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# *Natural News*

## The Newsletter of the Rhode Island Natural History Survey

Vol. 1, No. 1      September 1994

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### *A Message from the President*

#### **Why Create a Rhode Island Natural History Survey?**

I suspect that Rhode Island has the highest density of naturalists of any state in the country. There is no shortage of ecologists from the academic side of the equation--Brown, URI, Roger Williams, RIC, and PC all support vigorous teaching and research programs in the life and environmental sciences. Many of the federal agencies involved in ecological assessment have offices or labs in the state, including the National Biological Survey, U. S. Fish & Wildlife Service, EPA, the National Park Service, and NOAA. We have an active group of NGO's here in RI--Audubon, Save the Bay, the Wild Plant Society, and The Nature Conservancy among them. Some of the best naturalists in the region work for the Rhode Island Department of Environmental Management, the Providence Water Supply Board, and the Coastal Resources Management Council. The Roger Williams Park Zoo and the Museum of Natural History maintain important collections (living and otherwise) of plants and animals. Many businesses in Rhode Island employ first-class ecologists, naturalists, and conservationists. Volunteer organizations such as Watershed Watch, River Watch, and Pond Watch have scores of naturalists in the field every day measuring and monitoring aspects of the state's ecological condition. All of this expertise is contained within the state's 2,500 square kilometers, but the lines of communication among these pockets of knowledge are lacking!

The fundamental purpose of the Rhode Island Natural History Survey is to foster communication and interaction among the large number of naturalists that live, work, and study in Rhode Island. Our mission statement says it all--the Rhode Island Natural History Survey was developed to:

- *Advance scientific knowledge of Rhode Island's biota, ecological communities, and environmental resources;*
- *To facilitate and coordinate the gathering and dissemination of information on Rhode Island's biota and natural communities; and*
- *To enhance communication among Rhode Island's environmental and life scientists.*

This newsletter is one of the ways we hope to create conduits of communication within Rhode Island's ecological community. Other activities described in this newsletter, such as the Fall Conference, clearly support our mission.

The recent surge of activity in supporting a systematic survey of the nation's biodiversity is exciting. The creation of the National Biological Survey within the Department of Interior is a bold first step. Secretary Babbitt has certainly done a superb job of recruiting some of the best ecologists in the country to help develop the program--Thomas Lovejoy, Peter Raven, and now Ronald Pulliam to name a few. What is clear, however, is that a biological survey of the nation will not happen without the collaboration and cooperation of local experts. When NBS settles in and gets down to work, the data and knowledge already in place in Rhode Island (and other states) will be an essential first resource to tap. The Rhode Island Natural History Survey is here and ready to go!

**Peter August**  
*URI Department of Natural Resources Science  
Woodward Hall, URI, Kingston, RI 02881*

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# Research Report

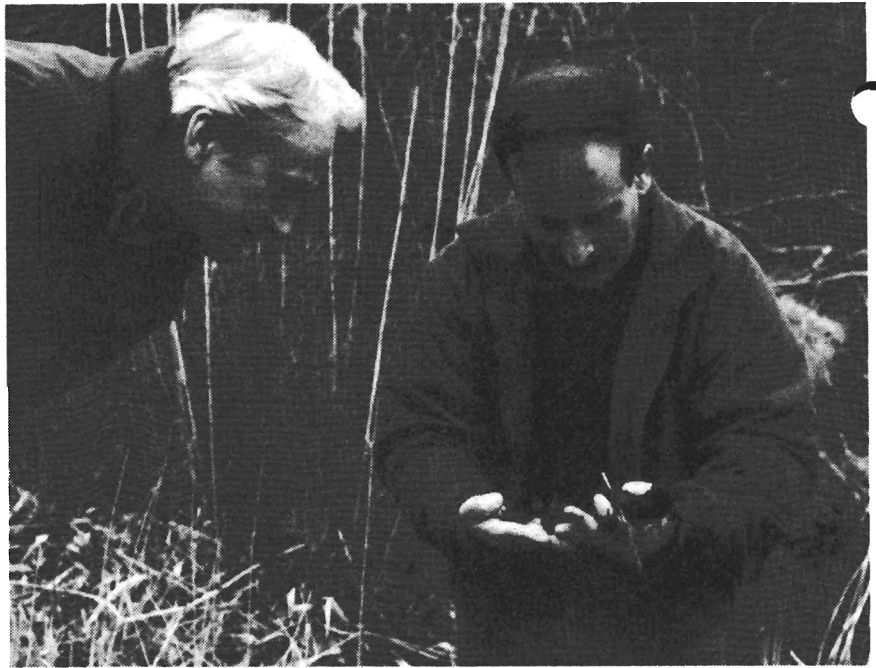
## The Use of Macroinvertebrates as Water Quality Indicators

