked eye, appear’d no bigger than the point of a Pin.” (Hooke 1961:121). He examined them under his microscope and saw “several small yellow knobs…out of which I perceiv’d there sprung multitudes of little cases or black bodies like Seed-cods [pods],” though he was unable to see any “seeds.” He had discovered, but did not name, the rose rust (*Phragmidium mucronatum*) (Ainsworth 1976:59). He suspected, despite his speculation about seeds, that these were simple moss or mold “which is set a moving by the putrefactive and fermentative heat, joyn’d with that of the ambient aerial” and so grows by the “same Principle, I imagine the Misleto of Oaks, Thorns, Appletrees, and other Trees, to have its original . . . seldom or never growing on any of these Trees, till they begin to wax decrepid . . . .”

Next, he investigated mold from a leather book cover and saw what seemed to be minute mushrooms. His illustration shows what are now called sporangio- phores with sporangia. He speculated the latter might be seed cases, though he had never found seeds in mushrooms, “which seem to depend upon a convenient constitution of the matter out of which they are made, and a concurrence of either natural or artificial heat.” (Hooke 1961:127). He smelled and tasted the mold and found it disagreeable. The microscope enabled him to raise the question of whether microscopic plants reproduce by “seeds,” but he did not pursue this investigation long enough to find out—so many other experiments to perform.

He then studied moss, which is visible to the naked eye, though its fine structures are best studied under a microscope. He easily identified its seed case, which was solid before it ripened, but after it grew bigger a hole appeared, out of which seeds probably fell, since later the seed cases were hollow. Although he failed to find any moss seeds, he assumed they existed, but even so, he remained uncertain about whether moss could also arise “out of corruption, without any dis-
seminated seed . . . .” (Hooke 1961:131–132). The four specimens on his plate XIII are well drawn, though they inadvertently came from two or three different species, and there is some mismatch between the letters on the drawings and the discussion in his text. Despite these minor confusions, Hooke gave “an excellent account of the structure of the moss, with a surprising amount of detail.” (Richards 1981:142).

When he turned to insects, he commented that a large fly (such as the blue fly, Calliphora erythrocephala, he illustrated) at one time lays 400–500 eggs, and their numbers would increase prodigiously “were they not prey’d on by multitudes of Birds, and destroy’d by Frosts and Rains,” which led him to conclude that the absence of climatic checks causes the tropics to be “infested with such multitudes of Locusts, and such other Vermine.” (Hooke 1961:182). He concluded from watching blue flies that they were stimulated by putrefying meat to lay their eggs on it.

His most detailed insect study was on mosquitoes, which he called water-insects or gnats. The name “mosquito” was in use by 1665, but it was borrowed from Spanish to refer to small American flies. Our distinction between biting mosquitoes and nonbiting gnats only gained common usage about 1900 (Christophers 1960:1–2). Hooke observed them in the aquatic stage, which he thought was generated in rainwater (presumably by spontaneous generation). He was fascinated by their shape and motion, and perhaps because of this fascination, he discovered after two or three weeks that they metamorphosed into gnats, “leaving their husks behind them in the water floating under the surface . . . .” (Hooke 1961:187). He described the process in detail because he had “not found that any Author has observ’d the like; and because the thing it self is so strange. . . .” He described two adults, guessing correctly their sex, though his larval stage (Fig. 3) is Culex and his adults (Hooke 1961: facing pages 193 and 195) are Chironomus (Bodenheimer 1928–1929, II:368; Christophers 1960:4). In the interest of science, he let a mosquito bite his hand and watched it suck his blood and “fill its belly as full as it could hold, making it appear very red and transparent…” (Hooke 1961:195).

Power (1945) argues that some of Hooke’s most striking illustrations were made by his lifelong friend and colleague, Sir Christopher Wren (1632–1723). Architect–scientist Wren had developed the techniques of drawing microscopic subjects, and the Royal Society had asked him to make insect drawings for Charles II. It was only because Wren had more
compelling demands on his time that Hooke took up the project. In the preface to *Micrographia* Hooke praised Wren without specifically attributing any of the drawings to him. Power suspects that plates illustrating the head of a “drone fly,” a flea, and a louse (plates XXIV, XXXIV, and XXXV) are Wren’s, and possibly also plate XXXVI on two mites. Drawings of the fly head, flea, and louse are all gigantic; the flea, at 16.5 inches (43.5 cm) long, is surely the largest insect drawing in the scientific literature. It is ironic that Hooke published a large illustration of a flea in the very year that a plague epidemic struck London, killing almost 100,000. The Royal Society was alerted to the epidemic’s seriousness from the published bills of mortality and suspended its meetings in late June. Charles II also fled the city for safer climes (Gregg 1978:9–11). No one, of course, made the connection between the rat flea (*Nosophyllus fasciatus*) and the plague.

Fig. 4. Flea (now called the dog flea, *Pulex irritans*) (Hooke 1961: facing p. 210).

Hooke observed a louse sucking blood after fasting for two days; presumably it was his blood, as it had been with the mosquito he observed. He found that the louse was “so greedy, that though it could not contain more, yet it continued sucking as fast as ever, and as fast emptying it self behind…” (Hooke 1961:213).

