

Role of Communities in Adaptive Management: A Case from North America

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Adaptive management involves planning to learn while doing. Forest communities can play important role in adaptive management at all stages: By initiating innovative management practices, collecting and evaluating information, and incorporating findings into decision-making processes. In the Northwest forests of the United States, adaptive management is being adopted to assist with the difficult task of integrating biological antisocial needs in ecosystem management. This paper describes conditions in US forest communities and community participation in forest management. It then describes an experiment in adaptive management in the Pacific Northwest, and in particular the case of Trinity County, California. Experience from these projects suggests that both high level policy and local initiative are required to implement adaptive management. The benefits derived from community involvement in these cases of adaptive management indicate the potential benefits of community forestry to both forests and forest communities in the US.

INTRODUCTION

Adaptive management is not just learning from the past, but planning to learn while doing. It requires identifying data needs, collecting and evaluating information about management practices, and then inserting those findings into the decision-making processes. Adaptive management is the only way to approach difficult tasks such as ecosystem management: Managing for the functional integrity of an ecosystem while retaining viable populations of species and integrating socioeconomic goals. As scientific as it sounds, adaptive management is not the exclusive domain of forestry professionals or technical specialists. Forest communities can play important roles in implementing adaptive management. In fact, in the examples described here, community groups have played decisive roles in initiating and carrying out adaptive management projects. The roles that US communities have demonstrated in adaptive management has brought them one step closer to community forestry as practiced in other parts of the world.

FOREST COMMUNITIES IN THE UNITED STATES

Because forest communities in the US are diverse, it is hard to make general statements about them. On average, forest communities that have been dependent on surrounding forests are relatively poor and have little control over the forests that surround them (Fortmann and Kusel 1991; Hoffmann and Fortmann 1996). One forest community, however, can differ greatly from another in terms of both socioeconomic factors and the natural environment. They are also internally diverse, with residents who differ in the way they use and view the surrounding forests. Some forest communities are shrinking due to declining forest industries, while others are swelling in size with urban refugees seeking a higher quality of life at low prices. Because of their diversity, not in spite of it, communities can make good partners with government agencies in forest management.

What do forestry issues of communities in tropical, developing countries have in common with those in a large, temperate, industrial country? The forest-dependent communities in many parts of the US, such as Trinity County, California, share several characteristics with many of the forest dependent communities abroad that are exploring community forestry options. These characteristics include:

- Relatively poor:
 - high poverty
 - high unemployment
 - little local capital
- Lack of control over forest resources:
 - government control of most forest land
 - external ownership of private timber land and sawmills
- Degraded forest resources:
 - due to extraction for export to urban centres
 - little reinvestment in the land and local communities
- Physically isolated.

- Politically and economically weak.
- Dependent on the local forest in diverse ways (not just for commodities)
- Strong identity with the place.
- Deep concern over the fate of the local forests.
- Deep concern about local socio-economic conditions.
- Diversity among residents; and
- History of conflict over resource use:
 - between the community and the national government over forest management
 - between interest groups and the government over forest management
 - among local user groups.

Residents in forest communities such as Hayfork, California have been grappling with these issues for years and have often referred to themselves and their Trinity region as a colony. Of course, the technology and resource use patterns of an advanced industrialised country, the sophisticated land management bureaucracies, and the financial resources of one of the richest countries in the world are among the factors that set Trinity County apart from developing country counterparts. Nevertheless, visitors and local residents familiar with community forestry abroad have noted similarities between the position of Trinity County residents and those of marginalised forest communities abroad (Danks 1996/97).

HAYFORK AND TRINITY COUNTY

Hayfork is located in the middle of Trinity County and the Trinity National Forest in Northern California. Trinity County is mountainous with rich, mixed coniferous forests as well as some oak woodlands and grasslands. Trinity is a rural county of about 8,100 km² hectares (two million acres) and 13,000 people. Weaverville, the county seat, has a population of 3,200, and Hayfork, the second largest town, has a population of 2,500. The only local government is the Trinity County Board of Supervisors. There are no incorporated towns, no mayors, and no town councils. Most communities are fairly isolated with large tracts of undeveloped land (mostly public) between them. There are no traffic lights in Trinity County.

Table 1: Comparison of adaptive Forest Management in North America (Danks, this paper) with Joint Forest Management in India (Robley, 1996).

