COPE Report

Coastal Oregon Productivity Enhancement Program

Promoting Integrated Management of Oregon's Coast Range Forests Through Research and Education

Volume 3, Number 4 Fall 1990

The COPE Program

The Coastal Oregon Productivity Enhancement (COPE) Program is a cooperative effort between Oregon State University's (OSU) College of Forestry, the USDA Forest Service Pacific Northwest Research Station (PNW), the USDI Bureau of Land Management (BLM), other federal and state agencies, forest industry, county governments, and the Oregon Small Woodland Association. The intent of the program is to provide resource managers and the public with information relative to the issues and opportunities associated with the management of fish, timber, water, wildlife, and other resources of the Oregon Coast Range. The COPE Program emphasizes an integrated approach—an integration of research and education and an integration of scientific disciplines—to find effective ways to manage these diverse resources collectively.

The COPE Program has two related components: Fundamental COPE and Adaptive COPE. Comprised of OSU and PNW scientists based primarily in Corvallis, Fundamental COPE addresses problems related to riparian zone management and reforestation in the Coast Range through basic research. Adaptive COPE is comprised of an interdisciplinary team responsible for applying and adapting new and existing research information to solve specific management problems. Stationed on the coast in Newport at the Hatfield Marine Science Center, the Adaptive COPE team is also responsible for providing continuing education opportunities to facilitate technology transfer.

Published quarterly, the COPE Report provides a means to rapidly disseminate research findings, announce upcoming educational opportunities, and highlight recent publications and topics of interest. Its goal is to foster good resource management by helping people involved in the management of Oregon Coast Range resources to stay well-informed. Comments and suggestions concerning the content of the COPE Report are welcomed and encouraged. To receive this free newsletter, contact COPE, Hatfield Marine Science Center, Oregon State University, Newport, OR 97365. Phone: (503) 867-0220.

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Another principle is integration of actions up and down geographic scales. It is not possible to meet all goals on all acres at all times. Therefore, the multiple values and multiple uses of a large area are planned and scheduled to better complement one another. Technologies such as geographic information systems and cumulative effects analysis models are essential in this landscape process. Finally, managers must design and carry out their actions in ways that provide better opportunities to learn from the results. This means bringing scientists into more active roles in building the knowledge base for ecosystem management and designing management strategies and actions, then following through with implementation, monitoring and evaluation. This approach is called adaptive resource management by its practitioners. To this end, a national research program in ecosystem science is unfolding in fiscal years 1991 and 1992.

The Chief of the Forest Service created the New Perspectives program in February of 1990 to guide the agency's transition to more environmentally sensitive resource management. Although stimulated by Jerry Franklin's "New Forestry," the Chief wants New Perspectives to encompass all wildland ecosystems and include social values as well as ecological considerations. He appointed Hal Salwasser, an ecologist for the agency since 1978, as Director. Hal has a core team of three assistant directors for conservation, research, and communication, respectively. The role of the core team is to help field units develop research and management projects that demonstrate Forest Plan and RPA direction through the principles of New Perspectives mentioned above.

In the Pacific Northwest, Region 6 and the PNW Research Station have organized a New Perspectives effort under a 10-year Research, Development, and Applications Program (RD&A) called "New Perspectives in Forestry." The Program is currently identifying its research, development, and application focus and determining how it will be integrated with management demonstrations on the national forests.

Dean DeBell and Marty Raphael, at the Forestry Sciences Laboratory (FSL) in Olympia, are working with scientists and managers on stand-level problem analysis. Fred Swanson's project personnel at the Corvallis FSL are working on a landscape-level problem analysis. They are seeking input from a wide range of interested people. The RD&A program has engaged the "Social Consortium for Natural Resource Values" to provide the problem analysis for the social implications of implementing new perspectives. The consortium includes scientists from the University of Washington, Oregon State University, PNW Research Station, and a growing number of other social scientists interested in natural resources management. Richard Haynes's project personnel in the Portland FSL, are working on economic modeling for the program.

We expect to have the problem analyses in draft form by October for discussion with scientists and managers. As the RD&A Program prepares the research agenda, we will be documenting and tracking the field testing and demonstration of New Perspectives.

We realize there is a lot of concern and uncertainty over just what New Perspectives is. One thing it is not is "smoke-and-mirrors" to obscure business as usual. The direction of Forest Service programs is changing and the evidence of that change is already in place in the 1990 RPA Program and other existing plans and projects. Based on what we learn and how society's goals for the national forests change over the next few years, there will likely be more change to come.

