



N C S R News

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Marine Reserves by Wynn W. Cudmore, Ph.D.

Although land-based reserves have been part of national and international conservation strategies for decades, until recently the concept had not been broadly applied to marine environments. With overall declines in marine biodiversity including some high profile species, such as the Atlantic cod and several Pacific salmon species, the need to be more creative in fisheries management has become imperative. Recent reports by the U.S. Commission on Ocean Policy (2004) and the Pew Oceans Commission (2003) have documented the need for a new, ecosystem-based approach to the management of U.S. territorial waters. Networks of marine reserves are widely viewed by scientists, managers and advocacy organizations as an important element of an ecosystem-based effort to preserve both marine biodiversity and sustainable fisheries.

Marine reserves are ocean areas in which extractive activities such as fishing, mining and oil drilling are prohibited. They represent the most restrictive type of "marine protected areas", which may afford a wide variation in degree of protection. Currently, less than 1% of territorial waters in the United States are in marine reserves. The first marine reserves were established in the 1980's off the California and Washington coasts and are now under consideration for other coastal states.

Although our understanding of how marine reserves function is incomplete, two goals are universal. First, marine reserves, or systems of reserves, should preserve or assist in the restoration of natural functioning ecosystems. It is anticipated that as human-caused disturbances are removed, ecosystem structure, composition and processes will recover. Second, as a result of spill-over from these reserves, yield to fisheries is expected to increase. Preliminary results from reserves established off the coast of California, for example, indicate that fish are twice as abundant and 30% larger on reserves as compared to non-reserve areas. Also, there is increasing evidence that reserves replenish fish populations outside of reserves by exporting fish larvae and juveniles to non-reserve areas. For these reasons, marine reserves often

enjoy support from both environmental and economic interests.

Many questions remain and research on marine reserves is fertile ground for investigation. For example: How large should marine reserves be and how should their location be selected? Will the benefit of more fish produced in reserve areas outweigh the increases in fishing pressure placed on non-reserve areas as a result of excluding fishing from reserve areas? How do systems of reserves function?

The answers to these and other questions concerning the establishment and monitoring of marine reserves represent a new area of exploration in natural resources programs. The National Center for Ecological Analysis and Synthesis at the University of California, Santa Barbara (www.nceas.ucsb.edu) conducts research on marine reserves and has published a concise statement of the scientific consensus on marine reserves. Those who are interested in learning more about marine reserves would benefit from browsing this web site.

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Urban Forestry Interview conducted by Lester Reed, Ph.D. with Steve Resh, Coordinator of Forestry Programs, Allegany College, Cumberland, Maryland

Urban forestry practices are a specialty for forestry technicians in metropolitan and suburban settings. The challenges of urban forestry are often overlooked in traditional forest management programs. However, there is an increasing interest in the availability and health of urban and suburban green space by citizens and governments. As a result, there is a need to introduce the special knowledge and skills associated with managing these spaces into forest technician programs. We asked Steve Resh, the coordinator of one of the nation's leading forest management technology programs, to provide some insight into the urban forestry specialty.

Lester: Just what is urban forestry?



Steve: Urban forestry to me is the adaptation of traditional forest management skills, which are normally concerned with a large stand of trees, to individual trees or small groups of trees. In traditional forestry, foresters must understand what makes a group of trees healthy by understanding what makes individual trees healthy. It is obviously easy to apply these lessons to the urban arena.

Lester: Are there special knowledge and skills needed in the urban setting that differ from those taught in more traditional programs?

Steve: In general, the basic skills are the same but the environment is different. Of course, an urban forester will run into a much more diverse population of tree and shrub species than will a traditional forester, so we have adapted our dendrology course to those needs. We teach our students to identify more tree species than in a traditional course and we really differ in our approach by spending much more time teaching our students how to “key out” species so that they will be able to identify the strange new specimens when they are encountered in the “urban forest”.

Lester: How else have you structured your program?