	Adaptive Forest Management	Joint Forest Management
Basic consideration	Eco-challenge based	Livelihood-challenge based
General objectives	Involving local communities in ecosystem management should assist in achieving conservation objectives and sustain forest communities	Involving local communities in forest management should contribute towards both community empowerment and forest conservation
Environmental aim	Maintain ecological processes	Rehabilitate degraded lands
Aim of production	Adaptation of commercial timber management	Basic-needs forest products
Scale	Eco-zone 400km ² - 1000km ²	Communal/group-managed forest areas up to 4km ²
Interpretation of community	Administrative village	Specific forest-user groups
Boundary setting	Forest Department	Jointly decided by Forest Department and user groups

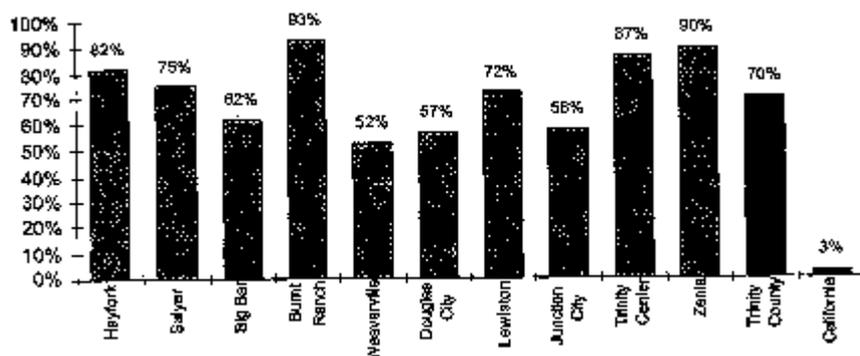
More than 70% of the land area in Trinity County is controlled by the federal government, primarily the US Forest Service². In 1996, 99.2% of private timber land in Trinity County was held by out-of-county owners (County Assessor Maps 1996). Over the past 150 years, mining, grazing, logging, roads, fire suppression, dams, and catastrophic fire have altered the natural landscape of Trinity County, leaving a degraded environment compared to the abundance of the past. While heavily affected by the extraction of minerals, trees, and water, the small population in this remote area still lives amidst a fairly rich forest resource.

The timber and recreation industries are the core sectors of the economy, making Trinity County one of the

most forest dependent areas in the Pacific Northwest³. Other than local commercial and support services (e.g., stores, schools, government services), there is relatively little economic activity, public or private, that is not directly related to National Forest management (e.g., logging, lumber mills, recreation, tourism, reforestation, watershed management, fire management). Agricultural and mining income is now negligible, although they were among the dominant economic sectors before World War II.

More than 30% of employment wages in Trinity County were related to the timber industry alone in the late 1980s (Greber 1994). Seventy percent of the homes in Trinity County are heated with wood; in some communities about 90% are wood-heated (USDC Bureau of the Census 1993) (Figure 1). The only remaining sawmill in the county is located in Weaverville. In the spring of 1996, the sawmill in Hayfork closed. It was formerly the major employer in the community and the largest business in the county.

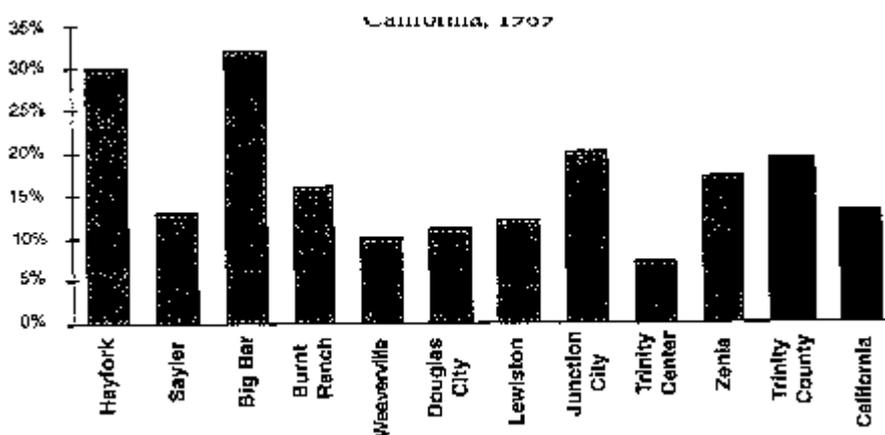
Figure 1: Percent of Homes Heated with Wood,
Trinity County Communities, Trinity County and California, 1990



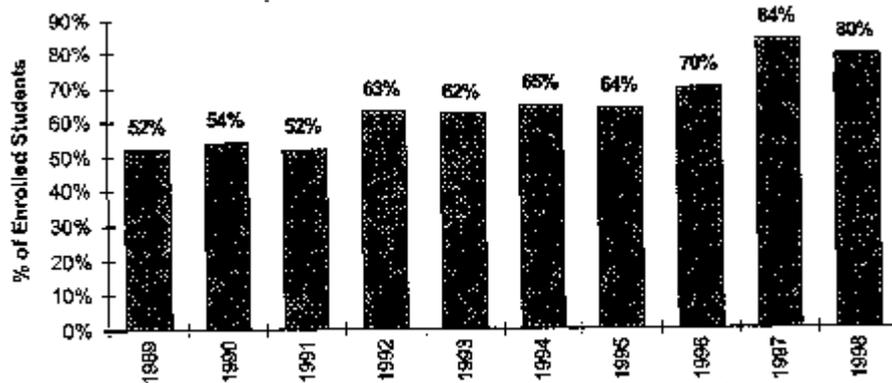
Source: U.S. Dept. of Commerce, 1990 Census STF3B