As the New Perspectives Program evolves over the next year, the Forest Service, with the help of its many partners, will shape the path to scientifically sound and environmentally sensitive management for all the values and use of our rich forest lands.

John Henshaw,
PNW

AN APPROACH FOR EVALUATING STAND SIGNIFICANCE AND DESIGNING FOREST LANDSCAPES

Forest management decisions affecting old-growth and mature forests have become increasingly controversial. The qualities found in these stands include diverse wildlife and plant habitat, productive soil and hydrologic systems, a potential for conversion into high value wood products, and unique aesthetic and cultural values.

The pattern of old-growth and mature forests remaining on the landscape is highly variable. In some places only isolated small patches (5-50 acres) remain; in other places larger blocks (>500 acres) remain. In Northwest National Forests managed for timber production, however, most of the remaining old-growth and mature forests are fragmented into various patch sizes and convoluted shapes.

This condition typifies the Upper Fall Creek planning area on the Lowell Ranger District, Willamette National Forest. Upper Fall Creek was selected as a prototype area to develop Forest Plan implementation processes for the Willamette National Forest. Project efforts began in early 1989. One of the major analyses undertaken was to evaluate old-growth and mature forest stand conditions and patterns over the entire 22,000 acre landscape. Most of the unharvested stands in the area are old growth. Past timber sale planning efforts on the Lowell Ranger District identified fragmentation of old-growth as a major issue. Alternatives that minimized further fragmentation were developed, and corridors to connect old-growth stands were located. However, the scale of these analyses was generally limited to 2,000-5,000 acres. At this more limited scale, the relative significance of old-growth and mature stands is difficult to discern, both in terms of stand values and the larger landscape values. Yet, in the attempt to locate timber sale units where they will have the least effect on old-growth and mature forest values, it is precisely these values that influence decision making.

Evaluating Old-Growth and Mature Stands

Our objective was to develop a landscape-level context for assessing the relative values of old-growth and mature forest. The existing stand condition inventory proved to be too general for project-level interpretations. Accordingly, the first task was to supplement our inventory and database with extensive "walk thru" surveys and quick plots focused on basic stand and site characteristics.

Next, we delineated blocks of old-growth and mature forest based upon topographic factors, stand conditions, and the degree of stand fragmentation. Major ridges and streams separated different vegetative and hydrologic systems. Major differences in stand conditions, e.g., an edge between fully developed old growth and a 120-year-old stand, were also used to form blocks. To evaluate fragmentation, the edge effects of surrounding openings upon mature and old-growth stands were approximated with a 400 foot buffer (approximately two tree heights). This was done because edge effects of increased light, heat, and wind penetration from surrounding openings are thought to alter plant and animal habitat along the forest edge. The resulting map of interior forest conditions helped separate relatively intact blocks from more fragmented blocks. All of these factors were integrated to form a map of old-growth and mature forest blocks ranging from forty to several hundred acres in size.

The value of these forest blocks was assessed using a numerical rating system based largely upon ecological criteria. We identified approximately fifteen potentially relevant criteria; five of these proved to be most relevant and operationally feasible at this scale. They were:

1. The presence of old-growth characteristics (large Douglas-firs, a multi-layered canopy containing some shade tolerant species, large snags, and large fallen trees).
2. The amount of interior forest habitat.
3. Landscape position (an isolated patch or an entire small watershed).
4. The presence of unique features (very large or old trees, unique mixes of plant associations, or unique structural features).
5. Extent of human intrusion (presence or absence of old roads, stumps, views of fragmented landscapes, etc.).

This last criterion was an attempt to incorporate a cultural or aesthetic perspective into the evaluation of old-growth values. Each block was rated for all five criteria and classified as high, medium, or low in volume based upon the total score.

The next step was to place these forest blocks into the larger landscape context. The blocks with the highest rating were placed on a map along with the pattern of special management areas designated in the Forest Plan (e.g., Special Interest Areas or Spotted Owl Habitat Areas). These forest tracts represent the hubs and nodes of a potential landscape network of old growth and mature forest. With these areas as the focal points, connecting corridors were identified (Figure 1). Providing pathways between the network nodes may help facilitate dispersal of some plants and animals over time. Medium ratêd blocks and connecting corridors were then placed onto the map and coded accordingly.

Results from this process established the relative significance of old-growth and mature forest blocks for either: (a) retention of old-growth and mature stand values for some period of time, or (b) timber harvest that would minimize the effects on old-growth or mature forest values. Conducting the analysis over an area large relative to timber sale areas allowed consideration analysis of larger landscape patterns.

