

PLENARY ADDRESSES



California's Oak Woodlands: Where We Have Been, Where We Are, Where We Need to Go¹

Jack Ward Thomas²

Oak woodlands comprise about 25 percent of California's forests and woodlands and include about 10 tree species, eight shrub species, and many hybrids. Three quarters of this resource is privately owned, mostly in large ownerships for agricultural and grazing purposes. This information comes from the latest available inventory of oak woodlands in the state, completed in 1985 by the USDA Forest Service, Forest Inventory and Assessment (FIA) Unit, located in Portland, Oregon. A new USDA Forest Service inventory has been done in California, but results are not yet available because of technical problems. They should be available early in 1997. The California Department of Forestry and Fire Protection has also inventoried oak woodlands using satellite imagery, and this information is available from that agency.

Oak woodlands yield important benefits to Californians. Water and watershed protection are probably the most important outputs of these woodlands, though most of the water in California originates at higher elevations. Other values include grazing, recreation, and wood products, in about that order of importance. Grazing occurs on about 75 percent of the oak woodlands, and these ecosystems produce about a third of the state's total forage. They are especially important as winter range for ranchers with access to higher-elevation summer range. Oak woodlands are extremely important for open-space and recreation uses because of their proximity to urban and suburban populations. Wood products include firewood and specialty products, such as furniture stock, flooring, and barrels.

Some other aspects of oak woodlands, such as their wildlife habitat and esthetics, have little or no direct economic value but are nonetheless important to California. For example, more than 300 vertebrate species use oak-dominated woodlands for reproduction, and many more spend some time in these woodlands. These include some threatened, endangered, and sensitive species, such as the California spotted owl and the willow flycatcher.

In recognition of these benefits to Californians, in 1986 the state initiated a 10-year program designated as the "Integrated Hardwood Range Management Program," which was designed to produce new information on oak management and transfer that information to managers of oak woodland resources. In 1988, the California Oak Foundation was chartered to foster the wise management of oaks. The California Legislature designated 1990 as the "Year of the Oak." And before this week's symposium (19-22 March 1996) in San Luis Obispo, California, previous symposia on oak woodlands were held in 1979, 1986, and 1990. Truly, considerable attention has been focused on California's oaks in recent years.

Before I issue the challenges that I was asked to provide in this address, I would like to review the past and present situations concerning oaks in California, as I see them.

¹This was an invited, plenary paper for the Symposium on Oak Woodlands: Ecology, Management, and Urban Interface Issues, 19-22 March 1996, San Luis Obispo, Calif. In the absence of the author, the paper was presented by Ronald E. Stewart, Associate Deputy Chief for Research, USDA Forest Service. None of the plenary papers presented at this symposium was subjected to technical peer review.

²Chief, USDA Forest Service, Box 96090, Washington, DC 20090-6090.

Where We Have Been

Oaks have been a part of California for at least 10 million years. For most of that period, impacts on the oak ecosystem were natural and dominated by periodic, climatic fluctuations and by natural fires. An important perspective to understanding the earlier impacts of humans is that the resource was extensive and the population small. Many of California's Native Americans depended upon the abundant oak resource. Within the past 3,000 years, Native Americans practiced localized and intensive land management, including hunting, forest burning, seed harvesting, pruning, irrigation, and thinning. Effects were probably significant locally but generally near natural conditions at the rangewide scale of the oak woodlands.

Immigration of non-Indian settlers in the early 1800's began a period of increasingly intense resource use and development. Europeans introduced cattle in the 1770's and, in so doing, they introduced non-native grasses and forbs. These introductions brought about major and probably irreversible changes. For example, California's native perennial grasses were largely replaced by European annual grasses, which adapted well to the Mediterranean climate. Changes in vegetation were reinforced by grazing.

Much of the gold rush of 1849, and other gold mining activities throughout the latter part of the 1800's, occurred in the foothill oak and oak-pine woodlands of the central Sierra Nevada. Placer, hard-rock, and hydraulic mining, combined with the associated settlements, brought about significant changes, readily visible today. Other long-term changes were introduced with the advent of fire prevention and aggressive fire control in the early part of this century.

Where We Are

In contrast to the abundant oak woodlands available to Native Americans and Europeans in the past, today the resource is limited in relation to the expanding population. At least 90 percent of California's 31 million people are living in urban and suburban communities. They increasingly look to the oak woodlands for open space, recreation, and community expansion.