Since Hooke was uncertain about the possibility of spontaneous generation in small organisms, it is interesting that he discovered the eggs of mites. The mites themselves were barely visible to the naked eye, yet he undoubtedly found their eggs. He estimated that a mite is only one-hundredth of an inch thick, which means that there would be a million in a cubic inch, yet their eggs are only a 400th or 500th the size of the adult. “Notwithstanding which minuteness a good Microscope discovers those small moveable specks to be very prettily shap’d Insects, each of them furnish’d with eight well shap’d and proportion’d legs…” (Hooke 1961:213–214). He believed that a mite

*is very much diversify’d in shape, colour, and divers other properties, according to the nature of the substance out of which it seems to be ingendred and nourished, being in one substance more long, in another more round, in some more hairy, in others more smooth, in this nimble, in that slow, here pale and whiter; there browner, blacker, more transparent, &c. I have observed it to be resident almost on all kinds of substances that are mouldy, or putrifying, and have seen it very nimbly meshing through the thicket of mould, and sometimes to lye dormant underneath them; and ’tis not unlikely, but that it may feed on that vegetating substance, spontaneous Vegetables seeming a food proper enough for spontaneous Animals.*

But then again, he says, maybe they all come from eggs!

The illustrations in *Micrographia* inspired the Dutchman Antoni van Leeuwenhoek (1632–1723) to begin sending his own findings to the Royal Society in 1673. Leeuwenhoek could not read the English text, but may have had help from someone who could (Jardine 1993:314). Hooke often repeated Leeuwenhoek’s investigations for the Society and sometimes added his own comments (Hooke 1968, Inwood 2002,
Jardine 2004). In 1692 Hooke expressed regret that, although there had been other microscopists in the 1660s to 1680s, Leeuwenhoek was the only one still publishing scientific observations. He could not return to the subject himself because of declining eyesight (Hooke 1967:262, Wilson 1995:226).

Hooke’s, and the Royal Society’s, interests were quite broad, and he easily wandered into other fields. In an effort to show the practical importance of science, both he and the Royal Society investigated various aspects of seafaring and navigation. Little was known about the oceans, and he thought sea captains might be willing to undertake some investigations if provided with equipment and a program. He invented a depth sounder and water sampler (described 30 September 1663) that might provide useful data. The former determined depths deeper than was possible by dropping a weighted line. It consisted of a larger hollow ball linked to a smaller solid metal ball by a clasp that opened when the solid ball struck the bottom, allowing the hollow ball to rise to the surface. One estimated depth by the time lapsed between dropping both balls into the water and the reappearance of the hollow ball. It was never widely used because it was an inconvenient device and because sailors were uninterested in great depths. However, his water sampler was commonly used by oceanographers in the 1700s and 1800s. It was “a square bucket with upper and lower hinged lids which opened upwards as it was lowered through the water on a weighted bracket” (Wolf 1950:117–119, Bennett et al. 2003:76–77). As one pulled the sampler back up, the lids closed automatically, enclosing the water sample.

Hooke, at the suggestion of the Royal Society in September 1663, began to keep daily weather records, and thereby founded the regular investigation of weather which he hoped would lead to weather prediction (Inwood 2002:43, Bennett et al. 2003:77–80). The subject stimulated his inventive genius, leading him to invent or improve all five basic meteorological instruments: barometer, thermometer, hygroscope, rain gauge, and wind gauge (‘Espinasse 1956:50).

But making one of each was not enough for Hooke; he was always thinking up better versions of his instruments, which explains why the indexes of Middleton’s histories of the barometer, thermometer, and weather instruments (1964, 1966, 1969), have longer entries under “Hooke” than for any other investigator-inventor.

The same is true for Bud and Warner’s encyclopedia of scientific instruments (1998).

Fig. 5. Wheel-barometer, hygrometer, and wind gauge (Hooke 1958: facing p.173).
Not only did he invent the instruments, he also developed and printed a meteorological form on which to record the data (Hooke 1958, Wolf 1950:308–313).

From the start, he and the Royal Society realized that any scientific study of weather required both a uniform set of records and a standard set of instruments (Patterson 1953). However, science was not yet well enough organized for these insights to be widely implemented. That would take another two centuries.

The kind of seaman-investigator whom the Royal Society longed for eventually appeared—the remarkable William Dampier (1652–1715). It seems unlikely that the Royal Society influenced him before his first voyage around the world (early 1679–September 1691), during which he collected valuable information on geography, ocean currents, prevailing winds, people, animals, and plants. After he returned, however, he discussed his findings with Hooke and the Royal Society (Preston and Preston 2004:230–235), and those discussions undoubtedly increased his sophistication when he was writing *A New Voyage Round the World* (Hooke 1697). It was the most important travel book since Marco Polo’s *Travels* (which appeared about 1300). After it appeared, Hooke (1697) summarized it for the Royal Society.