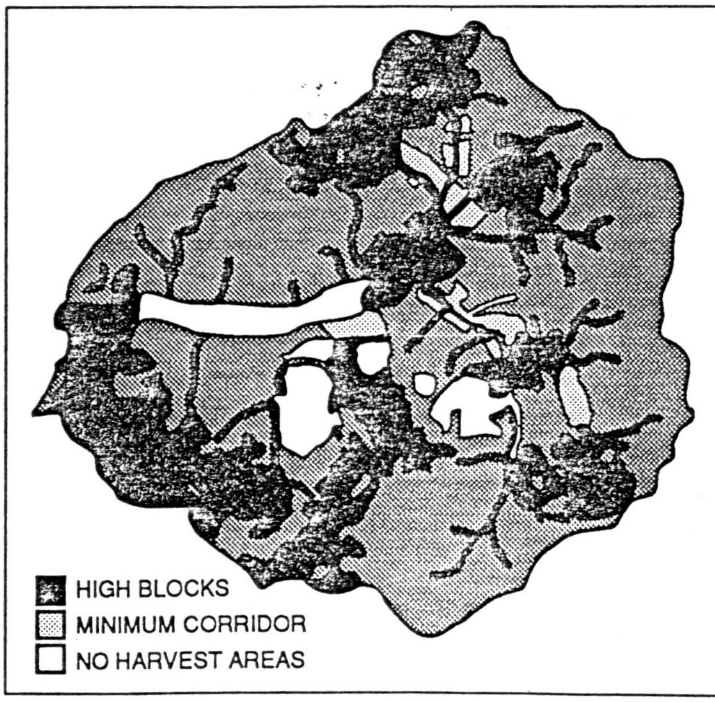

Figure 1. Map of planning area showing mature and old-growth stands rated as high in value, special management areas designated by the Forest Plan, and connecting corridors.

Evaluating Timber Harvest Patterns Over Time

The analysis described above established a set of priorities within a landscape scheduled for timber harvest. But does it really mean anything if the stands are scheduled for harvest at some point anyway? Are there alternative patterns of harvest in the short and intermediate terms (the next 10 or 20 years) that will significantly affect resource values in the landscape? If so, how will those patterns differ in their effects, and over what periods of time?

To address these questions, we embarked on a timber harvest scheduling analysis. Using concepts developed and tested on the Blue River Ranger District, Willamette National Forest (see COPE Report 3(1):8-11), we defined two scenarios: staggered-harvest settings and minimum-fragmentation settings. Additionally, we evaluated a third scenario as an extension of the minimum fragmentation approach. In the first two scenarios the blocks and connectors were identified within each 2,000 to 5,000 acre drainage independently. In the third scenario, the landscape pattern of old growth was used as a template for applying the minimum fragmentation approach across the entire 22,000 acre landscape. Tradeoffs between individual drainages were made to maintain the overall landscape pattern for as long as feasible. Additional objectives guiding the analysis included:

1. Maintaining large patches and connectors among stands in an unharvested condition for as long as possible in the minimum-fragmentation designs.

2. Dispersing harvest units through the watersheds according to traditional District practices in the staggered-setting design.

3. Simulating harvest patterns for staggered-setting and minimum-fragmentation designs through the remainder of the first rotation (approximately another 40 years).

4. Designing harvest patterns that can be implemented within current Regional guidelines regarding harvest unit size and total size of created openings.

5. Applying the same decadal harvest levels to all three landscape designs.

Results from these scenarios illustrate significant differences in the patterns and sizes of remaining unharvested stands and young plantations. The greatest differences appeared in comparing the staggered-setting and minimum-fragmentation scenarios; differences were also apparent in comparing the two minimum-fragmentation approaches. Figure 2 depicts the landscape patterns at the end of 30 more years of harvest under staggered-setting and minimum-fragmentation (landscape-based) approaches. Table 1 shows how long the high and medium rated blocks remained intact, were partially fragmented, or were mostly harvested for these three scenarios. All eight high rated blocks remained intact after the second decade in the landscape network approach, six remained intact in the 2,000 to 5,000 acre drainage based minimum fragmentation approach, whereas all eight were fragmented in the first two decades with the staggered setting approach. Choice of harvest pattern obviously has implications for old-growth and mature forest values through the next 20 to 30 years in this situation.

