

Natural Areas Report

Vol. 8, No. 2

Summer 1996

Information Exchange for Natural Area Scientists and Managers

Natural areas are not only communities of plants and animals. They are themselves part of a larger community of landscapes, governments, and people. To this larger community, natural areas not only add their natural amenities (cleansing air and water; increasing biophysical diversity), they also contribute knowledge in partnership with other agencies and organizations.

In this issue of the *Natural Areas Report*, we examine three very different programs, and their partnerships within the larger community.

A Tale of Two States

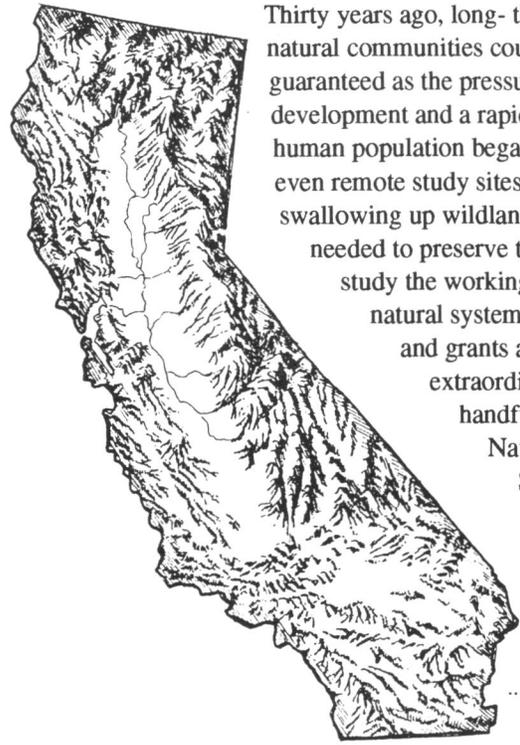
A University-based Natural Reserve System in California

In 1965, the University of California began to assemble a series of natural reserves that would broadly represent California's extensive ecological diversity. Scientists there wished to create a system of outdoor classrooms and laboratories, a library of the state's natural communities, where students and researchers could study the natural processes that underlie life on earth.

The University of California's Natural Reserve System (NRS) became an educational innovation born of necessity.

Thirty years ago, long-term research of natural communities could no longer be guaranteed as the pressure from increasing development and a rapidly expanding human population began to encroach on even remote study sites. Urbanization was swallowing up wildlands. The university needed to preserve the opportunity to study the workings of the state's natural systems. Through gifts and grants and the extraordinary foresight of a handful of scientists, the Natural Reserve System was established and has grown to encompass more than 140,000 acres

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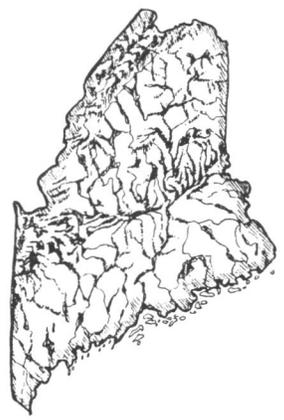
Creative Funding Keeps Maine Natural Areas Program Active

Funding to natural resource agencies is increasingly scarce, and natural area programs, including Natural Heritage Programs, have not escaped budget cuts. All across the country, agencies are scrambling for funds to maintain established, valuable natural areas programs. In Maine, several creative sources of funding are being tapped to keep the Natural Areas Program afloat, despite the loss of all state general funds for salaries.

In 1993, in an effort to consolidate similar missions, the state legislature combined the Natural Heritage Program and the Critical Areas Program to form the Maine Natural Areas Program (MNAP), located in the Department of Conservation. This program operates almost entirely on funds generated outside of the department's operating budget. The bulk of its revenue comes from contracts with federal and state agencies and fees charged for environmental reviews. Working in partnership with many interests and constituencies has enabled MNAP to continue its work conducting inventories of rare natural features and providing information for responsible natural resource decision-making.

The responsibilities of the Natural Area Program have not been reduced with its funding. Other state agencies, such as the Department of Transportation, the Department of Environmental Protection, and the State Planning Office, still

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Natural Areas Partnerships Enrich the Eastern Region

Partnerships play a key role in the research natural areas (RNA) program in the U.S. Forest Service Eastern Region. On the most basic level, the regional RNA Program is itself a partnership among the fourteen National Forests and the two Research Stations located in the area stretching from Minnesota to Missouri to Maine.