Robert Hooke, son of a clergyman, was a pious Christian as well as a brilliant scientist, yet he thought many students of Earth history exaggerated the importance of Noah’s flood to account for geological strata. From a modern perspective, we could say that he, in turn, exaggerated the importance of earthquakes to account for the same strata. But that was a small mistake when compared with his sophisticated approach to geology and Earth history. He studied and theorized on the shape of the earth, the wandering of the poles, cyclic terrestrial processes, fossil formation, and subterranean eruptions and earthquakes causing changes from land to sea (Hooke 1996:96). He was one of the earliest defenders of the idea that fossils represent the remains of once living beings. His reason was simple: there is no other adequate explanation. Nevertheless,
A Scheme
At one View representing to the Eye the Observations of the Weather for a Month.

<table>
<thead>
<tr>
<th>Days of the Month</th>
<th>Age and Sign of the Moon at Noon</th>
<th>Quarters of the Wind and its Strength</th>
<th>Degrees of Heat and Cold</th>
<th>Degrees of Dryness and Moisture</th>
<th>The Degrees of Pressure</th>
<th>The Faces or Visions of the Sky</th>
<th>The Notable Effects</th>
<th>General Deductions to be made after the Side is fitted with Observations: As</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>27</td>
<td>W. 2. 9</td>
<td>3</td>
<td>3. 2</td>
<td>5. 29</td>
<td>Clear blew, but yellowish. in the N. E. Thunder, far to the South. A very great Tide.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>W. SW. 17</td>
<td>10</td>
<td>3. 12</td>
<td>2. 29</td>
<td>A clear Sky. White as yesterday. Thunder in the North.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>II 4</td>
<td>N. W. 39</td>
<td>4</td>
<td>2</td>
<td>2. 29</td>
<td>A little before the last great Wind, and till the Wind rose at its highest, the Quicksilver continued descending till it came very low; after which it began to ascend,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>6</td>
<td>24. 51. N</td>
<td>2. 8</td>
<td>1. 2</td>
<td>2. 10. 29</td>
<td>Overcast and very low. No dew upon the ground, but very much upon Marble stones, &amp;c.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 8. Form for a weather report (Hooke 1958:179).
he had to argue the point with colleagues in the Royal Society who defended the idea of a “plastic virtue” in the earth that could produce fossils (Rudwick 1985: 53–56, Rapport 1997:106). His claims about fossils were based on observations going back to his boyhood on the fossil-rich Isle of Wight. He was especially fascinated by what he called “snail-stones” or “snake-stones,” now called ammonites. These were much larger than any known living species, though he compared them with the chambered nautilus, which he illustrated as cut in half along the spiral axis (Hooke 1971:281–285, Drake 1996:161–167, Jardine 2004:37–42). The only way he could account for fossils that do not resemble living species was to assume that species must change over time (Drake 1996:97–103). If species change, then fossils might indicate the chronology of the world (Rossi 1984:12–17, Drake 1996:233, 304). When he was informed that the Danish physician Niels (or Nicolaus) Stensen (or Steno) shared his perspectives, instead of welcoming the support, he wondered if someone had secretly sent his own ideas to Stensen (Cutler 2003:130–138). Hooke’s thoughts on fossils were published posthumously.

Robert Hooke was active in the Royal Society for 40 years, during its golden age. His own most important contributions came in his earlier years in the Society, when the standards and traditions of modern science were developing. After his death, Sir Isaac Newton became president of the Royal Society, yet in the 1700s the Society mostly continued along the paths blazed in the later 1600s. The loss of Hooke’s portrait contributed to his being overshadowed by Newton. Some historians have wondered if Newton permitted it to disappear when the Royal Society moved from Gresham College after Hooke’s death. Lisa Jardine has a different answer to the mystery: a picture clearly mislabeled “John Ray” is the long-lost portrait of Hooke (Jardine 2004:17).

Literature cited
Hooke, R. 1661. Micrographia: or some physiological descriptions of minute bodies made by magnifying glasses, with observations and inquiries thereupon. Reprinted from the 1665 edition. Dover, New York, New York, USA.


Acknowledgments

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Erratum:
Improving the Presentation of Results of Logistic Regression with R.

In the Emerging Technologies section of the January 2005 issue, *ESA Bulletin* (Volume 85, No. 1, p. 42), the article, “Improving the presentation of the results of logistic regression with R,” contained an incorrect version of Fig. 3, “Fitted logistic Gaussian regression curve . . . .” The correct version appears below.

![Corrected Figure 3](image)

Fig. 3. Fitted logistic Gaussian regression curve with dit plots and box plots of dependent variable categories.
Motivating Students to Ask Scientifically Productive Questions

We describe a framework for supporting student inquiry in K–16 science classes in the context of student investigation of ecologically or environmentally related problems and issues. The framework was developed based on research from a case study in a 6th grade classroom on how to motivate and support student thinking about questions and evidence. We discuss how we have applied this framework in professional development for K–12 science teachers and for K–16 instructional materials for students. We describe how this framework can facilitate the collaboration of K–12 teachers with scientists, science educators, and learning scientists.