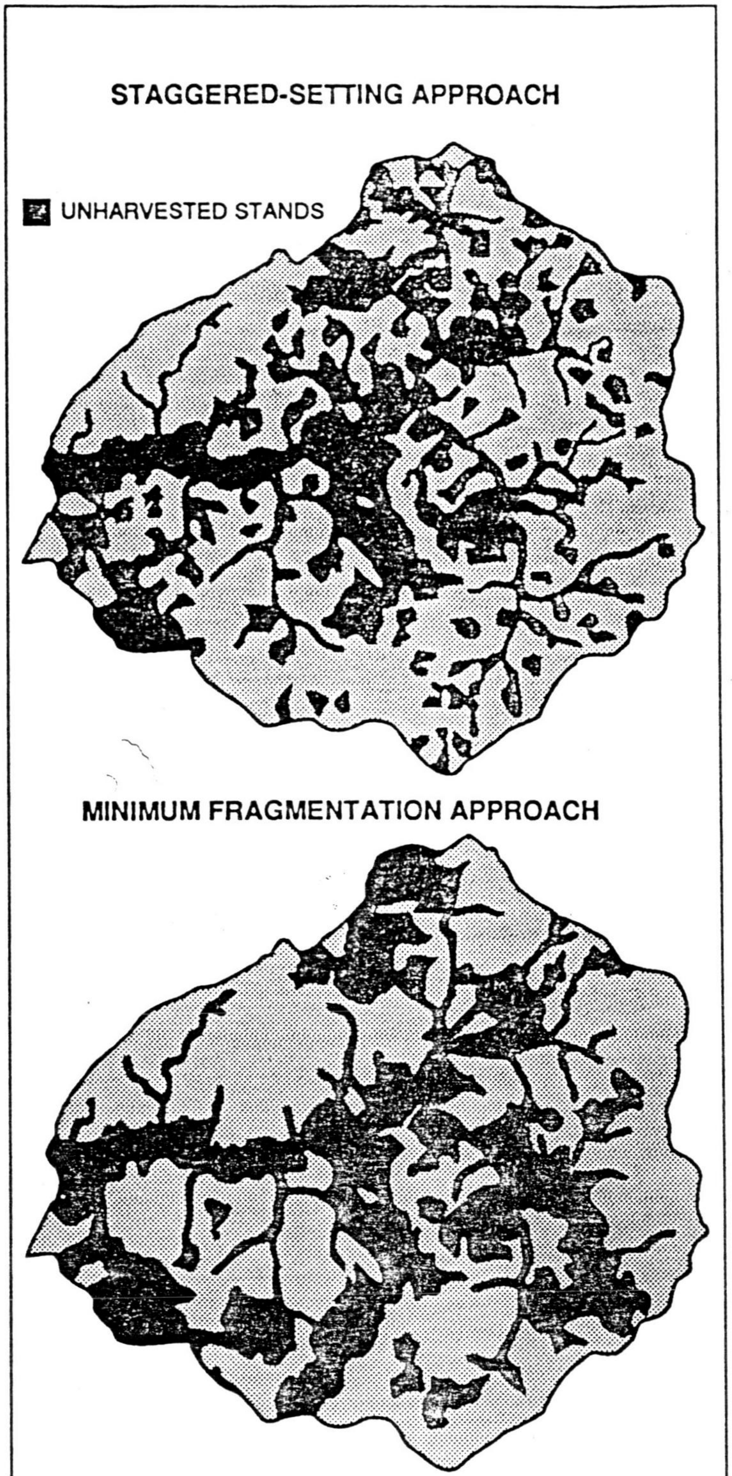

Figure 2. Landscape patterns in the study area under two different cutting patterns projected for 30 years beyond current patterns.

Table 1. Influence of three timber harvest scenarios[1] on old-growth and mature forest blocks (8 per rating) in the study area projected for the next four decades.

Forest blocks	Decade 1 SS	Decade 1 DMF	Decade 1 LMF	Decade 2 SS	Decade 2 DMF	Decade 2 LMF	Decade 3 SS	Decade 3 DMF	Decade 3 LMF	Decade 4 SS	Decade 4 DMF	Decade 4 LMF
	Number of stands at end of decade											
	High rating											
# intact	1	7	8	0	6	8	0	2	5	0	0	1
# partially fragmented	6	1	0	3	1	0	0	4	3	0	3	5
# mostly harvested	1	0	0	5	1	0	8	2	0	8	5	2
	Medium rating											
# intact	1	5	5	0	0	1	0	0	0	0	0	0
# partially fragmented	7	3	3	0	5	4	0	1	1	0	0	1
# mostly harvested	0	0	0	8	3	3	8	7	7	8	8	7

[1] SS = Staggered Settings; DMF= Drainage based Minimum Fragmentation; LMF= Landscape based Minimum Fragmentation.