Stream invertebrates are well-adapted to their environment. Many species exist in the larval stage for a year or more; the adult often emerges for one or two days, mates, and dies. The survival of the species is dependent upon favorable environmental conditions in the water column. If conditions are not conducive at any time for the survival of a particular species, the stream will not support such a population. Species that occur in the freshwater environment are products of long-term environmental success.

The population density and species composition of freshwater benthic macroinvertebrates are controlled by many factors. These parameters include substratum, temperature, oxygen concentration, turbidity, organic content, and pH. The presence or absence of an organism can measure the effects of past short- and long-term environmental stresses. The use of benthic macroinvertebrates as indicator organisms for the evaluation of the quality of a water body is therefore a valuable tool for monitoring aquatic ecosystems.

It is relatively difficult to obtain quantitative samples of benthic invertebrates due to the heterogeneity of the habitat type; the depth of the organisms in the substrate; the stage in the life of the organism (many insects emerge as winged adults); variations in discharge, environmental conditions such as ice, etc.; and movement and transport of the organisms.

As a stream progresses from its source to end point, organisms will appear or disappear according to the water quality. The overall species composition present in polluted waters differs from those in clean waters. For example, as the organic content increases in a water body, Plecoptera (e.g., *Alloperla*) and Pelecypoda (e.g., *Musculium*) are usually the first macroinvertebrates to disappear. As the water quality and the available oxygen continue to decrease, Ephemeroptera (e.g., *Stenonema*), Trichoptera (e.g., *Hydropsyche*), Coleoptera (e.g., *Promoresia*), and Porifera will become absent. Freshwater amphipods are the next to disappear



Allan Beck, of the Narragansett Bay National Estuarine Research Reserve, and Mark Gould examine freshwater macroinvertebrates in a stream on Prudence Island. Photo by Lisa L. Gould.

and these in turn are followed by the isopods. In severely polluted environments (usually those with low dissolved oxygen concentrations and high organic enrichment), Diptera (e.g., *Chironomus*) and Oligochaeta are the organisms most frequently found.

In Rhode Island two major factors that may affect species density and diversity are point and non-point sources of pollution. In order to determine whether or not these factors affect water quality, we have been conducting a study to evaluate the aquatic macroinvertebrates found throughout Rhode Island. The information obtained is analyzed to determine species composition and ecosystem structure, as well as to determine a reference baseline data for freshwater habitats.

During the past four years, forty-five freshwater sites within Rhode Island have been sampled. Freshwater Class A, B, and C streams were chosen, including reference streams, water supply streams, impacted streams, and rural streams. The selected sites were representative of the different watershed environments within the state and included different water quality types.

The methodology utilized is described in an EPA document by Plafkin *et al.* 1989. This method enables the researcher to assess the status of the riffle community, percentage of

canopy cover, bottom type, bank vegetation, flow of stream, accessibility and other parameters, and to sample the macroinvertebrates both qualitatively and quantitatively.

Each river has been categorized according to its biology. Using the Wood River in Hopkinton as the reference station for the state, two of the rivers were considered to be non-impaired (>83% of the Wood value) while 32 were considered to be slightly impaired (54-79% of the Wood value). The remainder of the stations were considered to be moderately impaired (21-50% of the Wood value) by utilization of the metric proposed by the Pflakin protocol.