Even before the mill closure, 30% of individuals and nearly 50% of children in Hayfork lived in poverty in 1989 (USDC Bureau of the Census 1993). Countywide, 18.5% of all residents and 27.2% of children lived below the poverty level⁴ in 1989, compared to 12.5% of Californians and 17.8% of Californian children (USDC Bureau of the Census 1992). Three Trinity communities had 1989 poverty rates that were 250% of the average rate for California (Figure 2). Between the 1980 and 1990 censuses, the poverty rate in Trinity County increased 62%, by far the largest increase in poverty of any California county. Poverty has continued to increase since the 1990 census. Participation in the free and reduced lunch programme, a proxy for low-income families with children, has increased since 1989. Currently more than half of the County's school children are from low-income families that qualify for this programme. In 1998, 80% of Hayfork Elementary School students were in the free and reduced lunch programme, up from 52% in 1989 (Trinity County Office of Education 1999) (Figure 3).

Figure 2: Percentage of Individuals Below Poverty,
Trinity County Communities, Trinity County and California, 1989

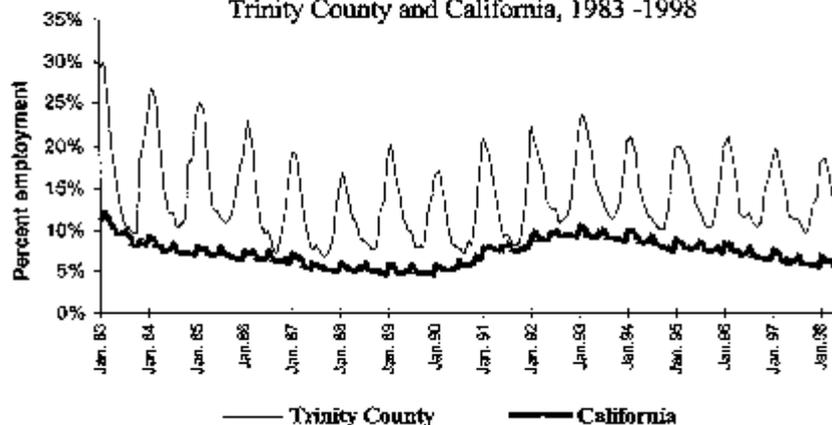


Source: U.S. Census 1990, STF3B

Figure 3: Percentage of Students in Free and Reduced Lunch Program, Hayfork Elementary School, 1989-1998

Source: Mountain Valley Unified School District and Trinity Office of Education

For more than a decade, the annual unemployment rates in Trinity County have been about twice that of the state of California. Analysis of monthly unemployment (Figure 4) shows that unemployment is highly seasonal in Trinity County, with very high winter unemployment and summer unemployment dropping to near the statewide averages in the best years. Forest dependence, on both timber and recreation, contributes to this strong seasonality. Trinity County has not shared in the economic growth of the mid- to late-1990s experienced by much of the rest of California and the United States. In 1998, the unemployment rate was 13.0% in Trinity County, while it was 5.9% statewide in California (California Employment Development Department 1999).

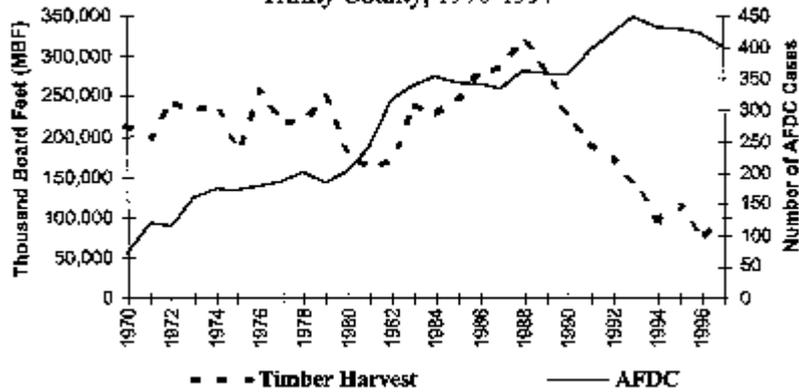
**Figure 4
Monthly Unemployment Rates,
Trinity County and California, 1983 -1998**

Source: California Employment Development Division, Labor Market Information

Despite a clear economic dependence on the surrounding national forests, measures of local well-being do not correlate well with timber harvest levels. Poverty, as measured by the number of families on welfare (i. e., AFDC cases - Aid to Families with Dependent Children), has generally gone up, despite fluctuations in the timber harvest (Figure 5). Although 90% of manufacturing employment in Trinity County is in the timber industry, the number of jobs in the manufacturing sector has not been correlated with timber harvest levels over the past 15 years (Figure 6). Although timber volume has declined in the 1990s, the value of timber has reached all time highs, despite the reduced volume (Figure 7). Stumpage prices rose dramatically in the early 1990s due to a number of factors including reduced supply. However, this higher value has not led to a