Background

Most teachers use some form of inquiry in their classrooms. Our work with teachers and their students, in part, has emphasized inquiry that involves students asking and investigating their own questions about phenomena or observations that they experience, and results in students developing arguments and or explanations that include evidence from data. We show this as a graphic representation of an example inquiry from a Bottle Biology Activity on Decomposition. See [http://www.bottlebiology.org/investigations/decomp_main.html](http://www.bottlebiology.org/investigations/decomp_main.html)
Development of questions is initially grounded in observations or discussion of phenomena. Observations may be in the laboratory or outdoors. Examples of discussion of phenomena may include exploring and analyzing published data (e.g., change in ice cover on lakes related to changes in climate).

- Classroom discussion is used to develop questions and to develop criteria for what makes a good question.

- Classroom discussion of evidence is used to refine questions to make questions scientifically productive for inquiry.

- Classroom discussion is used to develop criteria for evidence.

- Students construct evidence-based models, arguments, or explanations based on observation and discussions.

Our case study (Lucas et al. 2005) was part of a district-wide middle school science professional development project, School Yard Science, in Madison, Wisconsin, to improve inquiry-based teaching and learning using habitats at or near schools (see http://www.wisc.edu/cbe/cbe_pubs/schoolyardsciencemodel.ppt for background). The case study was on a year-long field and classroom investigation of aquatic systems in a 6th grade classroom. The teacher (Lucas) was a former elementary school teacher who had recently moved to a middle school and was teaching science for the first time in her career. Her goal was to have her students engaged in small groups in scientifically productive (e.g., scientifically testable) investigations of their own questions.

Scientists, science educators, and learning scientists collaborated with the teacher to create an overarching context for research under which students then developed their own related small-group inquiry projects. The overarching context was investigation of aquatic systems. In this particular classroom, the specific context was a study of aquatic systems that combined field observations (a pond near their school) and laboratory investigations (gallon jar microcosms).

Scientists provided relevant research vignettes, access to existing data, and other types of background on aquatic systems to add science content for the teacher and students, and they advised on the research design of student inquiry projects. Science educators worked with the teacher to develop classroom practices (e.g., integration of model-based reasoning by students) and instructional materials (e.g., problem-based materials) to support student investigations. Learning scientists helped to design assessment instruments (e.g., rubrics for analyzing student work) and approaches (e.g., ob-
servations and interviews) to study change in student learning.

At the beginning of the case study, we quickly learned that it was very challenging for students to ask scientifically productive questions. After an initial observation of a pair of small urban sediment detention ponds within walking distance of the school, students individually generated a list of 10 questions of interest. We list several examples of these questions below in Table 1.

*Table 1. Questions posed by sixth-grade students after initial pond observations.

- How much blood can a leech suck in an hour?
- Are there more fish in our pond?
- Where does the water come from?
- What happens to the animals in the winter?
- How does the water in the pond get polluted?
- Is the animal life in pond 2 more diverse than pond 1?

As you can see, most of these, as written, were not scientifically testable. To facilitate the refinement of their questions, we asked students to develop criteria for what they thought made one question a better scientific question than another. The initial criteria to evaluate their questions are listed in Table 2.

*Table 2. Initial criteria developed by students for what makes a good scientific question.

- Easy to answer
- Meaningful/valuable
- Genuine
- Researchable
- Cannot be answered yes or no

To expand on their initial notions of what made one question a better scientific question than another, we asked students to identify the sources and types of evidence that they would need to provide at the end of their investigation in order to present a convincing argument or explanation. The result of this discussion was a group revision of criteria that they accepted as a class for what made a good scientific question. These are summarized in Table 3 below.

*Table 3. Revised criteria developed by students for what makes a good scientific question after connecting questions and evidence.

- Investigator has an expected outcome
- Methods are clear from the wording
- Connected to other questions
- Revision of initial question
- Genuine: don’t already know the answer
- Research is doable given tools, knowledge, and supplies
- Research is sensible or meaningful and adds knowledge

Through a combination of analysis of student work, transcripts of group discussion, and interviews with individual students, we found that the trajectory of evidence-based reasoning in arguments and explanations generally began with personal beliefs, and by the end of the school year, included careful documentation of empirical results. Transcripts of classroom discussions, analysis of student work, and individual interviews with students that reflect changes in their thinking about evidence are summarized in Table 4. Conclusions from the case study are summarized in Table 5.

*Table 4. Change in student thinking about evidence.

- Because I said so
- Because someone told me so
- Because an authority said so
- Because I observed and documented
- Because I conducted an experiment
- Because I communicated my findings clearly
- Because I created a model based on research
- Because I only included evidence specific to my model
Table 5. Conclusions from the case study.

- Initial arguments constructed by students were based on personal beliefs.
- Initial arguments constructed by students were often based on single undocumented observations.
- Classroom discourse and teaching shifted arguments from a basis on personal belief or single observation to include scientific evidence in arguments.
- Scientific evidence used by students in arguments included documented observations (e.g., dated and documented in a laboratory notebook), research of others students in the classroom, and empirical results collected directly by students.
- Results were repeatable.
- Students developed and revised explanations or models based on their research findings and used these to create arguments.
- Students developed new questions and experiments based on initial findings from their inquiry.