Steve: Basically we introduce the difference in scope between traditional forest and urban settings. For instance, in traditional forestry we teach sampling methodology so

that we can make decisions about many acres of trees based on a good sample of a few acres from that forest. In urban forestry, we might sample insect populations on one tree and make decisions about the health of other trees based on a limited sample. The procedures may be different, but the concepts of a good sample are applicable in both cases. In our *Forest Measurements* class we change the scope of population and introduce several new exercises to satisfy the urban forestry needs of students. In *Land Surveying* students learn how to make measurements, and transfer those measurements to a map. An urban forester will do the same measurements to produce a map, but that map might show the location of trees that need to be pruned or sprayed: same skills, different applications.

We have also created one new course called *Urban Forestry*. In this course, we teach pruning and climbing techniques as well as planting, fertilization and pesticide application, just to mention a few necessary skills.

Lester: How would you characterize the role of an urban forester in maintaining healthy green space?

Steve: To most homeowners and city maintenance personnel, any tree that has a green top is healthy. The urban forester will see problems developing while they may still be corrected. Last summer, students conducted a “street tree inventory” in a nearby community. This community had received a grant to plant some very expensive trees along their streets. While conducting our inventory, students started to notice that when the trees were planted, a small nylon twine had been used to hold up a protective wrapping on the trunk of each tree. The twine was starting to girdle every one of those trees as they grew bigger so that in a year they all would have been dead. The urban forester would have known to remove the twine or use cotton twine. He or she has the knowledge and desire to keep the tree healthy. In another field exercise, students determined that lawnmowers or weed whackers had damaged over 80% of the trees. The next step was to educate the mower operators on how to avoid the damage. This would be the job of the urban forester in a community.

Lester: Given the concern over invasive exotic species,



does the urban forester distinguish between native and non-native tree species?

Steve: We are part of a global community that has in many ways been enriched because of the sharing of ideas and products. Trees and other plant materials are no exception. However, some introduced plants and several notable introduced pests have become serious problems. The urban forester may be the only person who is knowledgeable enough to know where to draw the line between trying the new and endangering existing plant materials. The average homeowner or city administrator sees green and thinks everything is good. The urban forester must look beyond the obvious.

Lester: Do you see a trend toward having urban foresters expand their efforts to include wildlife habitat and restoration?

Steve: This is a logical next step and one that is being encouraged by many agencies in and around cities. A “back yard” bird sanctuary requires very little space to create and can help develop pride in a neighborhood. The vacant lot can look attractive and still serve as a refuge for small animals and interesting plantings. The urban forester is a very likely candidate to be assigned this type of job.

Lester: Is there any movement to involving foresters in urban planning and if so, what role do you see them playing?

Steve: I attended an urban planning forum once where the hot topic of discussion was reducing the loss of rural lands by requiring that any new home would require a ten-acre lot. A forester raised his hand and suggested that the 100-acre development should place 10 homes on ½ acre lots and the remaining 95 acres should be kept as an undeveloped working forest or common park. I knew at that moment that foresters should have a role in urban planning.

In closing, let me say that the urban forestry field 15 years ago was sometimes a “last chance” job considered only by those students who “struggled” during their stay in college. They understood that they would drag brush for six months while they learned how to climb trees and then they would work in the treetops for the rest of their careers. Now, many of my top graduates seek out full-time positions with tree care companies and as urban foresters. A career ladder

is clearly presented and our graduates realize that if they choose, they will quickly advance to become crew leaders, integrated pest management technicians, sales people or any number of positions within state and/or local government. In a state like Maryland where the urban areas are reaching out far into the suburbs, educators can't ignore a very professional and rewarding job market. www.allegany.edu

What is Sustainability, Anyway? by Wynn W. Cudmore, Ph.D.

Although, "sustainability" is an oft-stated goal in natural resource management, trying to find agreement on what that means is a difficult task. After all, like apple pie - everyone wants sustainability. Who would knowingly manage a natural resource on an **un**-sustainable basis? Despite its popularity, sustainability it seems, like "beauty", is often in the eyes of the beholder.