A non-impaired station is comparable to the best situation to be expected in an ecoregion. These stations have balanced trophic structure and optimum community structure for the stream size and habitat quality. A slightly impaired station has a community structure that is less than expected, in that species composition is lower due to the loss of some intolerant forms. Tolerant forms increase in this stage.

Moderately impaired stations have fewer species due to a loss of most intolerant forms as well as the reduction in Ephemeroptera, Plecoptera, and Trichoptera. Severely impaired stations have few species present and often these stations are dominated by one or two species.

The sampling of Rhode Island streams is yielding significant information on Rhode Island's benthic macrofauna. Biologically, the stations are quite diverse, with approximately 150 species identified to date.

On-site observations and collections provide the researcher with information concerning biotic diversity and stream dynamics. The use of the state freshwater classification system and the use of indices that accurately portray the organisms within the study area require the development and understanding of both the organisms and the flaws within the collection/ enumeration process. Habitat assessment better delineates the stations, and an index based on the actual organism types present will provide a bioassessment protocol of increased value for this region.

**Mark D. Gould**

*College of Arts and Sciences*

*Roger Williams University, Bristol, RI 02809*

## **National News**

### **The National Biological Survey**

On Earth Day, 21 April 1993, President Clinton called for the creation of the National Biological Survey (NBS), a new bureau in the Department of the Interior. The Secretary of the Interior, Bruce Babbitt, called the NBS his "highest priority." The new agency is to serve as the biological research arm of Interior, and has consolidated many of the biological research, inventory and monitoring, and information transfer programs of seven Interior bureaus.

The NBS became operational on 11 November 1993, upon enactment of the Interior and Related Agencies Appropriations Act for Fiscal Year 1994. There are currently 1,950 employees, many of whom are research scientists formerly with the U. S. Fish & Wildlife Service (FWS), National Park Service (NPS), or Bureau of Land Management (BLM). The director of the NBS is Dr. H. Ronald Pulliam, a distinguished ecologist and recently Director of the Ecological Institute at the University of Georgia. Dr. F. Eugene Hester, who has had a long and productive career as a research scientist and administrator with the FWS and NPS, is Deputy Director.

The purpose of the NBS is to gather, analyze, and disseminate biological information useful for enlightened stewardship of our nation's natural resources. The NBS is not a regulatory, managerial, or advocacy organization. Its goal is to provide scientific input that other agencies, states, and organizations can use in making policy decisions. Too often in the past, environmental decisions have been made in the crisis mode: a problem arises, action is called for, and decisions are made rapidly, with limited information, amidst acrimonious debate. The NBS is designed to avoid this problem by taking a proactive approach to environmental research, by considering the ecosystem-level implications of environmental actions, and by building a body of knowledge about our nation's biota that will help us to anticipate environmental problems and to wisely manage our biotic resources. The NBS is implementing a National Research Council suggestion by acting as a central clearinghouse for biological information from federal agencies, state governments, Natural History surveys, and nongovernmental organizations. This information will be compiled and made universally available.

The NBS is composed of a central administration including the Director's and associated offices (External Affairs, Science Council, etc.), and four program offices: Budget and Administration; Research; Inventory and Monitoring; and Information and Technical Services. The United States is divided into four regions (Eastern, Western, Southern, and Mid-Continent), each with a regional office. There are 13 research centers, 56 university-based Cooperative Units, and over 100 field stations.

The University of Rhode Island has an NBS Cooperative Research Unit (formerly the NPS Coastal Research Center) with three employees on site. Also, several broad-based NBS programs, such as the Breeding Bird Survey and GAP Analysis program, have components in Rhode Island. The Rhode Island Natural History Survey clearly has a natural affinity with the NBS, and collaboration will undoubtedly be substantial.

During the first year of the NBS, the roles of state Natural History Surveys have been considered in the general organizational discussions in Washington, and NBS officials have met with the Consortium of State Biological Surveys. Discussions are still underway, so it is too early to outline the precise nature of the interaction between the NBS and RINHS. We in the NBS look forward to a close and mutually beneficial relationship with the Rhode Island Natural History Survey.