General framework for developing student questions and supporting inquiry

We provide a graphic representation of a general framework for helping students to develop scientifically productive questions and inquiry that result in evidence-based arguments and explanations in Fig. 1. We have used this general framework in professional development for elementary, middle, and high school science teachers and instructional materials for K–16 students. Instructional materials have used observations, experiments, and query and analysis of databases and digital libraries. Professional development and materials development involved collaboration among K–12 teachers, university faculty and staff, graduate students, and district science coordinators.

Step 1. Initial observations and subsequent classroom discussions set the context for the investigations that students can consider, elicits prior knowledge, and establishes personal or local relevance.

Step 2. Expands the discussion to help students think about and build possible connections to their investigations.

Step 3. Students individually identify several questions that they thought about (at least five and up to 10) to share with the class based on their initial observations and possible connections. By thinking of 5–10 questions, we found that all students create a range of questions that typically includes the obvious, the absurd, and a few that are somewhat scientifically testable. See the examples in Table 1.

Step 4. Groups discuss what makes one question a better scientific question than another. Results of their group discussion are summarized as a set of initial criteria that the class will use to evaluate their questions. See the examples in Table 2.

Step 5. Groups refine their questions by thinking about what data they will need to provide evidence for their arguments or explanations. This discussion is a very important part of our instruction to help students to develop scientifically productive questions. Results of this discussion are used in Step 6 to re-evaluate their criteria for what makes a better scientific question, and to develop criteria for convincing evidence.

Step 6. The discussion about what makes a better scientific question in light of the evidence needed to create a convincing argument or explanation is used to revise classroom criteria for questions. Groups revise their questions, if necessary, based on the new classroom criteria. See examples in Table 3.

Step 7. Groups conduct their investigations. During Step 7, groups share progress reports on their inquiry frequently (e.g., once per week in an investigation.
Fig. 1. Supporting inquiry by connecting scientific questions and evidence. Adapted from System-wide Change for All Learners and Educators (SCALE) [http://scale.mspnet.org/]

For an example of how this framework is applied in instructional materials for middle school science inquiry about the behavior and ecology of an invasive crayfish species see [http://www.wisc.edu/cbe/cbe_pubs/crayfishstudy.zip].

We have also applied this framework to inquiry using large-scale databases as a source of observations and data for high school science and undergradu-

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National Science Foundation Math Science Partnership Program Award No. 0227016 System-Wide Change for All Learners and Educators. T. Millar, Principal Investigator

National Science Foundation Research, Evaluation, and Communication REC-9973004, Modeling Nature. R. Lehrer, Principal Investigator

Dwight D. Eisenhower Science and Mathematics. SchoolYard Science. R. Bohanan, Principal Investigator

University of Wisconsin System Elementary and Secondary Education Act Improving Teacher Quality Higher Education Program. Teacher Leadership Development Project: Creating School-based Leadership Cadres to Adapt Exemplary Science Curriculum to Foster Student Inquiry. R. Bohanan, Principal Investigator

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Society Section and Chapter News

Applied Ecology Section Newsletter

Chapter officers

Co-Chairs, Deborah Ulinski Potter <dapotter@fs.fed.us> and Martin A. Spetch <mspetich@fs.fed.us>; Vice Chair, Becky Kay Kerns <bkerns@fs.fed.us>; and Secretary, Neal T. Butt <Nbutt@cabq.gov>.

Student travel awards

The Applied Ecology Section will support students in their efforts to present their work at the 90th ESA Annual Meeting in Montréal, Canada, 7–12 August 2005. The Section is now calling for nominations for scholarships, with individual awards up to $750 depending on the funding available and number of qualified applicants. The deadline for receipt of applications is 15 May 2005. Instructions and details for the application process can be found at the Applied Ecology Section web page: <http://www.esa.org/applied/>

Long-range planning grant

The Applied Ecology Section received a long-range planning grant from the ESA Governing Board to help implement ESA’s Long Range Plan. The award was for $1000, to be used for student scholarships, webmaster training, and the business mixer at the 2005 Annual Meeting. A written report on how the funds are used will be presented to the Governing Board in Montréal, Canada.

Annual Meeting update

The Applied, Agroecology, Rangelands, Long-Term Studies, and Soil Ecology Sections are planning a joint mixer for the 90th ESA Annual Meeting in Montréal, Canada, 7–12 August 2005. The mixer will be held on Wednesday, 10 August 2005, 6:30–8:00 pm, in Room 517 A, Level 5, Palais des Congres de Montréal. The Applied Ecology Section will hold its business meeting on Tuesday, 9 August 2005, at lunchtime, with the location to be announced later. We will review the past year’s business and accomplishments, as well as discuss the future direction of the Section.

Neal T. Butt
Secretary
E-mail: Nbutt@cabq.gov

Southeastern Chapter Newsletter

Chapter officers

Chair: James Luken (2004–2006) <JoLuken@coastal.edu>
Vice-Chair: Joan Walker (2003–2005) <joanwalker@fs.fed.us>
Secretary/Treasurer: Nicole Turrill Welch (2004–2006) <nwelch@mtsu.edu>
Web-Master: Mark Mackenzie <mackenzi@forestry.auburn.edu>

Chapter Home page: <http://www.auburn.edu/seesa>

2005 ASB Meeting

The 2005 meeting of the Association of Southeastern Biologists will be held 13–16 April 2005 in Florence, Alabama, hosted by the University of North Alabama.
SE-ESA Chapter luncheon

We will have our traditional luncheon on Friday, 15 April 2005, 12:15–1:30 pm, following the ASB Business Meeting.