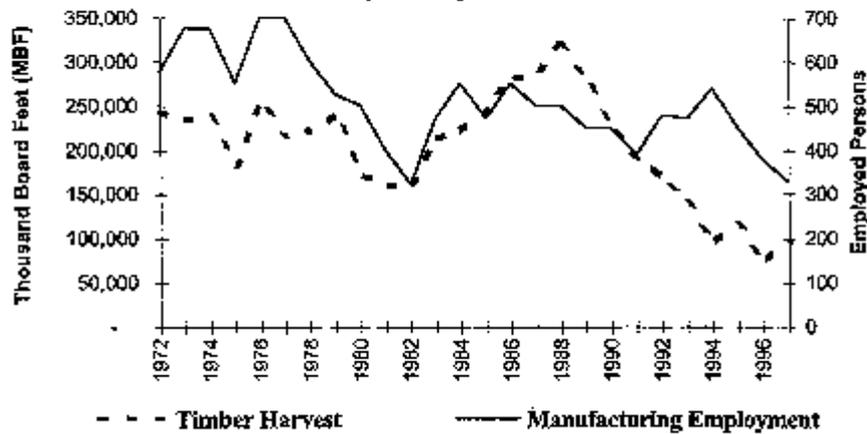
decrease in poverty or an increase in jobs. Most of that value is exported outside the county with the logs.

Figure 5
Timber Harvest and AFDC Cases,
Trinity County, 1970-1997



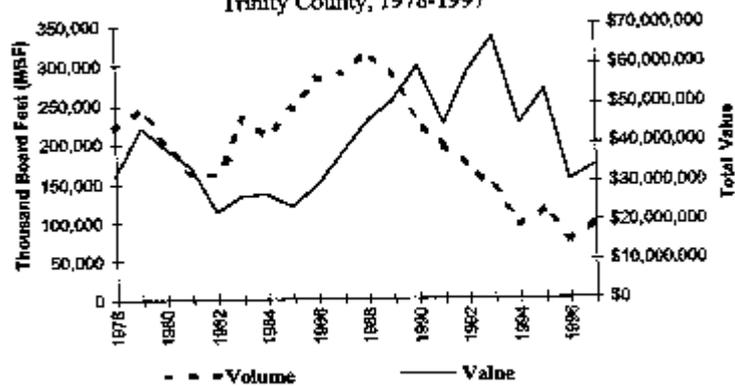
Sources: California State Board of Equalization and California Department of Social Services

Figure 6
Timber Harvest and Manufacturing Employment,
Trinity County, 1972-1997



Sources: California State Board of Equalization and California Employment Development Division

Figure 7
Volume and Value of Timber Harvest,
Trinity County, 1978-1997



Source: California State Board of Equalization

COMMUNITY PARTICIPATION IN FOREST MANAGEMENT IN THE UNITED STATES

Community forestry, as opposed to state-controlled forestry, refers to an institutional arrangement in which local communities proximate to a forest area have a share in the benefits from, and a voice in decision-making regarding, nearby forests. In addition, community members contribute to the labour and expertise required for forest management. In practice, the role of communities' vis-à-vis the state varies widely around the world. In some places, communities have complete control over management and benefits of a forested area. In other areas, perhaps even in the same country, a state bureaucracy manages the forest for the economic and political benefit of the central government. Many different institutional arrangements exist, mixing community and central government control.

The United States Department of Agriculture's Forest Service manages 570,000 km² million (140 million acres) of land, called 'national forests'. Revenue generated from national forest management and recreational activities is returned to the federal treasury. In the United States, communities of place have had a fairly limited role in national forest management. Regarding benefits, local counties have been given 25% of national forest receipts for schools and roads. Local communities are thought to benefit from employment opportunities associated with forest activities, especially timber cutting. Political arguments for the sustained yield of timber include the 'community stability' afforded by timber jobs. Regarding a voice in decision-making, nearby communities have no formal role. Community members are considered part of the general public, which is allowed to provide feedback on options presented in planning documents during the public comment period — after many basic choices have already been made. The expertise and much of the labour involved in management is provided by federal land management agencies, primarily the US Forest Service. Many community members, however, are employed or contracted by the Forest Service.

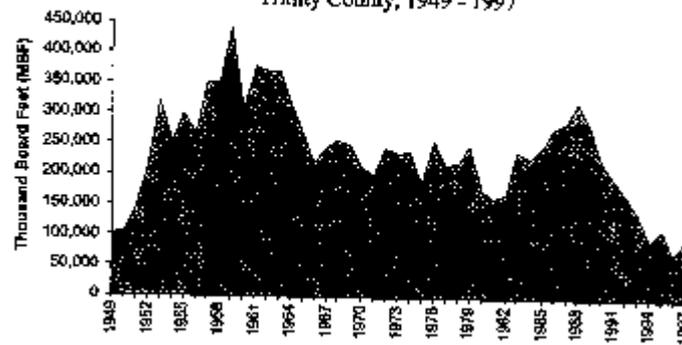
Several layers of authority affect the US Forest Service which is part of the Department of Agriculture. The budget is determined by Congress while the President and his appointee, the Chief of the Forest Service, are responsible for administrative direction. The Forest Service itself is a somewhat decentralised bureaucracy that must deal with the tension between maintaining the flexibility for locally appropriate, site-specific decisions, and maintaining compliance with national laws and allegiance to the agency. National forests are divided into a number of districts, each headed by a District Ranger, the person closest to the ground with decision-making authority. Community members are most likely to deal with District Rangers. However, their ability to respond to community concerns is constrained by higher levels.