Conclusions

This approach proved valuable for identifying relative old-growth and mature forest values and for displaying those values in a larger scale context for multi-resource decision making. We described an example of how this general process was applied to our planning area, but the general process may be applicable in other settings.

In situations where old-growth or mature forest values are high and options still exist within the current landscape pattern, an approach minimizing further fragmentation may be applicable. In many drainages where the harvest history is about midway through the first rotation, timber sale decisions made over the next decade may significantly restrict options for maintenance of interior habitat throughout the remainder of the current rotation. Moreover, implications of harvest pattern used in the first rotation extend beyond the existing old-growth or mature forest resource. We found that landscape patterns in the second rotation clearly reflected the imprint of cutting patterns in the first rotation.

Landscape management is still in an embryonic stage in the Northwest and the analysis identified several major questions needing critical thought and research:

1. What is an appropriate range of stand sizes for maintaining ecological values in natural forests?

2. What criteria should guide patch distribution over a landscape?

3. Do connective corridors really matter? For which species? What sizes and locations are most efficient and effective?

4. How can we maintain a mix of successional stages, including old growth stages, over time?

Clearly, many of the current stand-level questions, such as rotation age and structural diversity within managed stands, need to be evaluated within a landscape context. As usual, further work is needed!

John Cissel,
Blue River Ranger District
Willamette National Forest

OPPORTUNITIES

HOW TO DRY LUMBER FOR QUALITY AND PROFIT

December 3-7, 1990 **Corvallis, OR**

This course is designed for persons engaged in all aspects of dried-lumber production and is sponsored by the OSU Department of Forest Products. This includes kiln operators and supervisors, planer operators, superintendents and mill managers, and lumber salespersons.

The Lumber Drying course is taught by the Department's faculty and representatives from dry kiln and related-equipment manufacturers. The program includes classroom lectures, laboratory exercises, and hands-on demonstrations of modern control equipment.

Participants learn basic principles about how energy and water move through wood and how wood chemistry and anatomy affect drying. Information will be given on ways to dry lumber and maximize grade recovery, optimize costs and minimize kiln residence time. Modern kiln construction techniques, controllers and control strategies will be covered as well as moisture measurement methods and kiln schedule development. For more information contact the Conference Assistant, College of Forestry, OSU, 202 Peavy Hall, Corvallis, OR 97331-5707 or phone (503) 737-2329.

FOREST FERTILIZATION: SUSTAINING AND IMPROVING NUTRITION AND GROWTH OF WESTERN FORESTS

February 12-14, 1991 **Seattle, WA**

The Forest Fertilization Conference will summarize and synthesize research results and operational experience over the past decade relevant to forests in the western United

Cissel, J. 1990. An approach for evaluating stand significance and designing forest landscapes. COPE Report. Oregon State University. 3:8-11. 2224