*Howard Ginsberg*

*National Biological Survey*

*Woodward Hall, URI, Kingston, RI 02881*

## **Consortium of State Biological Surveys Formed**

The Consortium of State Biological Surveys was incorporated in December, 1993, with the following objectives:

- To advance the knowledge and practical application of our living natural resources in the several States;
- To improve the work of State Biological Surveys through interchange of ideas pertaining to their administrative organization, programs, techniques, and other biological survey matters;
- To improve methods of assembling data and disseminating the results to governmental agencies, the public, industry, agriculture, educational institutions, non-governmental organizations, and civic organizations;
- To develop increased coordination and correlation of research with Federal agencies,

State agencies, and non-governmental organizations working in similar or related fields.

The Consortium has representatives from the Connecticut Geological and Natural History Survey, Hawaii Biological Survey, Illinois Natural History Survey, Kansas Biological Survey, New York State Biological Survey, North Carolina Biological Survey, Ohio Biological Survey, Oklahoma Biological Survey, Pennsylvania Biological Survey, and the Rhode Island Natural History Survey. Officers are: Lorin Nevling (Illinois), President; Gary Schnell (Oklahoma), Vice President; and Brian Armitage (Ohio), Secretary/Treasurer.

During its first annual meeting, the CSBS approved a resolution supporting the National Biological Survey and stating CSBS's willingness to work as a partner with the NBS. A copy of the resolution is available from the RINHS office.

## **Rhode Island News**

### **R. I. Natural History Survey Now Official**

On May 20, 1994, the RINHS Advisory Board approved Articles of Incorporation and By-laws, making the Rhode Island Natural History Survey an official corporation. Peter August was elected President of the Board of Directors; also elected were Richard Enser, Vice President; Mark Gould, Secretary; and Virginia Carpenter, Treasurer. Other members of the Board of Directors are: David Abedon, Ronald Flores, Howard Ginsberg, Keith Killingbeck, Patrick Logan, Joanne Michaud, Douglass Morse, and Anthony Vecchio. Members of the Board of Directors are part of a broader Advisory Board; for a complete listing of the RINHS Advisory Board and affiliations, see p. 8.

Thanks to a \$50,000 start-up grant from the Lamb Foundation, the RINHS was able to hire Lisa Gould to serve as Executive Director, and now has an office at the Cooperative Extension Education Center on the URI campus. Initial activities will include the October conference (see page 5), a joint project with R.I. Cooperative Extension to develop educational slide programs (see page 7), facilitating publications on Rhode Island's natural history, and preparing an update of *A Natural History Directory for the State of Rhode Island* (see page 7).

## **R. I. Natural History Survey Hosts Second Annual Conference: *Ecological Research in Rhode Island: What's Going On?***

On Friday, October 14, Rhode Island's ecologists and naturalists will gather at Johnson and Wales Airport Hotel in Warwick, RI, to discuss current ecological research in the state. Reports and poster sessions will come from the entire spectrum of the state's environmental scientists and naturalists, and will include such topics as ecological distribution of ticks, mice, and Lyme disease; metapopulations of Bog Copper butterflies in Rhode Island; measuring wetland potential to support wildlife diversity; and habitat assessment using digital orthophotography. There will also be a keynote speaker.

Proposals for abstracts for papers and posters are due by September 1.

The registration fee (which includes lunch) is due by September 30, and is \$60 for RINHS members, \$80 for non-members, and \$40 for students (registrations after September 30 add \$25). Make registration checks payable to URI, and send to: Conference Office, P. O. 123, Kingston, RI 02881-0123. For registration forms and information, contact the RINHS office at (401) 792-5800.

## **Environmental Indicators Being Developed for Rhode Island**

The Rhode Island Department of Administration is coordinating the development of a set of environmental indicators which can provide an overview of the health of Rhode Island's environment. The project involves staff from the Department of Environmental Management, the Department of Health, and the Department of Administration's Office of Strategic Planning. Mark Gould represents the RINHS on the project.