In addition to this internal Forest Service cooperation, the regional RNA Program benefits from and continues to build important partnerships within the 12 states in which National Forests are located. Invaluable to the RNA Program has been the continued long-term support of expertise and experience, often accompanied by monetary or in-kind cooperative agreements, offered by the state agencies and non-governmental organizations, primarily The Nature Conservancy (TNC). In different states, the cooperating agency may be Heritage programs, divisions within the Department of Natural Resources, Natural Areas programs, county biological surveys, or other agency areas involved with protection of natural features and conservation planning. Many of the 40 sites now established as RNAs in the Eastern Region were identified and evaluated by Heritage or TNC personnel. These same cooperators, often through contracts or as part of larger conservation efforts, provided ecological evaluations of the sites, or drafted establishing documents for the RNAs.

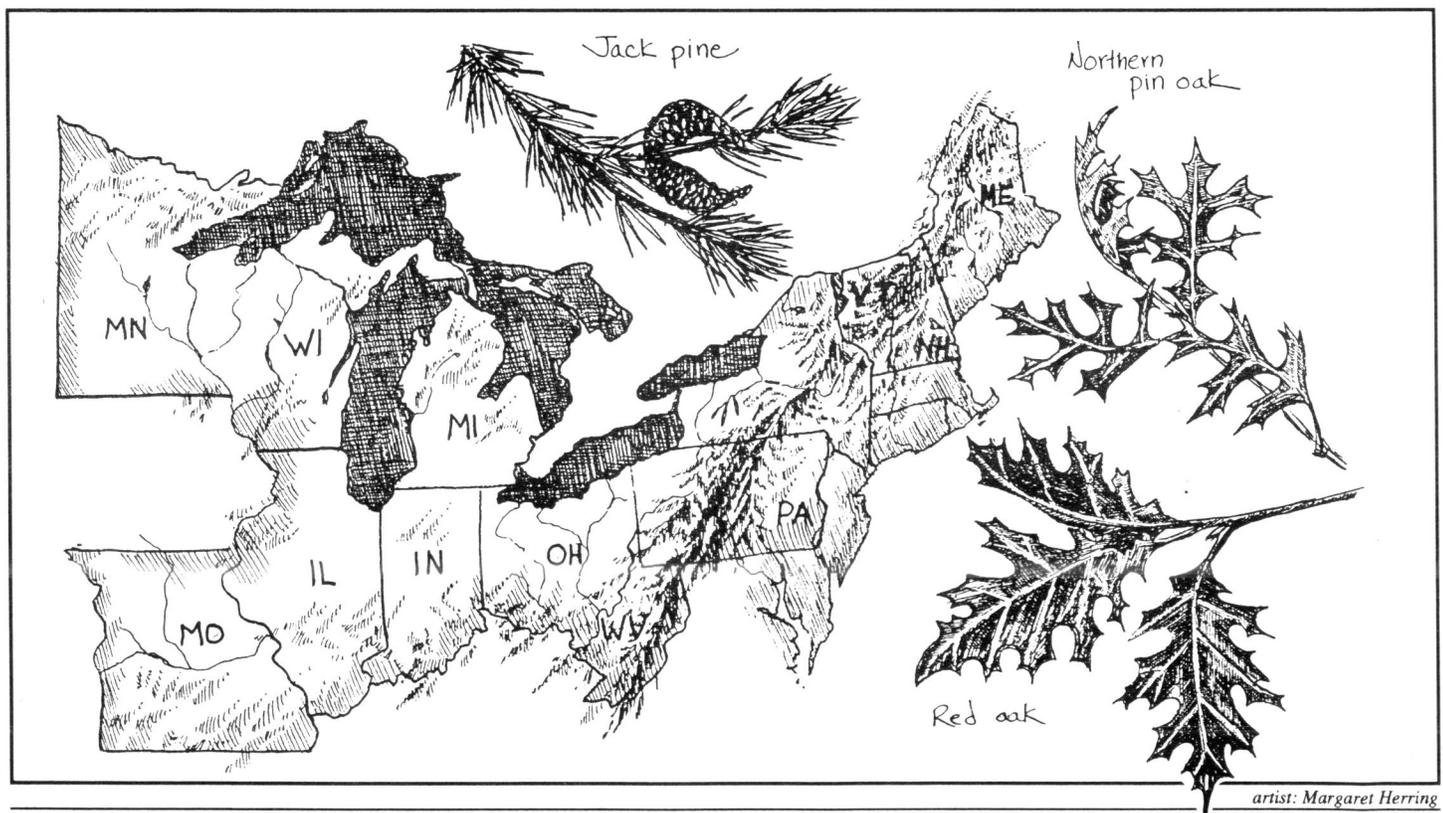
It is in this context of cooperation that the regional RNA

Program is broadening its approach to identifying additional areas for establishment as RNAs. As our region continues to seek out unique or special ecosystems, we are also placing additional emphasis on building a network of "representative" RNAs that are high quality examples of common ecosystems in the region. These RNAs will serve as reference areas for ecosystem management.