Through conversion to agriculture and other uses, the state's original 10-12 million acres of oak woodlands have been reduced to about 7 million acres today. At the same time, riparian areas, which were hardest hit by conversion, were reduced from about 700,000 acres to about 20,000 acres today.

The California Native Plant Society considers the Valley oak and Engelmann oak to be threatened. Only about 4 percent of the state's woodlands and grasslands are protected. The human population has more than doubled in the oak woodlands since 1970, causing considerable conflict. Some of the fastest growth rates in the state are occurring in areas dominated by oak woodlands. As the population grows and the demographics of rural communities change, conflicts between agrarian and urban lifestyles increase. This brings increasing pressure to regulate historical land uses that conflict with environmental concerns and values of the new emigrants.

Conversion by development (both urbanization and agriculture) and the resulting fire and fragmentation of ecosystems foster concerns. The population boom in oak woodlands has resulted in the development of sizable communities there, in what were once sleepy hamlets that are now rapidly growing suburban centers, such as Oakhurst in Madera County. Because the woodlands in these areas have burned periodically, concern is growing that much property and many lives will be lost as a result of wildfire. More people also mean an increased chance of ignition. Conversion to agricultural uses such as open pastures and

vineyards will likely continue. More houses, roads, vineyards, and so on mean more change, fragmentation, and actual loss of habitat. This can result in a continuing decline of wildlife species associated with the oak woodlands. Interactions between people and mountain lions are particularly volatile, and mountain lion management will again be on the state's ballot in March 1996.

Oaks have low survival rates in many areas of the state. Regeneration and survival are spotty and periodic. Thus, many stands have trees that regenerated around the turn of the century but have not regenerated since then. Considerable research in recent years has been devoted to the regeneration issue, and several organizations have spent much effort and money on planting oaks.

Changing lifestyles and values, together with public appropriation of private property rights, cause further concern. Ranchers in particular are seeing their way of life change as rural communities expand with urbanites. The freedom the ranchers once had to manage their lands is increasingly being curtailed by state and local rules and regulations. Obviously, the ranchers are not happy! On the other hand, many of the conservation groups are not happy about the changing character of the oak woodland ecosystem, and the urbanites who move into these areas are unhappy with the limited public services in more rural communities, the threat of wildfire, the smells of agriculture, and so on. This can result in very interesting mixtures of coalitions, depending upon the particular issue being addressed.

Where We Need to Go

California is fortunate. All the proper ingredients are here to solve these problems with the usual far-sightedness that distinguishes the State: (1) California is blessed with some very clear-thinking people from all sides of the oak woodland issue. It is my impression that many leaders from the agricultural, governmental, environmental, and conservationist perspectives are looking for working solutions, rather than for new battlegrounds to fight old wars. (2) California is blessed with some very innovative mechanisms, such as the Biodiversity Memorandum of Understanding, Conservation Reserves, and the Cooperative Resource Management Planning (CRMP) process as championed by the Natural Resource Conservation Service (formerly Soil Conservation Service). If these live up to their potential, they can provide some excellent solutions. The recent effort in southern California to take an ecosystem approach for the California gnatcatcher to provide sufficient habitat, while allowing development, shows promise for long-term answers to other problems. (3) We are beginning to understand how ecosystems work, and an ecosystem approach to management of oak woodlands is critical.

Although people may disagree about the concept of "ecosystem management" and what it means, clearly we are beyond attempting to solve our natural resource problems one species at a time. I appreciate the simple definition of ecosystem management implied by Aldo Leopold when he wrote, "The intelligent tinkerer saves all the parts." Simply stated, ecosystem management means the integration of ecological, economical, and social factors to maintain and enhance the quality of the environment to best meet current and future needs.

Ecosystems can be described at different scales in a hierarchy. These ecosystems are coupled to one another: changes in the structure or function of one ecosystem can have consequences in many contiguous and some noncontiguous ecosystems. For example, late successional and riparian forests in the Sierra Nevada are important habitats for wildlife, as are the low-elevation foothill oak woodlands and pine-oak forests. In the latter case, conversion of

habitat and loss of ecological function in this zone have dramatically altered the grouping of species that once used these communities. A common and important pattern for many Sierra Nevadan birds is their seasonal migration up- and downslope. When specific habitats needed to complete critical life-history stages (for example, foothill zones for breeding) are disrupted, then species can be put at risk even if they are able to use other habitats for other needs.