The intent of the project is to select a broad range of indicators revealing trends in the status of Rhode Island's air, water, land, and living resources. What is new about this project is the use of existing data to develop environmental indicators, data already gathered by the Department of Environmental Management and the Department of Health.

Also new is the preparation of an annual *State of the State's Environment* report. It will contain a graphic representation of each environmental indicator as well as a short written description of that indicator and an

interpretation of any trends that are revealed. The report will be readily understandable by the general public.

As the Rhode Island Biological Survey grows, it could provide valuable information that would be useful in developing additional environmental indicators for inclusion in the *State of the State's Environment* report.

*Roger Greene, RIDEM Legal Services  
9 Hayes Street, Providence, RI 02908*

## **Museum Goes State-of-the-Art**

The Roger Williams Park Museum of Natural History is pleased to announce completion of the move of its collection into a state-of-the-art storage facility in the museum's basement. The new facility encompasses nearly 2000 square feet of collection storage, workspace, and conservation lab area. It features a climate-controlled environment for almost a quarter of a million specimens installed in steel high-density mobile storage units.

Since 1989 the collections have been undergoing intensive curatorial upgrading including inventory, reorganization, stabilization, and conservation. Nomenclatural and documentation records have been similarly upgraded. Nomenclatural updating to reflect current taxonomy and systematics remains to be accomplished for most taxa. The exception is the Museum's bird collection of over 5000 specimens, where scientific nomenclature has been 100% updated while conserving all original labels.

The comprehensive curatorial upgrading of these antiquarian collections (most specimens were collected between 1880 and 1930) is the first of such scale and scope in the Museum's 98-year history. In their new storage, most collections are arranged systematically and occupy well-lit ranges with ample workspace conducive to research. Curatorial staff with expertise in each of the Museum's major collection areas further contributes to the "user friendliness" of the facility.

With at least 50% of the collections of Rhode Island origin, researchers can find unlimited potential here for investigations in our state's natural and geological history. The Museum is open daily and the collections can be made available by appointment Monday through Friday, 8:30 a.m. to 4:30 p.m. For more information contact Marilyn Massaro, Curator, (401) 785-9451 extension 248.

**Marilyn Massaro**

*Roger Williams Park Museum of Natural History  
Providence, RI 02905*

## RINHS Helps "Discover" Important Study Skin Collection

In September 1992 I responded to the questionnaire sent out by the Rhode Island Natural History Survey Steering Committee. Some of the survey questions pertained to museum collections, and I responded that the Norman Bird Sanctuary had in its possession approximately 200 study skins of birds, most collected by Edward Sturtevant nearly a century ago. The Sanctuary had been using the specimens on occasion for teaching.

In April of 1993, I attended the first annual conference of the Rhode Island Natural History Survey, held at Roger Williams Park. There, during a talk by Marilyn Massaro, Museum Curator of the Roger Williams Park Museum of Natural History, I began to learn of the importance of the Sanctuary's collection.

The Sturtevant collection is an historic artifact, an important piece of Rhode Island's natural history. It is also a unique scientific resource that documents this area's avifauna and ecological history a century ago. Edward Sturtevant, who in 1899 co-authored *Birds of Rhode Island* with Reginald Heber Howe, Jr., collected the birds in and around the Newport area. The collection is cited throughout the publication.

*Birds of Rhode Island*, though nearly a century old, still stands as the only published book on the birds of our state. Most of the collecting dates (1890-1910) are representative of the pre-protectionist era when ornithology was done afield with a shotgun, rather than a pair of binoculars. Norman Bird Sanctuary lies within sight of St. George's School where Mr. Sturtevant taught Natural Science while amassing his collection and writing *Birds of Rhode Island*.

At the Norman Bird Sanctuary's annual meeting in June 1993 I asked Marilyn to speak about the collection and the need for its conservation. We had been totally unaware of the rich cultural and scientific legacy that was housed in our midst.