Broadening the Framework for RNA Representation

The existing framework for identifying additional RNAs in Region 9, given in the Regional Guide, developed in 1982, is now quite dated. The Guide's goal is to represent one or more examples of Society of American Forester (SAF) cover types in each subregion (East, Central, Lake States). While SAF cover types may be useful for some purposes, this system of representation ignores non-forested ecosystems, and does not take into account the physical-biological interactions important to ecosystem function.

The proposed new framework for RNA representation, still in its formative stages, depends on the National Hierarchy of Ecological Units, a system of mapped units adopted by the Forest Service to be used in national forest planning at different spatial scales. By linking RNA selection to this hierarchy, the RNA representative landscapes can be more useful to planning and in monitoring effects of management. An RNA that represents a



particular land unit, such as Subsection or Landtype Association, represents an integrated set of factors (e.g., climate, glacial geology, soils, landform, local topography and aspect, and potential natural vegetation) that distinguishes that land unit from others.

While the region contains considerable variation in ecological features, and each Forest is at different stages of classifying and mapping these ecological units, we have generally agreed that reference areas should be identified for each Subsection, at minimum. Ideally, landscape-level RNAs are selected to represent the full complement of Landtypes or Landtype Associations within the Subsection.

To provide a cross-check of representation of natural communities within Subsections, the regional RNA program is considering the use of alliances, a unit of The Nature Conservancy's vegetation classification hierarchy that consists of a group of community elements. For example, elements within the *Pinus banksiana* Forest Alliance include the Jack Pine/Red Oak-Northern Pin Oak Forest and the Jack Pine/Blueberry/Feathermoss Forest. TNC's classification provides a crosswalk between the community names used in different states and will be useful when analyzing natural area representation across Forest and even state boundaries.

A cooperative agreement has been set up between The Nature Conservancy Midwest Regional Office and the Forest Service (R9/NC/NE) to gather information about the occurrence of alliances in the Subsections covered by National Forests. The assessment summarizes which alliances occur within which Subsections, which alliances are now represented in natural areas either on-Forest or off-Forest within these Subsections, and thus identifies gaps in representation.

RNA-equivalents

Cooperation and partnership are key to this assessment. The regional RNA Program is cooperating with TNC to conduct this assessment, and the Forest Service and TNC are relying on State programs to document our knowledge of the occurrence of alliances within Subsections. Meanwhile, the RNA program is making every effort to integrate and coordinate with conservation planning efforts in each state. The idea of "RNA-equivalents" which can serve as reference areas for the purposes of Forest Service monitoring projects invokes partnerships with cooperators in each state. A non-Forest Service area, such as a TNC preserve, State Natural Area, or State Forest Natural Area can serve as an RNA-equivalent area to represent a landscape or set of ecosystems, if it meets the criteria that the Forest Service and cooperators are working jointly to establish.

The proposed criterion of protection of an area as an RNA-equivalent requires that the site have Level One protection, a concept borrowed from TNC's portfolio planning. A Level One area, or a "Highly Protected Managed Area", as with RNAs, would be an area "maintained in its natural state with an active

management which allows for mimicking of natural processes or allows natural disturbance events to proceed without interference."

Frequently the Forest boundaries do not coincide with Subsection or other ecological unit boundaries. Through cooperative planning, areas that are not Forest Service owned (instead are owned and managed by non-Forest Service public or private agencies), but meet the protection criteria, may serve as RNA-equivalents. Thus the RNA program shares the responsibility of providing reference areas with other state conservation planning groups. For example, thirty-one of Indiana's state nature preserves (covering more than 3,000 acres) are located in the four Subsections covered by the Hoosier National Forest. On the Mark Twain NF there are no established RNAs yet; however 18 Missouri Natural Areas are located on the National Forest, and additional areas are located near enough to the Forest to represent some of its landscapes.

Coordinating Programs

Work will be on-going to complete the assessment in the various parts of the Region, working with both the Midwest and Eastern TNC Regional Offices. To date, meetings and information exchange specifically about this project have been held with state cooperators in Minnesota, Michigan, and Wisconsin. Coordination of representative RNAs with planning goals of other conservation planning groups are in progress and will continue to build partnerships.