Most attempts to define sustainability have been broad statements that provide general guidance but offer little to natural resource managers in a practical sense. Probably the most widely cited of these is the definition proposed in 1983 by the Brundtland Commission of the United Nations, which defined sustainability as "the ability for the present generation to meet its needs without compromising that ability for future generations". Others are simplistic models that balance inputs and outputs (i.e., sustained yield) for a single, harvested commodity, such as tuna or timber. More recent efforts have attempted to broaden the definition beyond single commodities to include sustainable *ecosystems*. However, until recently, science-based definitions for sustainability that receive widespread support have been hard to come by.

A recent attempt to define sustainable forestry in scientific terms has been made the National Commission on Science for Sustainable Forestry (www.ncssf.org). The Commission is an independent, non-advocacy, multi-stakeholder body and, as such, does not promote any particular policy positions or management practices. Its mission is "to improve the scientific basis for developing, implementing and evaluating sustainable forestry in the United States". The work of the commission will be used to inform forest management decisions and policies while providing a sound

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Reestablishing an Ecosystem, by Lester Reed, Ph.D.



The Fox

The eight Channel Islands off the southern California coast, five of which make up Channel Island National Park, are often referred to as "the Galapagos of North America". The Channel Islands were virtually untouched by economic exploitation until the 1800's. This isolation allowed the islands to become home for more than a thousand species of plants and animals, including 12 found nowhere else on Earth. Among these unique species is the island fox, an endearing creature the size of a small house cat. Historically, island foxes have occupied the top spot in the Channel Islands food chain. However, two events have changed the pristine nature of the island. In the 1800's the small Native American population of the island was relocated to the mainland and ranching was introduced. As a result, grazing by cattle and sheep destroyed many of the native plant species and created "grass meadows". Also, pigs were introduced and allowed to become feral to support sport hunting. The next major impact was the disappearance of bald eagles from the islands in the 1950's and 1960's due to DDT contamination and the resulting thinning of their eggshells. That opened the door to golden eagles, which were not native to the Channel Islands. The native bald eagles fed primarily on fish and dead marine mammals, ignoring the foxes and holding the territory against golden eagles, their mainland cousins. The arrival of the golden eagle did not bode well for the

fox. The fox along with the feral piglets became the favorite food of the mammal-hunting golden eagle. As a result, the fox population dropped dramatically.



The Pigs

In 1988 the Nature Conservancy acquired the western 90% of Santa Cruz Island, the largest of the Channel Islands. The National Park Service owns the eastern 10%. The Nature Conservancy has worked to return the island to its pre-1800 state. Cattle and sheep have been removed, native plants encouraged to repopulate the island, and a fox captive breeding program has started. The plan calls for the removal of pigs and golden eagles and the reintroduction of the bald eagle. Here is the problem: until the bald eagle returns in sufficient numbers, the golden eagle (also a protected species) will persist; the golden eagle will prey on piglets and fox until the pigs are removed and then



The Eagle

on the few foxes, if any are left. In short, there seems no way to return to the pre-1980 ecological balance. As we continue to learn, preservation of an ecosystem is superior to trying to restore the system. Faculty seeking more information concerning the Channel Islands restoration effort can search the Internet for *Channel Island fox, California Channel Islands, or Santa Cruz Island*.

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ecological framework for long-term economic management of forests. Established forest certification systems, in particular, such as the Forest Stewardship Council and Sustainable Forestry Initiative, will become more science-based as a result. These certifications allow landowners to market their timber products as being produced on lands that are sustainably managed and thus command a higher price in the marketplace.

To date, the commission has emphasized the role of biodiversity in a sustainable forest. An interim report (www.ncseonline.org/ncssf) has been released, which examines the relationship between protecting biodiversity and implementing sustainable forestry management. Models

are being developed, for example, to evaluate how well landowners are able to achieve a balance between the removal of biomass (i.e., thinning) to reduce wildfire risk and the retention of enough "biological legacy" to provide for biological diversity.

NCSR attempts to place in the hands of educators, the tools that allow instructors to teach sustainable concepts to students. For those in forestry, this resource seems like a reasonable start. In final year of the NCSSF project, teaching materials and trained workshop leaders will be made available. Although these are developed primarily for use by woodland owners and working foresters, educators may find them to be a valuable resource as they seek to develop modules that convey the scientific basis for sustainability.