Once convinced that this irreplaceable chronicle of Rhode Island ornithology and Middletown natural history should be given the care and proper storage it deserved, the Sanctuary applied for and received a grant from the Champlin Foundation to purchase state-of-the-art, museum-quality storage cages (the skins had been stored in antiquated "Cambridge Cans").

The Sturtevant Family also became interested in the collection and donated matching

funds, enabling the Sanctuary to hire a consultant to teach volunteers how to inventory and conserve the collection. The volunteer group consists of two Sanctuary members and two recent graduates of the URI Natural Resources program.

The very tedious work of restoration began in the early spring of 1994. To date, over one-third of the collection has been inventoried and conserved.

This collection, once properly conserved and stored, can become a unique resource for teaching about local ecology in an historical perspective.

*Lawrence Taft, Executive Director*

*Norman Bird Sanctuary*

*583 Third Beach Road, Middletown, RI 02840*

## Illustrated Natural History: A Catalogue of the Providence Athenaeum Collections

The Rhode Island Natural History Survey will find fascinating and useful material in the bibliography being currently prepared by the Athenaeum Library, under a grant from the Rhode Island Council for the Humanities. The bibliography will fully describe the Athenaeum holdings on 19th-century illustrated Natural Science material. The treasures of this collection are known only to a limited public, since the holdings of this small library, founded in 1750, are accessed through its non-computerized catalogue. Nevertheless, readers can quickly and conveniently find their way to such titles as the elephant folios of Audubon's *Birds of North America* or *The Quadrupeds of North America* (the Athenaeum was one of the original subscribers to Audubon's works). They may consult the 14 volumes of Sprague's *Silva of North America*, dedicated to Asa Gray (1890); open the pages of *The Ferns of North America* by Daniel Cady Eaton (1880); or pore over the five-volume set of Holbrook's *Herpetology* (1842) and marvel at the hundreds of hand-colored plates in many other rare volumes.

Here are found the first editions of works by Asa Gray, Charles Darwin, Charles Lyell, and Joseph Dalton Hooker, as well as many other naturalists whose discoveries and new direction of thought marked the last century.

Estimated at approximately 600 titles, the





Athenaeum's 19th century catalogue on Natural History includes a significant number of works connected with New England and Rhode Island botany, zoology, geology, and ecology, and the bibliographers who are currently preparing this catalogue for publication are giving them particular attention. Among these works are treatises and state surveys undertaken by specialists in the field, but also there are many works by self-trained students of natural sciences, some of them prominent in the local society of that time, who kept notes with scholarly accuracy and passionate interest in their environment.

A few examples of these include James L. Bennett's *Plants of Rhode Island* (1888), *The Geology of Rhode Island* (1895), the works of the botanist W. William Bailey, *The New England Blossoms and Their Insect Visitors* by Clarence Moores Weed (1895), *The Orchids of New England* by Henry Baldwin (1884), Edward Sturtevant's *Birds of Rhode Island* (1899), and George H. Ashley's investigation of *The Rhode Island Coal*, published by the U. S. Geological Survey in 1915.

Like the Athenaeum's first published catalogue on *Travel and Exploration*, this annotated bibliography of illustrated Natural History works will also offer this library's distinctive resources to the community of scholars and readers, hoping to facilitate and encourage the use of a rare collection which is open to the public. The library welcomes hearing from any individual or organization who would like to purchase the now-in-progress catalogue. In the coming fall, a series of public lectures by specialists on the collection in its various aspects, will be held at the Athenaeum.

*Carol Cook and Marguerite Dorian*

*The Providence Athenaeum*  
251 Benefit Street, Providence, RI 02903

## Picture This!

*Rhode Island's Ecological Communities* will be the first of a series of slideshows to be co-produced by the RINHS and URI Cooperative Extension.

A call for slides will be forthcoming, with a description of images needed; we hope all of our members will be able to share their best shots in this effort. URI Cooperative Extension has laid some groundwork by researching copyright protection for slide donors, procuring slide storage cabinets, and permission to house this new restricted resource in the University of Rhode Island Special Collections section at the main

library.