For example, under a recently signed Memorandum of Understanding with the Wisconsin Department of Natural Resources, RNAs and Special Management Areas on the Chequamegon and Nicolet National Forests can be co-designated as State Natural Areas. The Nature Conservancy's Northern Lake Huron Bioreserve project in the Upper Peninsula of Michigan is working cooperatively with the Hiawatha NF, as several candidate RNAs are included in the reserve design. Michigan's TNC is embarking on a statewide conservation planning project and the Forest Service is one of its partners. In New England, in response to the Northern Forest Lands Study, New Hampshire has organized a committee to pursue the design of a science-based system of ecological reserves. Similar efforts are underway in Maine and Vermont.

Partnerships with state-wide and regional planning efforts provide an opportunity for the RNA program to continue to grapple with such questions as how much is enough to represent adequately a landscape of ecosystems, and how can we incorporate natural areas into improved landscape-scale planning for ecosystem management. From these partnerships may emerge a more comprehensive view of natural area management and protection.

Lucy Tyrrell

Research Natural Areas Coordinator

U.S. Forest Service

North Central Station/Northeastern Station/Region 9

A University-based Natural Reserve System in California

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in 32 reserves throughout the state.

Today, it would be next to impossible to acquire the land that now makes up the heart of the NRS. Such land includes the largest of the Channel Islands, a vast tract of uncut old-growth Douglas fir forest, a Sonoran desert canyon on the edge of posh urbania, the last protected remnants of coastal wetlands, and more. The Natural Reserve System stretches from Pacific marine canyons to East Mojave

mountains, from coastal chaparral to the slopes of the Eastern Sierra. Some of the reserves, donated by generous benefactors, are located amid some of the most expensive real estate in the nation. These protected samples of the state's natural diversity are intended specifically for university-level teaching, research, and public service, as part of the land-grant mission of the University of California.

