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Preserving Historical Records in Ecology: Opportunities and Challenges

By Juliana Mulroy, Sharon Kingsland, Tom Mulroy, Fred Swanson, Charles Nilon, and Alan Covich

The Historical Records Committee (HRC) sponsored a Special Session at the Portland meeting of the Ecological Society of America in 2017 on the theme of “Preserving ecology’s historical record for the 21st century: opportunities and challenges.” Our purpose was to think broadly about what kinds of historical records should be preserved to tell the story of ecological science and environmental history in the next century. Session organizers brought a wide range of experiences, interests, and disciplinary expertise to the task, with the idea of prompting the audience to reflect broadly on future needs and opportunities for historical preservation.

Session organizers were chosen for their institutional diversity and knowledge of different types of data relevant to ecology. From the HRC, organizers were Alan Covich (University of Georgia; tropical ecology, conservation of river systems), Juliana Mulroy (Denison University, plant population ecology, undergraduate education), Sharon Kingsland (Johns Hopkins University; history of ecology), and Charles Nilon (University of Missouri; ecology at agricultural colleges, urban ecology). Two other organizers represented broader interests of ESA members: Fred Swanson (U.S. Forest Service; H. J. Andrews Experimental Forest, Oregon; long-term ecological research), and Tom Mulroy (environmental consulting in private employ).

Other participants from the Historical Records Committee present were Robert Jones (Provost, Clemson University, forest ecology) and Hal Balbach (emeritus, U. S. Army Corps of Engineers; environmental biology). The audience was exceptionally diverse in their interests and fields of expertise and brought many different perspectives to the Session. These interests included: historical ecology, long-term ecological research, forestry, ecology and evolution (the fusion of genomics, functional ecology, earth system science and informatics), network science, computational humanities, geomorphology and ecology, conservation ecology, and history of science.

As we enter our second century as a society, saving historical records is important not just to the historians of science of the future, but also to ecologists and other environmental scientists who can draw lessons from past experience to improve on how science is organized and conducted.

The Historical Records Committee commonly focuses on preserving records relevant to the history of the Ecological Society of America, which are archived at the Hargrett Library, University of Georgia. Apart from paper and electronic records, ESA's archives include oral histories of leading ecologists, which when processed are made available online. The Hargrett Library also accepts artifacts related to ecological work and careers, for example equipment and other memorabilia. Since the library has excellent exhibit and teaching facilities, the collection of these materials opens new possibilities for educational activities and public outreach. Our committee also encourages preservation of research ecologists' personal materials (important for charting careers and progress in our field), often at their home institutions.

But there are many other kinds of records needed for a full history of ecological disciplines, most of which need to be housed elsewhere than the ESA archives. Examples include the records of long-term ecological projects; records relating to applied ecology (such as those generated by environmental consulting firms); and records relating to the teaching of ecology for different audiences and with innovative tools. Paper, digital, photographic and film records await archiving, as well as photographic, specimen, and narrative records documenting the condition of specific places at specific times.

We especially wanted to identify records that were beyond the usual categories that come to mind. Discussions ranged across several different categories of record-keeping, some of which would be valuable for future ecologists and to scientists interested in historical ecology, while other kinds of records would be of special interest to historians of ecology and environmentalism.

One large category involves records that seek to preserve natural history data and ecological data from the past in order to understand change today. These might include photographs and notebooks of field observations from early naturalists, often preserved in museums. But thinking ahead, we should also consider preservation of data being collected by ecologists today. Often scientists want to preserve and share data from their projects. What models are out there to help people and programs to save data?

An example of a relatively well organized effort is the Environmental Data Initiative (EDI), a project funded by the National Science Foundation to accelerate the curation and archiving of environmental data, with focus on projects funded by NSF's Division of Environmental Biology. The main programs that fall within this initiative are Long-term Research in Environmental Biology, Organization of Biological Field Stations, Macrosystems Biology, and Long-Term Ecological Research (LTER). Projects like EDI, while very important, will not address the needs of individual researchers who fall outside these categories and who must search for other mechanisms to share their data.