We know that all ecosystems are dynamic, that they undergo change naturally, with or without human interference. Consequently, why should we worry about retaining natural diversity and function at any specific place or time? We worry because the rate and direction of change in natural systems are extremely important to ecosystem sustainability. Natural change tends to occur slowly over long periods of time, allowing structural elements and populations to adapt. By contrast, in some places in California over the past 150 years, humans have brought about ecological changes on a scale that, under natural conditions, would have required millions of years.

Healthy ecosystems in the future will require that managers act within natural ranges of change so that biota can adapt to them. We need to avoid changes within decades or centuries that are of such magnitude that they would occur naturally only over periods along a geologic time scale.

Because funds will always be limited, I suggest that we prioritize our ecosystem management efforts. First, we need to protect what we have while we learn to use it wisely. A priority must be placed on preventing further deterioration of key ecosystems. We know that it is far less expensive to protect ecosystems than it is to restore them. Second, we need to identify deteriorated ecosystems and together undertake efforts to restore them to a sustainable, productive state. Third, we need to learn how to better manage the oak woodlands to provide multiple benefits within the sustainable capability of these ecosystems.

Rather than getting side-tracked on terminology and the debate about the future of the concept for managing complex vegetation types, I will focus on some of its principles. A good starting point for reference is the "Interim Report" from the recent Workshop on Ecosystem Management held last December in Tucson, Arizona (*Interim Report. Toward a Scientific and Social Framework for Ecologically Based Stewardship of Federal Lands and Waters*. December 4-14, 1995). I will briefly discuss four aspects of the principles of ecosystem management, based on that report: (1) science-based management, (2) people as part of the ecosystem, (3) partnerships to make it work, and (4) telling the public the ecosystem management story.

Science-Based Management

Everyone understands that good science is critical to good decision making, but much research is not relevant to the actual decisions that managers must make. In particular, we increasingly need research that looks at structure, composition, and function simultaneously, and at multiple scales. Because this kind of research is the most expensive to undertake, it is also becoming critical to build constituency support for scientific research. Finally, and perhaps most importantly, much of the controversy surrounding resource management questions is not due to a lack of science, or disagreements about the state of nature, but instead involves basic disputes about human values. Scientists and decision makers need to make sure these issues are clearly separated in both the research and decision-making processes.

Good information is required to make good management decisions. Thanks to the state's Integrated Hardwood Range Management Program, started in 1986, as well as other efforts, we now know a great deal more about oak

woodlands than we did a decade ago. We still have a ways to go, however, particularly for valley and Engelmann oaks, and for oaks found in forested ecosystems. When the next USDA Forest Service FIA inventory is available, it will add to our understanding of the nature and extent of the hardwood resources in California.

Concerns about low rates of regeneration have stimulated considerable research, particularly on blue oak. Results of this effort have been reported in previous symposia, and our knowledge will be expanded at this symposium.

Profitable areas of research include silviculture, disturbance ecology, wildlife habitat relations, and economic benefits and tradeoffs. It is unlikely that sufficient public funding will be available to protect and restore a significant amount of the oak woodland resource, so I believe that we need to find ecologically sound management techniques that provide a return on investment whenever possible. Research results must be packaged in ways that invite rapid adoption by land managers and policy makers.

We should keep in mind, however, what one participant at the Ecosystem Management Workshop said: "No matter how good and useable the science is, nothing of great value will result without support for, and direct action by, local communities. The trust and confidence required for this may take years. Only then is the science useful/useable."

The challenge is to continue to support the quest for better scientific understanding of the oak woodland ecosystem. More research is needed on oak woodland dynamics, especially on such topics as patterns of natural disturbance, responses to people's activities, and ecosystem processes. More information on silvics of individual oak species and their associates is also important. Finally, we need better information on the occurrence and habitat requirements of plant and animal species dependent upon the oak woodlands.

People As Part of the Ecosystem

Unfortunately, some individuals would argue that people are not part of the ecosystem—that the only acceptable ecosystem is one in which natural processes are allowed to continue without the influence of humans. I disagree. First, with the population of California at more than 31 million, we could not exclude people from the oak woodlands even if we wanted to. As I mentioned earlier, the human population has more than doubled in the oak woodlands since 1970, and the fastest rates of growth in the state are generally occurring in the Sierra Nevada foothills, where oak woodlands are common. Second, humans have already influenced the oak woodlands significantly, and it would be prohibitively expensive to try to return to "natural conditions" even if we could define what those conditions are. For example, some would advocate allowing wildfires to burn. Given that decades of fire prevention and aggressive fire suppression have allowed fuels to accumulate to unnatural levels, and that expensive homes and new communities are interspersed within the oak woodland, return to natural fire regimes is not acceptable.