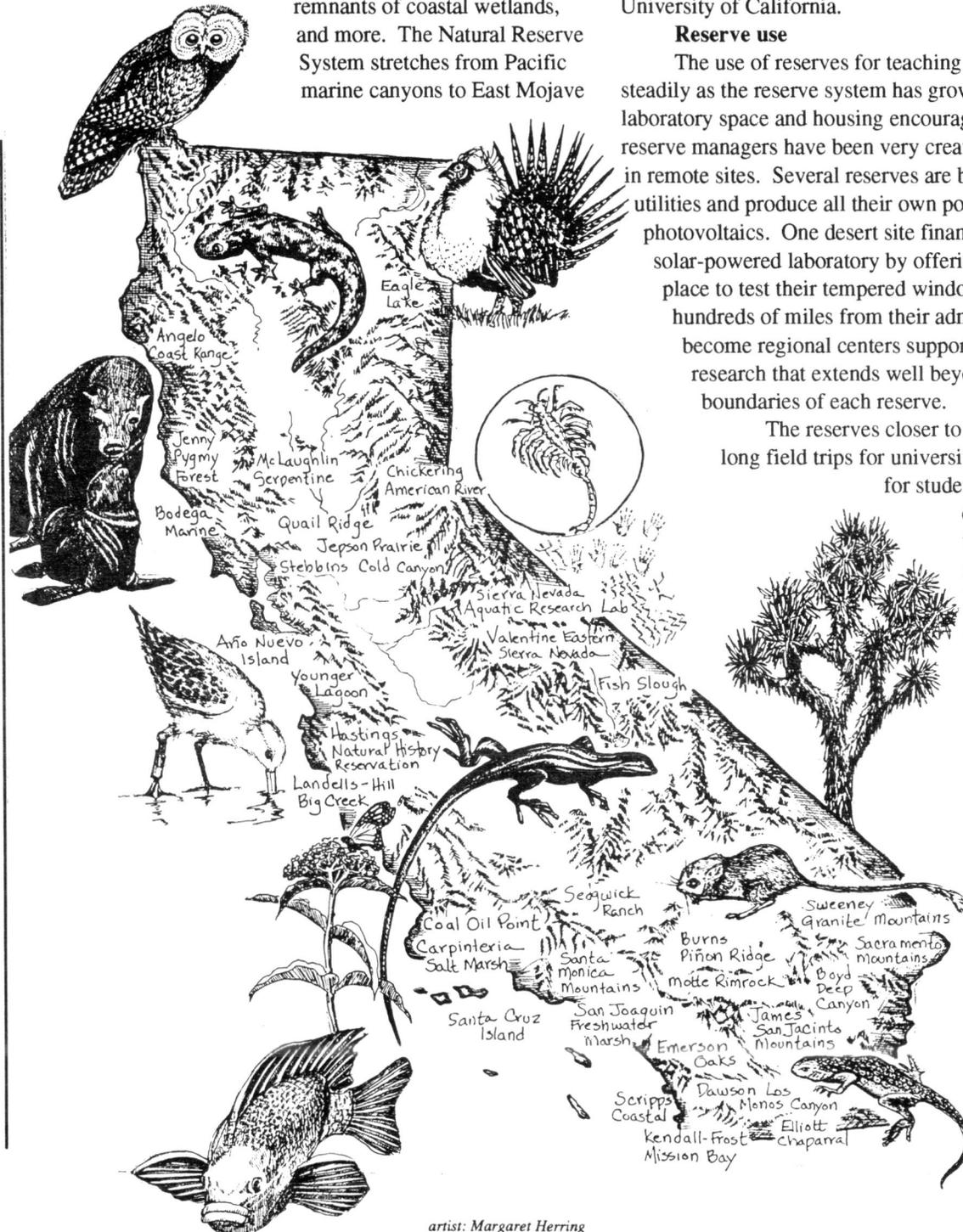
Reserve use

The use of reserves for teaching and research has grown steadily as the reserve system has grown. The availability of laboratory space and housing encourages the greatest use, and the reserve managers have been very creative in developing facilities in remote sites. Several reserves are beyond the reach of public utilities and produce all their own power from banks of photovoltaics. One desert site financed part of an ambitious solar-powered laboratory by offering a large glass company a place to test their tempered windows. Such facilities, hundreds of miles from their administrating campuses, have become regional centers supporting environmental research that extends well beyond the property boundaries of each reserve.

The reserves closer to campus often host day-long field trips for university classes and provide sites for student research. In the words

of Mildred Mathias, one of the NRS founders who frequently brought her UCLA classes out to the reserves, "How can anyone begin to understand the dynamics of an ecosystem without actually experiencing it? Chaparral is just a word until you have crawled through it, or watched the flush of new growth following a fire, or listened to the hum of insects and the songs of chaparral birds. It is an intricately woven web of life to be seen, heard, and smelled, not just read about."

The reserve system benefits from the long-term interest of faculty and researchers affiliated with the university.



artist: Margaret Herring

Their interest sparks the interest of students, and long-term site-based data can span generations of research. The reserve system also benefits from its affiliations with campus-based laboratories and their state-of-the-science facilities available to researchers. For example, the NRS has begun to develop geographic information systems (GIS) for some of the reserves and their surrounding bioregions. One such GIS developed by Mike Hamilton of the James San Jacinto Mountains Reserve provides a critical planning tool for fire management in the neighboring community of Idyllwild and provides a model for a growing number of similar communities at the urban/wildland interface.

To stimulate teaching and research use of the reserves, the NRS has developed funds for travel to remote sites and for undergraduate and graduate research support. More than \$16 million dollars in extramural grants support NRS reserve-based research in a typical year. Participation in field-based research provides formative experience to community volunteers, to high school students enrolled in mentor programs, to undergraduate and graduate students working with faculty, and to faculty and other professionals collaborating with one another. Team-based research is becoming increasingly important as scientists, managers, and the public work together to solve complex environmental problems.

In the words of former NRS Director Deborah Elliott-Fisk, "California's citizens are becoming increasingly concerned about the deterioration of their environment and the rapid loss of their state's natural diversity. Ironically, as the demand for long-term environmental knowledge increases, the number of possible research sites in California continues to decrease. It is in this context that the NRS stands ready to make important contributions to the future of the University, the state, and our human society and environment."

In an effort to communicate these contributions and to promote use of the reserves, the NRS publishes a biannual newsletter, the *Transect*, and informational brochures about many of the sites. To request these publications contact the Editor, Natural Reserve System, University of California, 300 Lakeside Drive, 6th Floor, Oakland, CA 94612-3560 (510-987-0150). For more information about the system, its sites and research opportunities, check the NRS home page on the World Wide Web. The Internet address is: <http://nrs.ucop.edu>.

Field Notes

Using GIS to Delineate Potential Research Natural Areas on the White Mountain National Forest

The White Mountain National Forest, working with the Spatial Analysis Laboratory at the University of Vermont, has been using GIS to explore opportunities for RNAs. The goal is to incorporate structure, function, and exemplary communities to identify representative landscapes. Researchers used a map indicating relative richness of ecological Landtypes within 10,000-acre "neighborhoods" to locate areas with the highest richness on the Forest. A contour map of trail densities was created to display areas of lowest human use. These maps of "high richness" and "low trail density" will next be combined with a scatter diagram of sensitive species occurrence on the Forest. (Stephen Fay, RNA Coordinator, White Mountain NF)

RNAs and Natural Areas Part of Reserve Design on Chequamegon and Nicolet National Forests.