Elsie Quarterman-Catherine Keever Award for best student poster

This award is sponsored by our chapter and will be presented for the first time at the 2005 ASB Meeting. Undergraduate and graduate students are eligible, and the student must be the sole or senior author on a poster clearly dealing with an ecological topic and representing a completed research project. Dr. Howard Neufeld, Department of Biology, Appalachian State University, neufeldhs@appstate.edu is the chair of the award committee.

Eugene P. Odum Award for best student paper

Our chapter also sponsors this award. Undergraduate and graduate students are eligible, and the student must be the sole or senior author on a paper presentation clearly dealing with an ecological topic and representing a completed research project. Dr. Jake Weltzin, Department of Ecology and Evolutionary Biology, University of Tennessee, jweltzin@utk.edu is the chair of this award committee. Past recipients of the Odum Award are acknowledged on the Chapter home page (http://www.auburn.edu/seesa/).

Membership renewal and award support

Please remember to renew your membership in the SE Chapter when you renew your ESA membership. Your donations to the Eugene P. Odum Fund and the new Quarterman-Keever Fund support our student poster and paper awards.

Keeping in touch

Check the Chapter home page: http://www.auburn.edu/seesa/ for updates and additional information. Join the Southeastern Chapter of ESA LISTSERVER. To join the ListServer, send a message to majordomo@mail.auburn.edu with “subscribe scesa” in the body of the message. Please send news or announcements to scesa@mail.auburn.edu for distribution to the listserv, or to nwelch@mtsu.edu for inclusion in the next quarterly newsletter.

Respectfully submitted,
Nicole Turrill Welch
Secretary/Treasurer
E-mail: nwelch@mtsu.edu
Technical Symposium and Workshop: Threatened, Endangered, and At-Risk Species on DoD and Adjacent Lands. Baltimore, Maryland

The goal of this symposium and workshop is to define and evaluate Threatened, Endangered, and At-Risk Species (TER-S) research on or adjacent to Department of Defense (DoD) lands. For the first time, researchers from multiple organizations will assemble to more holistically address TER-S issues at a national level. The event will be held 7–9 June 2005, at the Wyndham Inner Harbor Hotel in Baltimore, Maryland.

Online registration will be available from 5 January 2005 through 16 May 2005. Please see [www.serdp.org/TESWorkshop](http://www.serdp.org/TESWorkshop) for additional information. For questions, please e-mail: [TESWorkshop@hgl.com](mailto:TESWorkshop@hgl.com).
11th Symposium on the Natural History of the Bahamas, San Salvador Island, Bahamas

This biennial conference will be held at the Gerace Research Center (formerly the Bahamian Field Station) on San Salvador Island, Bahamas, 23–27 June 2005. Biologists who do research in the Bahamas and in the wider Western Atlantic, including Florida and parts of the Caribbean, are invited to give oral presentations or posters on their research in any aspect of natural history, including botany, entomology, vertebrate zoology, marine science, etc. Papers will be published in the Proceedings. The deadline for registration is 31 March 2005 and the deadline for abstracts is 22 April 2005. There is a charter flight from Fort Lauderdale. Further details are available on the web site; you can register online at: Geraceresearchcenter.com.

Contact: Mr. Vincent Voegeli, Executive Director, Gerace Research Center, %Twin Air, 1100 Lee Wagener Blvd., Ste. 113, Fort Lauderdale, FL 33315; Fax: (242) 331-2524; E-mail: grcss@juno.com

Or contact the program co-chairpersons:
Dr. William Hayes, Department of Earth and Biological Sciences, Loma Linda University, Loma Linda, CA 92350; E-mail: whayes@ns.llu.edu

Dr. Beverly Rathcke, Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, MI 48109; E-mail: bratcke@umich.edu

4th International Symposium and Workshop on Frugivores and Seed Dispersal. Brisbane, Australia


The Symposium will be held 9–16 July 2005 at the Nathan Campus of Griffith University, Brisbane, Australia. The theme will be Frugivores and Seed Dispersal: Theory and Its Application in a Changing World. It will encompass leading-edge theoretical studies and emphasize the application of our ever-expanding knowledge to environmental management. There will be approximately 35 plenary speakers as well as open sessions, poster sessions, and workshops. The plenary speakers have been selected to cover a broad range of geographical areas, plant and animal groups, and approaches, e.g., evolutionary aspects, field ecology, genetics, and modeling.

For Secretariat information, contact Rhonda Green:
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The Ecological Society of America announces an international conference

ECOLOGY IN AN ERA OF GLOBALIZATION: CHALLENGES AND OPPORTUNITIES FOR ENVIRONMENTAL SCIENTISTS IN THE AMERICAS

MÉRIDA, MEXICO
JANUARY 8–12, 2006

This conference is designed to develop strategies to increase international access to ecological knowledge and to increase collaboration among environmental scientists. The conference will be organized around three sub-themes:

INVASIVE SPECIES ▲ HUMAN MIGRATION ▲ PRODUCTION

The conference will feature keynote speakers, oral presentations, and poster sessions. Oral presentations and posters will include both invited submissions and contributions solicited in an open call for papers later this year. Workshops will also be organized around the sub-themes, and scientific field trips in the Yucatán will be offered.