As another participant at the Ecosystem Management Workshop said: "Ecosystem management is about people and for people. It is a tool for meeting people's needs for a sustainable natural system. It is a device to help us realize our very human goal of passing on to our children and theirs a world that will sustain them." What are the criteria for sustainable, forested ecosystems? Ecosystems are sustained when they maintain native biological diversity, when they are resilient to stress, when they adapt to major environmental changes, and when they support human needs and desires.

People living in and using the oak woodlands now expect many things:

- *Products*—clean water, meat, firewood, wood for specialty products.

At the same time, the demand exceeds what is available.

- *Recreational opportunities*—sightseeing, off-road vehicle trails, hunting, camping, hiking, picnicking, and so on. Yet, the supply of public areas is limited.
- *Biological diversity and ecosystem integrity*—People want to know that oak woodlands will continue to be part of California's landscape. Yet, more houses, roads, and so on mean change, fragmentation, and loss of habitat. This, in turn, can result in the loss of species.
- *Property and associated values*—home sites, ranching, community values. Yet, these values are changing with the influx of urbanites and the public appropriation of private property rights.
- *Safety*—fires controlled quickly without property damage or loss of life. Yet, fuels and ignitions are increasing, fire fighting resources are being reduced or stretched to their limit, and values at risk are increasing.

The challenge is to find the mix of oak woodland outputs that best meets human needs, both public and private, within the sustainable capability of the ecosystem. This implies some continued active management, based on better scientific information.

Partnerships to Make Ecosystem Management Work

Ecosystem management absolutely will not work without partnerships. Most of the oak woodlands are owned by private parties, yet many of the services of the woodlands accrue to the public at large. These include scenic vistas, recreational opportunities, biological diversity, clear air, open space, and wildlife. Partnerships can counter fragmentation effects on biodiversity, resource management, fire protection, economies of scale, and so on. The problems cross boundaries; so must the solutions.

As another participant at the Ecological Stewardship Workshop said, "Ecosystem management is not about 'us' or 'them,' but rather it transcends ownership boundaries and should be recognized as 'we' resource management. All parties can contribute, and all groups need to recognize each other's contributions. The expectation should not be maps of specific ecosystems or specific prescriptions for ecosystems, but rather we should look for tools and frameworks that all land managers, regardless of ownership objectives, can use to integrate scientifically based ecosystem approaches into their programs."

The challenge is to continue production of public goods and services while maintaining private property rights. CRMP, Conservation Reserves, and tax relief are especially useful for cooperative planning and mitigation (the former) and providing incentives to private owners to provide public benefits (the latter).

Telling the Public

A well-informed public will likely make better decisions. The "public" includes woodland owners, woodland users, community leaders, consumers of woodland products, the press, and the voting public in general. We must communicate research results in ways that people can understand. We must also communicate the reasoning behind our management decisions.

Social commitment exists for environmental protection, but social support for ecological stewardship must be improved. Somewhere along the way, ecosystem management got a bad name. One reason is the perceived negative effect of ecological stewardship on natural resource jobs—right or wrong, that is the perception. To gain legitimacy, ecosystem managers must tap into core public values and build social support for science and management dedicated to

sustaining healthy, productive ecosystems. This effort is not about “big government.” Rather, it is about looking for collaborative approaches among all landowners who desire health and productivity for the lands, waters, and resources they manage.

Successful approaches to ecosystem management are increasingly community-based—initiated by local people and motivated by a “love of place.” In such cases, ecosystem management is in the local interest and is a means to achieve the beneficial use of its “natural capital.” There is a growing realization that a long-term approach to land use and management is generally better ecologically and economically for developing harmonious and sustainable relationships between people and the land. Ecosystem management is also a means to build trusting relationships, often among former antagonists, to gain political power in furthering envisioned ends.

The challenge is to have both woodland managers and the public making informed decisions.

The Challenges Ahead

By way of summary, I challenge you to incorporate ecosystem management into California's oak woodlands by

- Providing new information for management decisions. This information must be readily available and user-friendly. Science-based knowledge that provides better explanations of how oak woodland ecosystems function is especially needed. An important tool is a continuously updated, statewide geographic information system accessible to local planners and the public.
- Finding the mix of oak woodland outputs that best meets human needs, both public and private, within the capabilities of the ecosystem.
- Continuing production of public goods and services while maintaining private property rights through partnerships.
- Making better woodland management decisions through efforts to keep the woodland manager and the public better informed.

I believe that you are up to these challenges.