The slide collection will be a valuable resource for everyone involved in teaching or lecturing on topics relevant to ecology in Rhode Island. Want more information? Call RINHS at (401) 792-5800 or Dave Abedon, URI Cooperative Extension, at (401) 792-2981.

*Dave Abedon, R. I. Cooperative Extension*  
*Rodman Hall, URI, Kingston, RI 02881*

## Opportunities for Students

*The Providence Athenaeum, 251 Benefit Street, Providence, RI* needs an intern for approximately five hours per week, editing typed copy, filing, researching, etc. Contact Carol Cook, (401) 421-6970.

*Roger Williams Park Museum of Natural History, Elmwood Avenue, Providence, RI* has a number of collection-related projects that would be readily adaptable as (unpaid) student internships. Among these projects are curatorial up-grading, nomenclatural updating, inventory and conservation of the museum's 10,000 specimen herbarium.

Opportunities to work with other natural and physical science collections exist as well. Independent research that earns college or graduate credit toward degree completion is encouraged and welcomed. For further information contact: Marilyn Massaro, Curator, (401) 785-9451 ext. 248.

*Roger Williams Park Zoo, Elmwood Avenue, Providence, RI* has an intern program designed for people considering a career in the zoo world. It provides initial zoo experience and exposure to different zoo careers. Interns spend a minimum of 4 days/week for 10 weeks in the program. Admission to the program is based on an application and interview. For information contact: Curator of Education, Roger Williams Park Zoo, Elmwood Ave., Providence, RI 02905; (401) 785-9450.

## R. I. Natural History Directory

RINHS will soon be updating *A Natural History Directory for the State of Rhode Island: Preliminary listing of the organizations, individuals, and publications pertaining to Rhode Island's Natural History*, first published in March 1993. Packed with information about who's doing what in the state, descriptions of collections, literature, educational programs, and other information, the directory is an invaluable resource for Rhode Island's ecologists and naturalists.

To insure that you'll be included in the revised edition, please respond promptly when you receive forms for updating or adding your specialty. The *Directory* will be free to all RINHS members.

## Upcoming Conferences & Seminars

*The Challenge of the 90's: Melding Research & Education* will be the theme of the 28th Annual Conference of the New England Environmental Education Alliance, **September 30-October 2** at URI's W. Alton Jones Campus in W. Greenwich, RI. Focusing on the themes of Global Change, Environmental Ethics, and Biodiversity, the conference will offer workshops, field trips, and speakers. Addresses will be given by Richard Block, Senior Fellow with the World Wildlife Fund, Professor Berrien Moore III, Director of the Institute for the Study of the Earth, Oceans, and Space at the University of New Hampshire; A. Virginia Ravndal, specialist on biological diversity conservation with the United Nations; and Elizabeth Dodson Gray, co-director of the Bolton Institute for a Sustainable Future and coordinator of the Theological Opportunities Program at Harvard Divinity School.

Registration deadline **September 12**.

For more information contact: Elaine Silva Mangiante, (401) 783-4917 or Cheryl Norton, (401) 949-5454; or write New England Environmental Education Alliance, 12 St. Georges Avenue, Middletown, RI 02842.

**R. I. Natural History Survey: Ecological Research in Rhode Island: What's Going On?** Johnson & Wales Airport Hotel, Warwick, RI, **October 14, 1994**. See page 5 for details.

**North American Conference on Savannas and Barrens: Living in the Edge** will be held at Illinois State University, Normal, IL, **October 15-16, 1994**. The conference will feature nationally known speakers, sessions with both technical and non-technical papers, posters and displays, and field trips. For more information write: North American Savannas and Barrens Conference (10002-5), Illinois State University, 8610 Conferencing Unit, Normal, IL 61790-8610; 1-800-877-1478.

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#### **Annual Membership Fees:**

\$20 Individual; \$50 Institution; \$500 Corporate  
\$10 Student/Limited Income