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Watch the ESA web site for further details: <esa.org>.
Enhancing Educational Opportunities at Biological Field Stations and Marine Laboratories

The report of the National Science Foundation sponsored workshop on Education and Recruitment in the Biological Sciences: Potential Role of Field Stations and Marine Laboratories, has been published and is available on the Organization of Biological Field Stations web page [www.obfs.org](http://www.obfs.org).

The goals of the workshop were to explore educational opportunities that capitalize on the unique learning environment of Field Stations and Marine Laboratories (FSMLs) and to explore the role that FSMLs can play in enhancing recruitment into the biological sciences. Three audiences were addressed: K–12 students and teachers, undergraduates, and community and continuing education audiences. For each group participants discussed the current conditions at FSMLs, the challenges to greater participation by the educational group, and research and evaluation needs. A common discussion was an exploration of ways to increase the diversity of participants within all forms of educational programming at FSMLs. In addition, the need for an evaluation component to educational efforts was included in all discussions. The report contains recommendations for the FSML community and for the NSF.

Recommendations for K–12 include that initial exposure to inquiry investigation in field biology needs to begin early and be continued, as single immersion experiences are often not successful or can be detrimental to continued interest. Successful K–12 programs are based on district, state, and national standards that are integrated into the school curriculum. Fostering the exposure of teachers to field experiences is likely to improve the quality and frequency of a student’s experience.

An important recommendation for undergraduate participation in FSMLs is based on the realization that a large percentage of students attend community colleges for their first two years of study, and get their initial, and perhaps only, biology coursework in this period. Unfortunately, FSMLs are rarely associated with community colleges; to facilitate field experiences for these students, linkages between FSMLs and community college faculty and students must be improved. Because a higher than average proportion of underrepresented minority students attend community colleges, improving these ties is likely to aid in the recruitment of minorities into biology.

Opportunities for experiences for community participation in FSMLs outside of the formal school setting include strengthening connections with groups such as minority-dominated church youth groups, tribal organizations, Girl and Boy Scout troops, 4-H, and boys and girls clubs. The report recommends repeated exposure to nature and research in field biology for these groups, and the encouragement of parent participation during the field experiences; these actions are likely to reinforce the experience for the child and increase the probability of subsequent field activities.

When assessing the current nature of education programs at FSMLs, it is apparent that there is little quantitative information about these programs. The report recommends a detailed survey of the current education programs at all FSMLs, and the development of common evaluation instruments to provide a quantitative assessment of the impact of FSML experiences.

Printed copies of the executive summary and the report are available from the e-mail address below.

Jan Hodder
Oregon Institute of Marine Biology
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E-mail: jhodder@uoregon.edu
DEADLINES: Contributions for publication in the *Bulletin* must reach the Editor’s office by the deadlines shown below to be published in a particular issue:

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Please note that all material for publication in the *Bulletin* must be sent to the *Bulletin* Editor. Materials sent to any address except that of the Editor, given below, must then be forwarded to the Editor, resulting in delay in action on the manuscripts. Send all contributions, except those for Emerging Technologies, Ecology 101, Ecological Education K–12, and Obituaries/Resolutions of Respect (see addresses below), to E. A. Johnson, *Bulletin* Editor-in-Chief, Department of Biological Sciences, University of Calgary, Calgary, Alberta T2N 1N4 Canada. (403) 220-7635, Fax (403) 289-9311, E-mail: bulletin@esa.org.

MANUSCRIPT PREPARATION: The manuscript should be submitted as a WordPerfect or Microsoft Word (for Mac or DOS) manuscript, preferably as an e-mail message attachment to bulletin@esa.org. E-mailed photographs and diagrams must be in .tif or .eps format. Other forms of electronic copy (text embedded in e-mail messages, diskettes sent by post) or hard copy can be submitted if absolutely necessary. If formatting could be troublesome (e.g., tables, European alphabet characters, etc.), hard copy also should be sent via fax to E.A. Johnson at (403) 289-9311, or via post. Hard-copy manuscripts should be double-spaced, with ample margins. Plain formatting must be used on hard-copy and electronic manuscripts. PLAIN FORMATTING consists of a single font of a single size, left justification throughout, line spacing the same throughout, and up to three different weights of headings. Other formats will not be accepted for publication. The author should THOROUGHLY PROOF the manuscript for accuracy, paying special attention to phone and fax numbers and web site and e-mail addresses, which are frequently incorrect.

COVER PHOTOGRAPHS: The photo should illustrate ecological processes or an ecological research design. The cover of the July, 2004 issue is a good example. It helps if the colors in the photo are bright, although black and white photos are considered if they are well composed with good contrast.