The Chequamegon and Nicolet National Forests are considering various reserve designs for the upcoming Forest Plan revision. The foundation of each of the options will be natural areas -- in many cases, Research Natural Areas (RNAs). An extensive natural area inventory of the Forests (using the Natural Heritage Inventory methodology) identifies ecologically significant or natural area-quality sites to serve as the "core" sites of a reserve network. These sites--referred to as *complexes* because they are relatively large and heterogeneous--are currently being evaluated for RNA or Special Management Area (SMA) designation. Evaluation criteria include contribution to the Regional representative network, ecological significance, landscape context, quality of community occurrences, and overlap with rare species occurrences.

To build alternative design scenarios, the Forests will test several of the leading reserve design models. Although the size, scale, and extent of the selected reserve network have yet to be decided, one thing is certain--that natural areas will be at the "center" of it all.

(Linda Parker, RNA Coordinator, Chequamegon and Nicolet National Forests)

Monitoring Guide for RNAs and other Ecosystems.

A user-friendly guide with information and field methods for developing a monitoring program will soon be available. *Options for Ecosystem Monitoring*, a three-volume guide developed jointly among the Forest Service's Eastern Region, and North Central and Northeastern Research Stations, is scheduled to be published as a joint NC/NE General Technical Report before the end of the calendar year. Originally developed for use in RNAs, the guide has broad applicability to a number of ecosystems, and provides an approach to monitoring that integrates ecosystem components at

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Creative Funding Keeps Maine Natural Areas Program Active

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depend on MNAP for environmental reviews of projects, for which MNAP now charges a subscription fee. Additional funding may come from Maine's new lottery to support the Outdoor Heritage Fund, an idea encouraged by an alliance of conservation and sportsman groups. While certainly not a stable source of funding, during its first six months, the lottery raised over \$500,000 for projects that target habitat conservation and endangered species inventory and management. To apply for private sources of funding, the Friends of Maine's Natural Areas has been a helpful partner to MNAP. This non-profit group works with MNAP to submit proposals to private foundations and encourages the public to become more involved with natural areas protection.

Federal grants have funded several recent projects. The Maine Forest Biodiversity Project is an ongoing consortium of citizen activists, state and federal agency employees, forest products industry representatives and other landowners, scientists, and natural resource planners interested in working together to reach consensus on how the north Maine woods should be managed for the future benefit of the ecology and economics of the area. In conjunction with this group, MNAP published *Biological Diversity in Maine: An Assessment of Status and Trends in the Terrestrial and Freshwater Landscape* assisted by a grant from the National Biological Service.

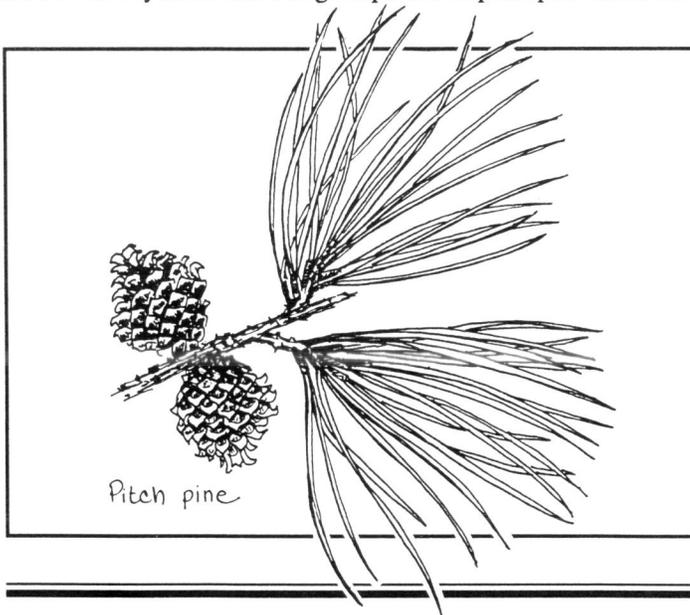
Another collaborative project involves the inventory and restoration of Department of Defense lands in southern Maine, funded in part through DOD's Legacy Program and conducted in collaboration with the Maine Army National Guard (MANG), local fire fighters, the Maine Forest Service, and researchers from the University of Massachusetts at Amherst. In 1991, MANG contacted MNAP to inventory their National Guard training site near Portland. During the next two field seasons, MNAP surveyed the site's large expanses of pitch pine-scrub oak

barrens, a globally rare natural community. Several species of rare lepidoptera and vascular plants are associated with this fire-dependent community type, yet this area had not burned in many years. Because of the site's proximity to suburban developments, fire had long been suppressed. Encroaching vegetation had degraded the barrens, making them less likely to support the associated lepidoptera and plants.