Many observers feel that institutions developed for community forestry abroad are much more sophisticated than in the US. Indeed, the US Government's approach to forest communities has been simply to offer a steady amount of timber for sale, which was thought to promote community stability (Dana and Fairfax 1980:82,332).

NORTHWEST FOREST PLAN AND ADAPTIVE MANAGEMENT AREAS

Timber has been harvested heavily in the forests of Northern California, especially in the late 1980s (Figure 8). Heavy timber harvesting, especially clear-cutting and associated roads, fire suppression (extinguishing forest fires), and conversion of forestland to non-forest uses have altered the forest ecosystem in the Pacific Northwest. The resulting changes have put a number of species at risk of extinction. In 1991, a federal court decision halted all timber sales on public land in the territory of one such species, the Northern Spotted Owl, an animal chosen as an 'indicator species' of the health of old growth forests. The territory of the Northern Spotted Owl included the forests of western Washington, western Oregon and northwestern California. If the Spotted Owl was failing, the health of the forest ecosystem was fading. The court ordered the federal government to come up with a comprehensive management plan that would protect all species before the government could sell any more timber.

Figure 8
Timber Harvest,
 Trinity County, 1949 - 1997



Source: California State Board of Equalization

That decision hit timber-dependent communities hard. Many residents feared that a decline in timber sales would worsen local economic conditions. The timber industry supported local rallies and lobbied Congress. The environmental groups held demonstrations and worked through the legal system. The residents of small forest communities, as well as government agencies, were caught in between.

The Clinton Administration understood that the impasse in the Pacific Northwest forests was not just a legal or scientific problem, but a social problem as well. President Clinton's first step was to invite key scientists, environmental activists, industry representatives, tribal representatives, agency personnel, and community leaders to a Forest Conference in Portland, Oregon in April 1993. The Conference was an explicit attempt to set the tone for collaborative approaches and to begin to develop the social capital needed to work out a resolution.

Following the Forest Conference, a multi-agency, multi-disciplinary team of scientists, the Forest Ecosystem Management Assessment Team (FEMAT), laboured for over two months to assess the environmental and socioeconomic conditions and problems. The Team developed and compared 10 management options for federal forestlands in the Spotted Owl region. The FEMAT (1993) report was an extraordinary compilation of the latest scientific understandings of old growth forest ecosystems and it incorporated innovative approaches to assessing forest communities.

Because the FEMAT scientists knew that even their best knowledge was woefully inadequate to manage ecosystems for natural and social goals, they called for an adaptive management approach to ecosystem management. In adaptive management, forest managers plan to learn from management activities so that they can modify future actions to better achieve overall goals. Adaptive management requires identifying information gaps in the planning stage, monitoring the outcomes of management activities, evaluating new information and experiences, and inserting lessons learned into the decision-making process.

FEMAT (1993) formed the basis for the Record of Decision (ROD) which directed how the Forest Service and Bureau of Land Management would manage forests for late successional habitat in the range of the Northern Spotted Owl. The ROD met the criteria required for lifting the injunctions and instituted ecosystem management across the region. The ROD addressed not only measures needed to promote the survival of the Northern Spotted Owl, but also the overall integrity of late successional terrestrial and aquatic habitat, while achieving sustainable levels of timber production. Achieving these ecosystem goals required a dramatic decline in timber harvest compared to the historically high harvest levels of the late 1980s.

The forest management standards and guidelines outlined in the ROD formed the central piece of the Clinton Administration's two-part Northwest Forest Plan (NWFP). The second part of the Northwest Forest Plan was the Economic Adjustment Initiative to provide job retraining and economic development assistance to displaced timber workers and communities affected by the decline in timber harvests.

In both the forest management directives of the ROD and in the Economic Adjustment Initiative, the Northwest Forest Plan put special emphasis on forest communities and gave specific direction to federal agencies to work with communities. The Plan demonstrated a strong concern for the effect of reduced timber harvests on timber communities. However, communities were not involved in the development of either the new forest management plan (ROD) or of the Economic Adjustment Initiative, and it was unclear what role they could play in their implementation.

In part to assist struggling timber-dependent areas, the Northwest Forest Plan created 10 Adaptive Management Areas (AMAs), ranging in size from 370km² to over 1,620km² (92,000 to 400,000 acres), totalling approximately 6% of the Plan area. The AMAs were areas of existing federal land designated as "*.. landscape units designed to encourage the development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives*" (ROD 1994:D-1). The AMAs were to provide a geographical focus for the practice of adaptive management.