Individual LTER sites are clearly candidates for the preservation of historical records. An exceptionally thorough recent effort is an archival project documenting the history of the H. J. Andrews Forest Long-Term Ecological Research site, including its history of administration. This three-year project was done in conjunction with historians Sam Schmieding and Anita Guerrini (Oregon State University). The project was complex in that it involved working at the Federal/non-Federal interface with records of mixed provenance and therefore different records-management stipulations. Components of the project included: locating, organizing, and creating inventory of about 100 boxes of program records (distinguished from the scientific data, which are managed under rules set by NSF and the LTER network); creating an online, publicly accessible digital collection on Oregon State University and US Forest Service platforms; collecting new oral histories; assembling a digital collection of records of H. J. Andrews, the Forest Service

leader for whom the Forest is named, and supporting new history scholarship by Oregon historian Bill Robbins, who has been drawing on those records.

As Sam Schmieding remarked in follow-up comments sent after our discussion, assessing and curating historical records is hard work, time-consuming, takes space, and can be costly. He encouraged scientific societies and institutions to educate scientists and administrators on archiving, and to develop best practices policies that would include funding and storage. A model he identified was the National Archives and Records Administration (established only in 1934), which he thought could be emulated by scientists, their societies and institutions, albeit on a much smaller scale. Sam's approach as a historian and archivist is to start by assuming that most records are valuable until assessments can be made and advice obtained from experts. He advises those holding historical materials to consult with experts in historical and archival preservation. These experts might include archivists and librarians, historians, or other scientists and administrators.

Records like those of the Andrews Forest LTER provide an exceptional opportunity to learn all aspects of the history of a place from the inside out, and they are also significant for understanding environmental history. Andrews Forest science and scientists played vital roles in the battles over logging on Federal lands, and the eruption of Mount St. Helens was an important public event of historic proportions. Fred Swanson has been promoting history record-keeping in both contexts. In the Mount St. Helens case, some oral histories have been collected, but an incredibly rich trove of program records awaits tending.

The LTER Network Office, which has recently moved from the University of New Mexico to the National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara, is also poised to create an archival collection that would be valuable to future scholars interested in long-term ecological research and the challenges and opportunities of "network ecology." Robert Waide, former director of the Network Office, has kept all emails from his directorship, which being in digital form are also searchable.

But any records not stored on paper are in danger of being lost as technology changes; with such changes it can become impossible to retrieve records. We therefore also need methods for preserving materials that might be lost as recording technology becomes obsolete.

There may be lacunae in the historical records that will pose great challenges to future historians seeking to understand what has worked and what the results have been, and what did not work and why. For instance, proposals that are funded are commonly preserved, while those that are unsuccessful are discarded, along with explanations of why funding was denied. Understandably the criteria for preserving proposals will vary with different funding agencies, but knowing what failed, or what lines of research were not pursued, can be as instructive as knowing what succeeded.

Knowing what worked well and what did not work well in the past can also help to improve future science, especially in projects that are complex, interdisciplinary, or involve research networks. Fred Swanson gave an example of how historical scholarship might help improve future science: NSF is investing in new research networks (e.g., NEON, CZOs), but there has not been a close, critical look at the successes and shortcomings of the LTER network, now in its fourth decade, although one imagines that the perceived success of LTER has been a selling point for these new networks. Good historical scholarship might improve management of these substantial new investments. What is an observation network like NEON potentially capable of doing in 30 years? As we enter an age of increasing uncertainty about the

environment, there is value in having a good historical record of scientific practices and cultural norms to help us make predictions about how we will deal with future problems.

While a given funding agency such as NSF may not be receptive to funding this kind of critical analysis, possibly an institution such as NCEAS could take the lead in supporting these kinds of analytical and historically informed discussions involving both scientists and historians. The reasons for supporting such scholarship need to be more strongly articulated by the community interested in the history and future of ecology.