If you would like to submit a digital file, submissions can be small jpegs (72 dpi) but if the image is selected for a cover the final image must be 300 dpi and at least 7 inches wide and 5 inches high. E-mail the file as an attachment to the Editor of the *ESA Bulletin* at bulletin@esa.org. Or send a single 5 x 7 or 8 x 10 photo to the *Bulletin*. On an accompanying photocopy, give your name, address, a photo legend up to 100 words, and, if the photo describes a paper in ESA or in another journal, the literature citation or title of the accepted manuscript. If you wish unused photos to be returned please include a self-addressed return envelope.

LETTERS TO THE EDITOR AND COMMENTARIES: Please indicate if letters are intended for publication as this is not always obvious. The *Bulletin* publishes letters, longer commentaries, and philosophical and methodological items related to the science of Ecology. There are no page limits but authors may be asked to edit their submissions for clarity and precision. Previously published items from other sources can be republished in the *Bulletin* if the contributor obtains permission of the author and the copyright holder, and clearly identifies the original publication.

MEETING ANNOUNCEMENTS: Submit a brief prose description of the upcoming meeting, including title, a short paragraph on objectives and content, dates, location, registration requirements, and meeting contact person’s name, street address, and phone/fax/e-mail address. Please do not submit meeting brochures in the expectation that the Editor will write the prose description; he won’t. Compare the publication deadlines above with the meeting deadlines to be sure the announcement will appear in time.

MEETING REVIEWS: The *Bulletin* publishes reviews of symposia and workshops at the annual ESA meeting, as well as important and appropriate meetings that are unrelated to the annual ESA meeting. The reviewer should strive for a synthetic view of the meeting or symposium outcome, i.e., how the various presentations fit or conflict with each other and with current scientific thought on the topic. Review length is open, although about four double-spaced pages should be enough to capture the essence of most meetings.
The following advisory items are provided to help focus your review.

a) Meeting title, organizer, location, sponsoring organizations?

b) What were the meeting objectives, i.e., what scientific problems was the meeting organized to solve? Who cares (i.e., what was the relevance of this scientific problem to related ones under examination)?

c) How well did the meeting meet the objectives? Were there specific papers delivered or roundtables/discussion groups that were exemplary in reaching the objectives? You may concentrate the review on only the outstanding papers to the exclusion of all others, or give a comprehensive view of all presentations/meeting activities, or examine a selection of papers that neither describes all, nor focuses on a very few.

d) What new was discussed? What previously weak hypotheses were strengthened, confirmed or supported? Were any breakthroughs, or new or innovative hypotheses presented, that forced participants to rethink current concepts?

e) Was there anything else important that the meeting accomplished that may not have been part of its explicit objectives?

f) What subjects relevant to the meeting objectives were missing or left out? Did the scientific components of the problem that were included produce a strong slant or serious void by virtue of blind spots by the organizers, failure of invitees to appear, or similar difficulties?

g) Are there plans for a proceedings issue or meeting summary document, and if so who is editing it, who is publishing it, and when is it planned to appear (i.e., where can interested folks learn more about the meeting?)

EMERGING TECHNOLOGIES: Submissions for this section should be sent to the Section Editors in charge of the section: Dr. David Inouye, Department of Biology, University of Maryland, College Park, MD 20742. E-mail: inouye@umd.edu; or Dr. Sam Scheiner, Div. of Environmental Biology, Natl. Science Foundation, 4201 Wilson Blvd., Arlington, VA 22230. E-mail: sscheine@nsf.gov

ECOLOGY 101: Submissions should be sent to the Section Editor in charge of this section: Dr. Harold Ornes, College of Sciences, SB 310A, Southern Utah University, Cedar City, UT 84720. E-mail: ornes@suu.edu

ECOLOGICAL EDUCATION K–12: Correspondence and discussions about submissions to this section should be sent to Susan Barker, Department of Secondary Education, 350 Education South, University of Alberta, Edmonton, Alberta T6G 2G5 Canada. E-mail: susan.barker@ualberta.ca (780) 492 5415 Fax: (780) 492 9402 or Charles W. (Andy) Anderson, 319A Erickson Hall, Michigan State University, East Lansing, MI 48824 USA. E-mail: andya@msu.edu (517) 432-4648 Fax: (517) 432-5092

FOCUS ON FIELD STATIONS: Correspondence and discussions about submissions to this section should be sent to E. A. Johnson, Bulletin Editor-in-Chief, Department of Biological Sciences, University of Calgary, Calgary, Alberta T2N 1N4 Canada. (403) 220-7635, Fax (403) 289-9311, E-mail: bulletin@esa.org.

OBITUARIES AND RESOLUTIONS OF RESPECT: Details of ESA policy are published in the Bulletin, Volume 72(2):157–158, June 1991, and are abstracted below. The death of any deceased member will be acknowledged by the Bulletin upon submission of the information by a colleague to the Historical Records Committee. The Obituary should include a few sentences describing the person’s history (date and place of birth, professional address and title) and professional accomplishments. Longer Resolutions of Respect, up to three printed pages, will be solicited for all former ESA officers and winners of major awards, or for other ecologists on approval by the President. Solicited Resolutions of Respect will take precedence over unsolicited contributions, and either must be submitted to the Historical Records Committee before publication in the Bulletin.