



# Science Roundup

by I. Jack Stout

(Dr. Stout, Professor of Botany at the University of Central Florida and Science Committee Chairman for FNPS, will be presenting this regular column.)

Most everyone is for biodiversity, if asked. Biodiversity has a good ring to it, and it is now fashionable to use the term in the political arena, and in the titles of talks, scientific papers, and books. Probably the best place to read about the scientific basis for our concern about biodiversity is E. O. Wilson's book titled *The Diversity of Life*, published by W. W. Norton & Co. in 1992.

One of the challenges that comes with a cause like biodiversity is its justification to those who do not feel a strong bond to and need for contact

with natural communities and their species assemblages. It is generally not enough to say biodiversity should be protected because it is the right thing to do for ethical, moral, or aesthetic reasons. Until about 20 years ago, ecologists were defending biodiversity with the argument that diversity begot stability at the community level of organization. This argument fell on hard times as various theoretical and practical results suggested that the facts did not support the concept.

In a recent paper in *Nature*, perhaps the most important science journal in the world, David Tilman and John Downing reported that the yield of green plant material each year and the resistance to drought in 207 grassland plots over an 11-year period showed that diversity counted toward stability (D. Tilman and J. A. Downing. 1994. Biodiversity. *Nature* 367: 363-365.) Up to a point, plots with more species of grasses and herbs (15 to 20 species) produced more biomass and were less impacted by a record drought than were plots with fewer (1 to 6) species.

An alternative idea to the diversity-stability notion is one that claims many species in complex systems are

redundant and, as long as one or more of the dominant species survives some perturbation of the environment such as a drought, biomass production would be the same from year to year. The evidence from the Tilman work in Minnesota is not consistent with the species-redundancy hypothesis.

The authors concluded that preservation of biodiversity may be essential to the maintenance of stable productivity in natural communities. This is also the message that serves the cause of conservation biology and ecosystem management.



Ecosystem management has reached the status of a buzzword, along with landscape ecology, GIS, metapopulations, and gap analysis. Ecosystem management has been embraced by the Department of Environmental Protection in what some might refer to as a "paradigm shift" (which means that scientists have adopted a new way of thinking about some concept in a really big way). It also could be said that ecosystem management is an old idea dressed up in new language.

The writings of R. Edward Grumbine provide a convenient source of current thinking on ecosystem management. His most recent paper (R. E. Grumbine. 1994. What is ecosystem management? *Conservation Biology* 8:27-38.) contains most of the themes and goals that will be adopted by land management agencies in Florida. Grumbine provides a working definition of the process as: "Ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term."

The biodiversity crisis has, in part, forced land management experts to think beyond species management to whole systems. In my judgment, the recent and continuing focus on ecosystem management is a necessary step toward landscape management, which is on a larger scale and includes many diverse ecosystem types. Wild land management is, after all, a giant experiment being played out in big and small steps with much uncertainty associated with it. Real progress is being made, however, and the biota of Florida should be a big winner in this game.



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