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John Cissel,
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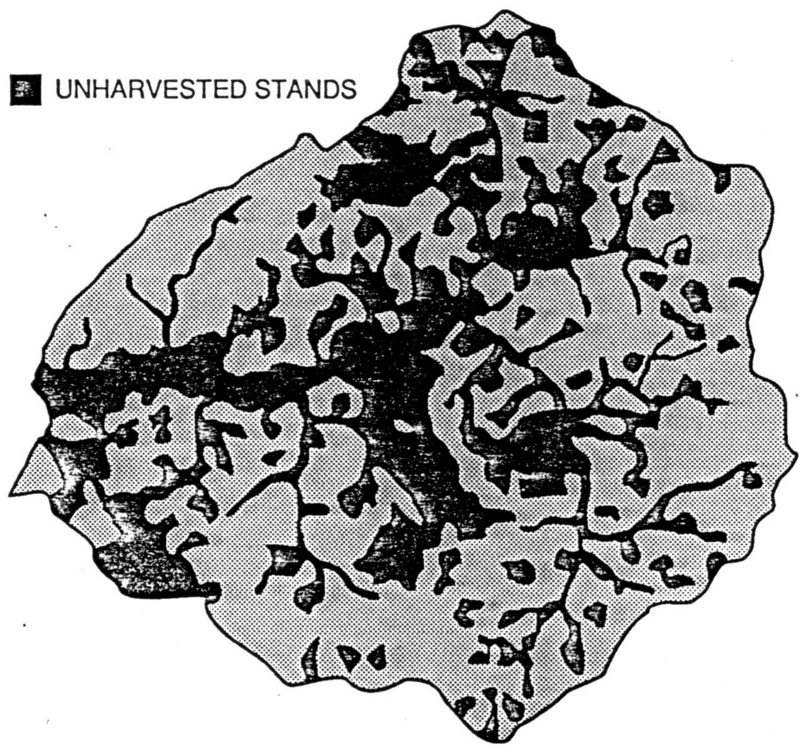
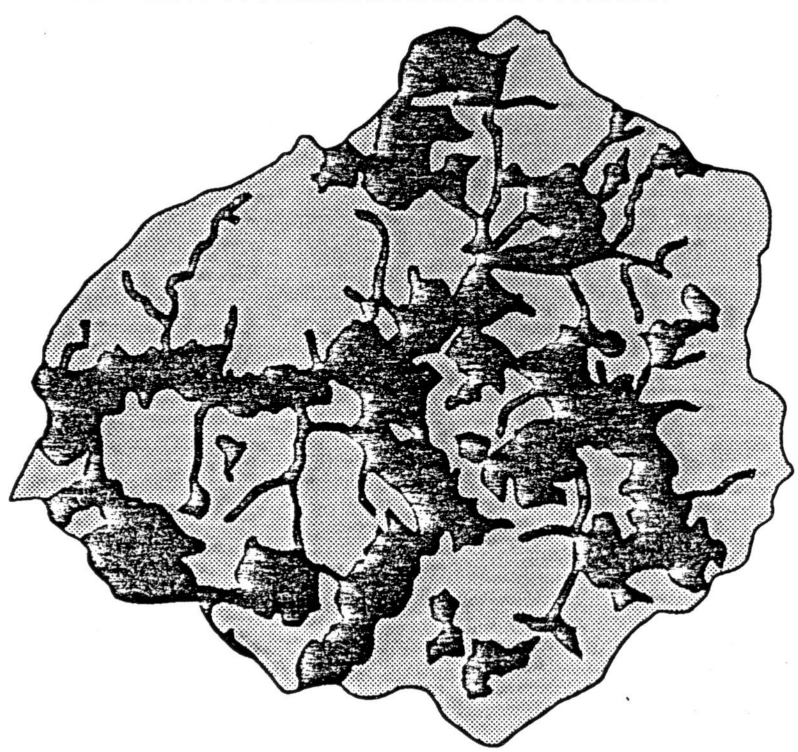
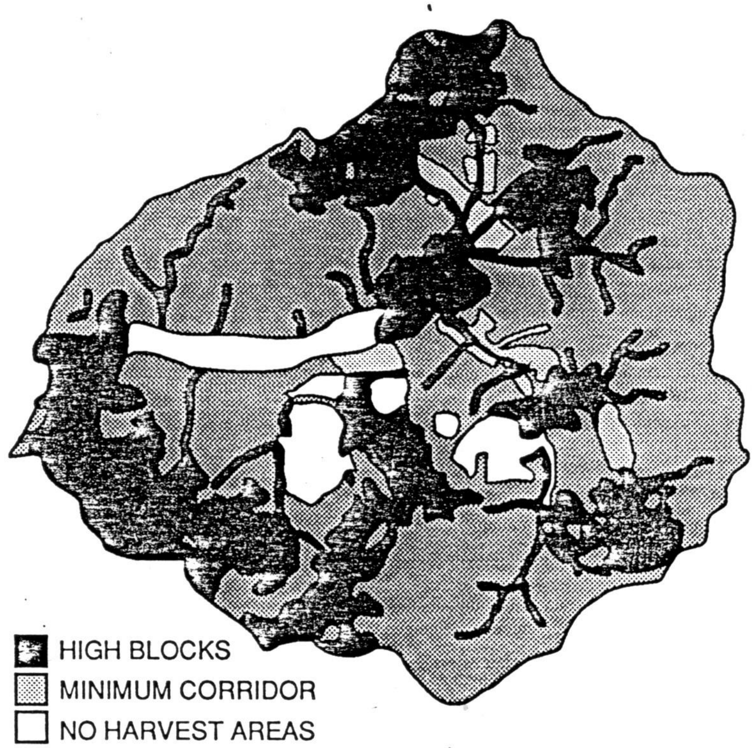
STAGGERED-SETTING APPROACH



MINIMUM FRAGMENTATION APPROACH




HIGH BLOCKS
MINIMUM CORRIDOR
NO HARVEST AREAS