Both agency personnel and community members see AMAs as places where local communities should have greater input, and activities should have greater benefits for communities than other national forest areas. Thus, AMAs are important because they provide a potential land base for community forest management. Even in AMAs, however, there are no clear institutional arrangements for community input

The need for such an institutional arrangement that allows diverse local responses to general objectives was expressed clearly in the Northwest Forest Plan (ROD 1994:D-1):

"The overall objective for Adaptive Management Areas is to learn how to manage on an ecosystem basis in terms of both technical and social challenges, and in a manner consistent with applicable laws. It is hoped that localised, idiosyncratic approaches that may achieve the conservation objectives of these standards and guidelines can be pursued. These approaches rely on the experience and ingenuity of resource managers and communities rather than traditionally derived and tightly prescriptive approaches that are generally applied in management of forests."

The social objectives of AMAs focus on community participation and well-being. The ROD (1994:D4) explicitly calls for collaboration among community groups and government agencies for the benefit of forest communities:

"These areas [AMAs] should provide opportunities for land managing and regulatory agencies, other government entities, non-governmental organisations, local groups, landowners, communities, and citizens to work together to develop innovative management approaches. Broadly, Adaptive Management Areas are intended to be prototypes of how forest communities might be sustained."

It is in the last sentence above that many forest communities saw the potential of adaptive management areas as the land base for community forestry on public land.

In recognition of Trinity County's historical dependence on the timber industry, the Forest Service designated 1,620 km² (400,000 acres) of national forest as the Hayfork Adaptive Management Area - the largest AMA in the US. It was intended as a place to experiment with innovative forestry activities that would benefit Hayfork and 15 neighbouring communities. Unfortunately, there was little funding allocated to AMA activities and the Forest Service had no clear idea of how to implement AMA objectives.

ROLE OF COMMUNITIES IN ADAPTIVE MANAGEMENT - EXAMPLES FROM HAYFORK

The local communities had lots of ideas of what to try in their new AMA. Ecosystem management, instead of industrial timber production, means that different kinds of forestry work are undertaken. In any transition, some groups can be left behind. Local communities wanted to make sure that they benefited in this new shift to ecosystem management.

The Watershed Research and Training Center, a community-based, Non-governmental Organisation in Hayfork, emerged about the same time as the NWFP and helped provide the organisational capacity needed for the community to partner with the government on these activities. The Watershed Center was an important community partner in most of the adaptive management activities in the Hayfork AMA. They proposed many of the projects to the Forest Service and provided much of the manpower. The Forest Service's response to these proposals was typically, "*Well, we don't normally work that way. But this is an AAM and we are supposed to be innovative and learn from our actions here - so okay, let's give it a try!*"

Example 1: Ecosystem Management Technician Training Program: Helping Local Workers Make the Transition

As part of President Clinton's 1994 Northwest Forest Plan, federal agencies made a commitment to fund job retraining and other activities to help dislocated workers and forest communities. While traditional timber jobs

are in decline, United States Forest Service management plans suggest that new work opportunities will be available in the future for people with an understanding of ecosystems and a diversity of technical skills. The Ecosystem Management Technician Training Program (EMTTP) began in Trinity County in 1995 as a collaborative effort to retrain dislocated workers and long-term unemployed persons for jobs in the emerging field of Ecosystem Management. This innovative training programme integrated on-the-job training with class work in accredited college courses. Ecosystem management requires more information, assessment, and ecological friendly technologies, as well as a whole new orientation towards forest management. Therefore, ecosystem management work requires skills in diverse inventory techniques, data collection protocols, and the use of global positioning units and geographical information system.

Ecosystem management technicians must also have experience in techniques for wildlife habitat restoration, erosion control, and fire hazard reduction. To work sensitively and intelligently in the woods, workers also need a broad understanding of ecosystem processes and functions. The training programme sought to provide these kinds of skills and knowledge to local workers so that they could compete successfully for new jobs associated with the transition to ecosystem management.

An important goal of the EMTTP was to provide retraining opportunities that allowed Trinity residents to retrain and hopefully find work without having to leave the county. However, Trinity County has no accredited retraining facilities and poor job prospects. If funding designated to assist Trinity County's displaced timber workers was spent sending them out of the county, Trinity County would lose in several ways. If trainees had to leave the area for training, they would be unavailable, at least temporarily, for many of their family and community commitments. If Trinity workers were retrained outside the county, they would more than likely be placed in jobs outside of Trinity County due to the local nature of professional networks that assist in placing graduates of any training institution. Wages supporting both trainees and trainers would more than likely be spent in stores and on services outside of Trinity County. And, any capacity building accomplished with the funds would accrue to organisations outside of the county. Thus, without a local training programme, funds that are supposed to assist Trinity County in dealing with the economic hardships resulting from the declining timber harvest could end up:

- Promoting the out migration of formerly employed community members; and
- Assuring that the many benefits of a retraining programme would accrue to entities outside of Trinity County.