Of concern too was the fact that many different organizations may not be thinking of preserving records at all, or may not have a way to make them accessible to scholars. The following institutions, all important for ecological and environmental research, came to mind:

- The Army Corps of Engineers, which has explored ecological issues in military installations amounting to 50 million acres;
- Liberal arts colleges, which may be highly influential sites for ecological education, but whose faculty (or their institutions) may think their teaching records do not need to be preserved. Teaching materials are, however, of considerable historical interest, for they chart how ecological knowledge is transmitted from one generation to the next, and record changes in the definition of the discipline and its relationship to other disciplines. The use of new technologies is valuable in charting how the discipline has departed from its roots in natural history. Visual materials generated purely for teaching purposes (such as films or photographs) may also turn out to have historical value as records of past environments. Teaching records can be as important to preserve as research-related material.
- Agricultural experimental stations and field stations that are attached to an institution or consortium, where there may be no systematic efforts to keep records;
- Work by environmental consultants in the private sector.

A lot of historical information is generated outside research universities, but there may be no mechanisms for preserving or creating access to such records. Tom Mulroy noted the particular challenges faced by environmental consultants in thinking through how and where to preserve these rich collections documenting the history of modern environmentalism. Before the session, the organizers asked for background information on each organizer's career and experience. Although this information was not part of the session discussions, we have taken excerpts from Tom's biographical statement to illustrate what kinds of records environmental consultants collect during their careers. Over a 40-year career as an environmental consultant, Tom conducted biological and ecological studies and monitoring programs, as well as preparing environmental compliance documents related to the National Environmental Policy Act, California environmental Quality Act, Endangered Species Act, and Clean Water Act. He worked for private consulting firms on a combination of federal projects and large and small regional and local projects. He contributed to the development of methodology for ecologically appropriate habitat restoration and revegetation in Mediterranean-climate regions and in the development of effective mitigation measures for large programs. His career spans the rise of the modern field of environmental consulting brought on by government regulations.

Private consulting firms generally only archive reports for seven years, and space is often at a premium. One must therefore look for the records kept by individual consultants to understand the history of these fields. Key records of the development of these fields include reports for clients (some public, some confidential), presentations at professional meetings, and manuscripts for newsletters. Many of these would be in the files of the authors or other individuals in the field. Field notes, photographic records, and specimens are examples of materials that provide records of individual activities.

The challenges of assembling dispersed materials and then finding a repository that could, for example, preserve all materials relevant to a particular geographic location, are enormous. One must decide what to archive, where to archive it, and how to pay for it. We suspect that this sub-field of ecology is underrepresented in archives, except through academic ecologists who consult on the side.

Also challenging is the preservation of what Fred Swanson described as “cultural data,” meaning the various artistic, musical, literary, and theatrical projects done in association with ecological work. The LTERs are an example of ecological projects that often have significant artistic components, but other institutions, such as biological field stations, marine labs, and parks are also engaging in arts/humanities in their programs, both for practical and for moral reasons. The preservation of cultural data will be important to future scholars trying to understand the history of environmentalism, and how people perceive the world and our place in it.

We can be far more attentive to the need to preserve cultural data of this type. These activities tell us a lot about evolving cultural perceptions -- about human ecology -- and are just as valuable as preserving data about vegetation or stream flows. We cannot rely on traditional institutions (such as universities, or agencies like the Forest Service), if we hope to capture artistic statements, media communications, films, performances, art, poetry, blog posts, YouTube videos, and other records of cultural activities, values, and diverse perspectives.

Apart from institutional records and records relating to long-term multi-disciplinary projects, we also discussed records of individual activities, ideas, and contributions to ecology. Recognizing that a person’s impact on a field can depend in part on their personal style or method of communication – especially in the case of people whose charisma inspires others – it would be valuable to have videos of lectures or keynote addresses that record the leaders of our disciplines. But we also realized that in addition to distinguished ecologists, it would be valuable to record the “voices from below” or the ideas and perspectives of people outside the accepted canon. Knowing about people’s personal experiences with advancing new ideas and perhaps meeting rejection, or having to struggle for acceptance, would also tell us a lot about the process of science.