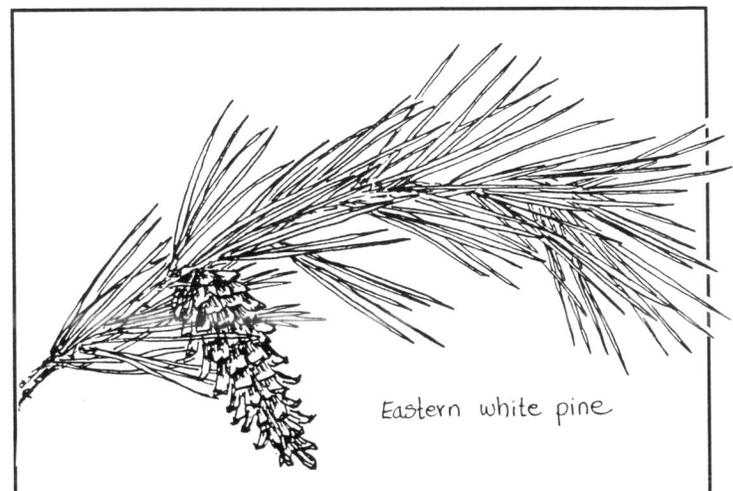
To promote the health of the pitch pine-scrub oak community, MNAP staff recommended prescribed burning for the area. MANG agreed (as much in the hope of restoring native vegetation as in the hope of controlling ticks in the training grounds.) Fire ecologists from the University of Massachusetts were contracted to plan and implement the burn. The Maine Forest Service and the local fire departments provided training and assisted with the burns, which took place in 1995 and will continue through 1996. Pre- and post-burn vegetation monitoring and invertebrate surveys will assess the degree of success that the prescribed burns have on promoting the health of the pitch pine-scrub oak community.

Grants over the past six years from the Environmental Protection Agency have funded MNAP and the Maine Department of Inland Fisheries and Wildlife to survey hundreds of wetlands in southern Maine for rare plants, animals, and natural communities. This work has led to the rediscovery of a plant species, featherfoil (*Hottonia inflata*), last documented in Maine at the turn of the century. Information gathered in the survey will serve as a model for addressing habitat conservation on a landscape scale.

While grants and cooperative arrangements allow MNAP to continue to pursue its mission, the work has become more opportunistic than comprehensive. Project funding dictates where and how staff will budget their time. Legislated mandates with no funding, such as the registry and maintenance of the RTE



Pitch pine



Eastern white pine

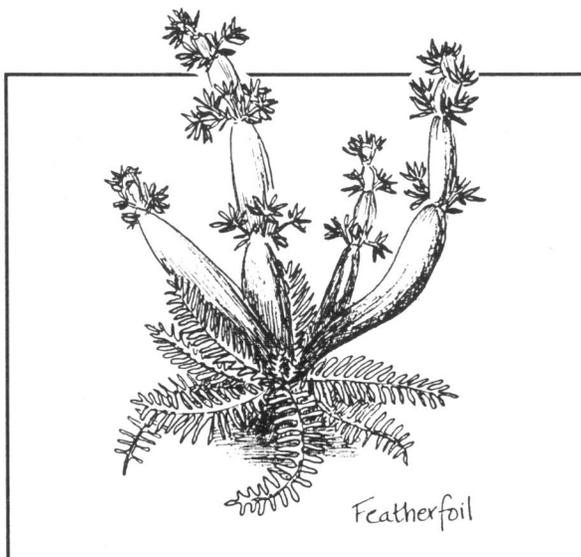
artist: Margaret Herring

plant list, remain unmet. Before consolidation of MNAP, the Critical Areas Program worked with landowners to voluntarily protect the sensitive features on their property. With the current political climate stressing non-regulatory means of protection, voluntary registry is an increasingly important tool for conservation, yet the registry is currently inactive. Plans are underway, when the opportunity arises to reactivate the registry, to broaden it to emphasize protection of entire habitats rather than single species.

Maintenance of Maine's endangered and threatened plant list continues, but on a shoestring budget. MNAP staff are managing to update the list based on current information from the Biological and Conservation Database and the expert advice of a Botanical Advisory Group composed of botanists from academia, conservation groups, consulting firms, and state and federal agencies. With help from these partners and despite the lack of funds, more than twenty taxa have been inventoried thoroughly enough to merit down-listing, and six species thought to have been extirpated as well as three new plants have been discovered in the state.