To avoid the loss of local workers, the Watershed Center set up a training programme and designed the programme so that graduates could find work locally in ecosystem management. If they had not, well-meaning government efforts to help communities adjust to the declining timber harvest would have actually hurt the local communities even more. The Forest Service was an important partner because it provided and partially paid for most of the work projects used for training. The training programme pioneered in the Hayfork AMA became a prototype for a number of other ecosystem management technician training programmes in California and Oregon.

Example 2: Chopsticks: What to do with Small Diameter Trees that Present a Fire Hazard

The Chopsticks Administrative Study conducted by the Watershed Center and the Hayfork Ranger District is a good case of adaptive management led by the community. Three to eight inch diameter plantation pine and suppressed Douglas fir are common by products of thinning in the Trinity area, but have little market value. In the past, the Forest Service had to pay someone to undertake these thinnings in order to increase stand vigour and reduce fuel loading. The resulting wood was usually piled and burned on site or, depending on the market, sold as chips. The Watershed Center was interested in developing a higher value for this wood, which would help make the thinnings more economical for both the Forest Service and local contractors, and could provide wood locally for value-added processing.

After discussing how they could experiment with such small diameter wood, the Watershed Center agreed to conduct an Administrative Study with the Forest Service in which they:

- Developed and demonstrated new extraction technologies.
- Experimented with mining, drying, secondary processing, and marketing of extracted material (primarily Douglas fir 3" to 10" diameter at breast height).
- Set up a log sort yard.
- Monitored ecological effects.
- Monitored production inputs, costs, and receipts; and
- Trained dislocated workers in ecosystem management.

The Forest Service benefited in that it received information on how to better measure the volume of small

diameter trees and write appropriate prescriptions and contract specifications. The information generated by the Chopsticks Administrative Study also allowed the Forest Service to better estimate the value of small diameter trees and potential markets. Such information can help the Forest Service turn costly service contracts to treat fuel hazards into income generating timber sales. This study was featured in other publications (Little 1998; Durning 1999) and has formed the basis for subsequent work on small diameter utilisation.

Chopsticks is an excellent case of adaptive management in practice. Chopsticks addressed both social and biological issues of forest management, involved agency and community, planned what data to collect beforehand, monitored the implementation and outcomes, produced a report, and disseminated information that has had an impact on subsequent management activities. It is also clearly a case that demonstrates the value of community-government co-operation in adaptive management. Neither the Watershed Center nor the local Forest Service could have done this work alone due to issues of organisational capacity and authority.

Example 3: Stewardship: Restoring the Forest and Forest Communities

While the new government mandate for ecosystem management is changing the type of forestry work that is undertaken, communities would also like to see changes in how that work is done. Specifically, they would like local people to have more opportunities to work as stewards of the land rather than as resource extractors for the benefit of corporations. There is widespread support for some form of local stewardship, not only because it would increase benefits to local communities, but also because it should result in better management and healthier forests.

Local stewardship can potentially improve ecosystem health by drawing on local knowledge of specific sites, increasing the effectiveness of limited dollars, and linking the workers more closely to the desired outcomes. An example of the inefficiency of the current system is the service contract work intended to restore forests after fires or logging. Service work is offered in discreet short-term packages, usually lasting a few weeks with separate contracts for different jobs on the same site even in the same year. For example, on one site, one crew will pile brush after a logging job and another crew will burn it. Next year, a different contractor will plant trees and later, a fourth will add plastic seedling protectors. In later years, a fifth contractor will measure seedling survival, a sixth crew will replant, and a seventh will set-up seedling protectors. Each job must be done within a short window of time and inspected by the Forest Service. None of the work crews is ultimately responsible for the successful regeneration of the site. A stewardship contract could make one local contractor responsible for all of these stages, as well as the logging and roadwork. It would allow the contractor to spread the work out over the year and implement it in a fashion that made sense economically and ecologically. Moreover, the Forest Service could have more work completed for less money if they had fewer contracts to prepare, bid, and administer.

The Grassy Flats Stewardship Project grew out of discussions of the Stewardship Group, a loose collection of community members who began meeting in February 1997. The Watershed Center provided staff support. Forest Service AMA coordinators participated in the Stewardship Group and developed a local pilot stewardship project with group input. The Stewardship Group chose a project site in which the community had already contributed to the definition of management goals through a Separate community participation process. The AMA coordinators submitted the project for special funding and awards that brought in money both to the US Forest Service for project implementation and to the Stewardship Group and Watershed Center for supporting activities. The Grassy Flats Stewardship Project was featured as a successful agency-community partnership at the National Forest Partnership Fair in 1998. The Grassy Flats project was selected as one of 23 national pilot projects in stewardship contracting and was ranked number one in the region due to its history of collaboration.