Finally, we reflected on the absence at ESA of a record of some of the main events of the annual meetings. Plenary talks and panels are not routinely recorded, nor are the talks later published. Other societies do routinely record formal activities at annual meetings, especially plenaries and other noteworthy events. In addition, since the meeting is the time of turnover of presidents, it might be valuable to record interviews with incoming and outgoing presidents at each annual meeting, getting their views on the field or on their own tenure as president, in a way not possible in the formal addresses given at the meetings. We

considered recording of such activities as well as presidential perspectives as valuable not only for tracking the history of ecological science and of ESA over the years, but also valuable in generating teaching aids for students of ecology, especially if they were made available on the website.

In summary, there appear to be many sources of historical records which are in danger of being lost, or which are being sporadically preserved thanks to prescient leadership, some involving collaborations among historians and ecologists. (See below for a profile of such a project at Andrews Experimental Forest). Such records – which extend across scientific fields and many areas of applied ecology, and embrace both scientific and cultural/social history – are likely to be of immense value to scholars charting the history of ecological and environmental sciences in the late-20th and 21st centuries. The challenges of selection and preservation are beyond the purview of HRC, but we hope ESA members and others will take up the challenge to draw attention to the needs and opportunities that exist now to organize and preserve records of many different kinds. Historians and scientists could collaborate, not only to preserve records, but also by engaging in historically-informed analysis of ecological science, applied ecology, and related cultural activities, which might help to guide future generations.

Gaining Access to 65 Years of Ecology: The “History Team” of the H. J. Andrews Experimental Forest

By Samuel Schmieding

The professional archiving of historical records is crucial to the health of complex institutions, including 28 active sites in the Long-Term Ecological Research (LTER) network as well as other long-term scientific research stations or organizations. Many science programs (including LTERs) excel at “data management” (quantifiable research and environmental monitoring information), but records of program development are often overlooked, leaving leaders of programs without ready access to their own history, which can be helpful in understanding past successes and shortcomings as well as with planning future efforts.



Recognizing these shortcomings, the H.J. Andrews Experimental Forest (HJA) “history team” -- Historian Sam Schmieding, OSU History Professor Anita Guerrini and USFS Emeritus Scientist Fred Swanson -- started in 2013 to transform 65 years of scattered and disorganized records into a professionally-arranged collection. Located in various storage sites in U.S. Forest Service and Oregon State University facilities, even including a “vault,” (at left) and in files of scholars associated

with the HJA, a mountain of records estimated at 250 linear feet and 50,000+ photographs had to be inventoried and arranged.

Performed in a fashion that reflected the history, form and function of an institution that evolved from its 1948 inception as a traditional Forest Service experimental forest to an ecosystem science research site, first in 1970 as an International Biological Program site representing the Coniferous Forest Biome, and in 1980 as one of six original LTER sites, the curation process for these records is nearly completed.

Work has been complicated by the records' mixed provenance; some are U.S. Forest Service and some are non-federal, with each having different management standards, something common with long-term research sites. To circumvent this bureaucratic challenge and maintain a unified collection – necessary due to the interconnectedness and continuity of HJA programs -- the physical collection will be housed in a federal facility, but an extensive collection of digital copies of records representing HJA history will be made public via both federal (USFS) and non-federal (Oregon State University Special Collections and Archives Research Center and Andrews Forest LTER) websites, a collection that will include 50-plus oral histories of HJA alumni and USFS personnel. We hope these products will provide useful records for scientists and historians and an example of best practices for long-term research and records management.

The Newsletter is issued quarterly. Please send news items or suggestions at any time to Sharon Kingsland (sharon@jhu.edu).