Through cooperation and innovation, the Maine Natural Areas Program continues to pursue its mission to maintain Maine's natural heritage for the benefit of present and future generations.

Francie Smith
Maine Natural Areas Program



Featherfoil

Field Notes

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different spatial scales of the U.S. Forest Service's National Hierarchy of Ecological Units. For more information on this upcoming publication, contact Lucy Tyrrell, Regional RNA Coordinator, 1992 Folwell Avenue, St. Paul, Minnesota, 55108.

Research Cooperators Meeting Held At Tionesta RNA

More than thirty past, present, and future research cooperators met on the Allegheny National Forest in northwestern Pennsylvania for the First Biennial Tionesta Scenic and Research Natural Areas Cooperator's Meeting in May. Established in 1940, and at 2,000 acres in size, the Tionesta Research Natural Area is one of the oldest, largest, and most often used RNAs in the East.

Northeastern Station RNA Representative Chris Nowak and Forest RNA Coordinator Brad Nelson organized the meeting to provide channels of communication to (1) elevate the knowledge and information base about on-going research and research opportunities, including collaboration, and (2) promote cooperation among Tionesta users in maintaining its integrity. Fourteen cooperators presented their recent research work, and noted their study locations on a map of the Tionesta Area. Considerable overlap in the mapped locations of research sites made graphically clear the need for coordination among researchers.

Communications at the meeting have already led to a new research proposal to study disturbance ecology using dendrochronological techniques as well as renewed efforts to improve the forest roads that access the Area.

(Chris Nowak; NE-Warren)

Regional RNA Group Convenes in West Virginia

The Monongahela National Forest hosted this year's Region 9 (Eastern Region) RNA meeting in Elkins, WV, which was attended by RNA Coordinators from Region 9 National Forests, North Central and Northeastern Station RNA Field Representatives, and others including representatives from the Eastern Regional Office, and Northeastern Area State and Private Forestry.

How to integrate RNAs into Forest Plan revisions was a major topic, as were discussions about the ecological basis for RNAs and the relationship of representative RNAs to the ECOMAP project and The Nature Conservancy efforts. The two RNA Coordinators from the Washington Office of the Forest Service provided their perspective on such topics as Forest Service budgets, the low likelihood of categorical exclusions for RNA establishment, and the significance of RNAs to monitoring.

No meeting would be complete without a field trip. In near-perfect weather, field participants visited three candidate RNAs, as well as other significant areas. Scenes from the fieldtrip can be viewed at the following web site: <http://\gypsy.fsl.wvnet.edu:80/~rmm/rna.html>

(Rose-Marie Muzika; NE-Morgantown)

Rigdon Point RNA Wins Ecosystem Management Award

Congratulations to Rigdon Point RNA steward John Agar and the Rigdon District ID Team for their 1995 Willamette Ecosystem Management Award. The forest-wide award is given annually to projects which implement principles of ecologically-based management. This year's award, presented concurrently with the establishment of the Rigdon Point RNA, highlighted the results of a cost-share project which united the efforts of the Oregon Native Plant Society (ONPS) and the Forest Service in maintaining one of the northernmost populations of knobcone pine (*Pinus attenuata*) as well as fire-dependent Douglas fir communities and meadows within the RNA. The project combines knowledge of the area's natural fire regime, the range of natural conditions appropriate to the RNA, and adaptive management of species and communities, all criteria which helped win the recognition of Research Natural Area monitoring and management efforts.

The ONPS volunteers and FS employees cooperatively surveyed plant communities, fuels, and stand conditions. Fire, long suppressed from the area, is critical in regenerating knobcones, which are rapidly dropping out of the stand, stressed by Douglas fir competition, and under insect attack. The Team is developing a prescribed fire plan as part of the RNA management to encourage regeneration of the knobcones. Careful management is critical since Rigdon Point RNA is within a Late Successional Reserve, and because fire can spread very fast in the area's steep terrain.

The vigorous efforts of the RNA steward and the District ID Team helped bring awareness of the role of RNAs in ecosystem management to the Willamette, and to the Forest's public partners.

Natural Areas Report
U.S. Department of Agriculture
Pacific Northwest Research Station
333 SW First Street
PO Box 3890
Portland, Oregon 97208

Official Business
Penalty for Private Use, \$300

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Natural Areas Report is published three times a year for scientists and managers working in natural areas throughout the country. This issue was supported by the USDA Forest Service Research Natural Areas Program of the Eastern Region (R9), North Central Research Station, and Northeastern Research Station. Send ideas, letters, and comments to:

Natural Areas Report
Pacific Northwest Research Station
3200 Jefferson Way
Corvallis, OR 97330
503-750-7360



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