The Grassy Flats Stewardship Project provided both a contract for real work put out for open bidding and an experiment in contracting itself. A Monitoring and Evaluation Team has been set up to collect data on project implementation and outcomes. The Team consists of three Forest Service employees and eight members of the community, including environmentalists, a sawmill manager, a businessman, and a County Supervisor. The Team will evaluate the project and make recommendations for future stewardship contracts. Thus, the Grassy Flats project is another good example of planning to learn while doing, i.e., adaptive management.

Example 4: All-party Monitoring

Monitoring is essential for adaptive management and in the Trinity County area, communities have played a key role. To adapt managers need to observe processes and collect information to determine what to do differently next time. The Forest Service has a mandate to monitor but no time and little money to do it. They have turned to the community and asked for 'third party monitoring', which tends to be watchdog monitoring by outsiders. Outside monitoring provides no assurance that efforts will have an effect on future management

activities because it is not tied to the decision-making process. Communities, in turn, have proposed and attempted all-party monitoring, which includes government agencies as well as diverse community members, including agencies, technical specialists, and interest group activists. They look at monitoring as an opportunity for learning to see how to do it better next time, not to judge current efforts as good or bad. If government agencies are included in collecting and interpreting data, monitoring results are more likely to affect government practices.

The monitoring of the Grassy Flats Stewardship Project described above is being conducted as an exercise in all-party monitoring. It is linked to other community-based monitoring efforts in the forests of California and Oregon. Comparing the processes and results of multiple monitoring efforts will help improve future monitoring and develop the political and financial support for future all-party monitoring efforts. Because it plans to learn by doing, this all-party monitoring programme can be considered an adaptive management approach to monitoring. More importantly, it provides a model for implementing the monitoring needed to make adaptive management of forest resources successful, despite limited government funds.

The specific roles of communities in all-party monitoring correspond to the earlier description of the roles of communities in unity forestry. Community in co-operation with the agency, share the following roles in monitoring:

- Defining criteria (based on a community's concern for diverse benefits).
- Data collection (through a community's role in the implementation of activities).
- Data interpretation (based on local knowledge of community members); and
- Incorporation of learning into modifying future plans (through a communities role in decision-making).

By participating in all of these steps, communities contribute to successful adaptive management. By showing the value of community involvement in achieving forest management goals, this kind of community leadership in monitoring can lay the basis for community forestry in the US.

ADAPTING TO ADAPTIVE MANAGEMENT

A new role for communities is emerging in the US. The role of partner with government agencies in adaptive management of forestland. Adaptive management is still in an incipient phase, but it shows great promise for improving the health of forest ecosystems and forest communities. Together, communities and agencies have the best chance of learning to manage complex forest ecosystems to meet a wide range of local and national concerns. The capacities that local communities bring to adaptive management suggest the broad benefits to greater community involvement in forest management — involvement that may be similar to community forestry programmes abroad.

Communities have similar roles in both community forestry and adaptive management, not just as beneficiaries or in decision-making, but also in implementing and learning from implementation. These roles are shared with government agencies that have technical capacities and protect national interests. Communities can bring organisational capacity, longevity, and local knowledge to complement the expertise of government agencies. Community members offer unique perspectives as both forest workers and as the people who must live with the consequences of forest management. Still missing, however, are enduring institutional arrangements that achieve productive complementarity (coproduction) between communities and agencies in the adaptive management of forest ecosystems. Adaptive management still depends on the willingness of individuals to try something new. As with community forestry efforts throughout the world, the challenge of how to institutionalise adaptive management in a pluralistic society without creating additional marginalisation and conflict remains.

In all of the cases described above, community groups were responsible for initiating and implementing activities. Their efforts, however, were sparked and aided by policy directives at the highest levels that suggested that federal agencies work with local communities in Adaptive Management Areas. Adaptive management represents a new opportunity to include communities in a meaningful way in forest management in the United States. The experiences in the Hayfork Adaptive Management Area suggest that:

- Policy changes must create opportunity; and
- Managers and communities must utilise that opportunity

Similar to models of community forestry abroad, adaptive management practices may start with a number of successful grassroots examples, before they receive nationwide support.

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Notes

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²'Public' land, 'federal' land, and 'national forests' all connote land controlled by the national government. The Forest Service is a federal agency that manages national forests. The Bureau of Land Management (BLM) is another federal land management agency that controls some land in Trinity County. Both the Forest Service and BLM manage to produce commodities, as well as recreation and other outputs. Both are different in mission from the National Park Service, which manages land primarily for recreation and protection.

³Normally the community - not the county - is the appropriate unit to analyze forest dependence, even though more data are available at the county levels. However, the absence of significant agricultural, industrial (other than timber), and urban sectors in Trinity County makes it more like a forest dependent community than an economically diverse California county.

⁴According to the Census Bureau, people living in poverty are those whose incomes are not adequate to provide the least costly nutritionally adequate diet plus basic living expenses. The poverty level varies for families of different sizes, e.g. the threshold annual income for a single individual is USD 6,310 and for a family of four is USD 12,674 (US Census 1992).