

1991 PROJECT ABSTRACT

FOR THE PERIOD ENDING JUNE 30, 1993

This project was supported by the Environment and Natural Resources Trust Fund (MS 116P).

TITLE: Generic Environmental Impact Statement on Timber Harvesting
PROGRAM MANAGER: Dr. Michael A. Kilgore
ORGANIZATION: Minnesota Environmental Quality Board
LEGAL CITATION: M.L. 91, Ch. 254, Art. 1, Sec. 14, Subd. 7(h)
APPROP AMOUNT: \$400,000

STATEMENT OF OBJECTIVES

The Generic Environmental Impact Statement (GEIS) on Timber Harvesting was developed to accomplish three major objectives:

- 1) Develop a basic understanding of the status of timber harvesting and related timber management activities in Minnesota, and how this level of statewide activity relates to long-term sustainable levels of timber removals.
- 2) Identify and assess the environmental and related (i.e., economic and social) impacts associated with current and potential future elevated levels of statewide timber harvesting and management activity.
- 3) Develop strategies to mitigate such impacts where existing or potential significant adverse impacts are identified.

OVERALL PROJECT RESULTS

The GEIS study process has been insightful from two different perspectives. From the standpoint of addressing the study's specific objectives, the GEIS identifies and quantifies long-term sustainable timber removal levels, and the environmental and related impacts that will likely occur over the next 50 years under three different levels of timber harvesting. In response to the significant impacts identified, the GEIS suggests a number of specific mitigation strategies be implemented. At a broader level, the GEIS recommends Minnesota establish a comprehensive forest practice program to address site-level resource impacts, a sustainable forest resources program to deal with landscape-level concerns, and a supporting forest-based research program to identify research priorities and coordinate their undertaking. As a means of administering these programs, the GEIS recommends creating a state board of forest resources.

The GEIS study process itself also has provided new insights regarding how large-scale resource assessments might be conducted. The techniques and methods used to simulate how forest resource conditions change both spatially and temporally in response to a given level of harvest activity may have applicability to similar generic resource assessments. Additionally, the methodology developed through the GEIS to assess resource-specific impacts on a large-scale basis (e.g., wildlife habitat) may also prove useful in conducting future resource studies.

PROJECT RESULTS USE AND DISSEMINATION

It is expected that the study's findings and recommendations will have a significant impact on the future policies and programs that influence how Minnesota's forest resources are used, managed and protected. Information developed through the GEIS study process has been widely presented to and used by a variety of client groups. The draft GEIS has been distributed to policymakers, resource managers, interest groups and citizens not only in Minnesota, but throughout the United States and Canada. Additionally, many resource managers and groups are finding the technical and background papers prepared through the GEIS study process as being extremely useful technical reference documents.

July 1, 1993

LCMR FINAL STATUS REPORT - SUMMARY

I. TITLE: GENERIC ENVIRONMENTAL IMPACT STATEMENT ON TIMBER HARVESTING - Forestry

Program Manager: Michael A. Kilgore
GEIS Project Manager
Office of Strategic and Long-Range Planning
300 Centennial Office Bldg.
658 Cedar Street
St. Paul, Minnesota 55155
(612) 297-2607

A. Laws of Minnesota, 1991, Appropriation: \$400,000
Chapter 254, Article 1, Balance: \$ 0
Sec. 14, Subd. 7(h)

Generic Environmental Impact Statement: This appropriation is from the environmental and natural resources trust fund to the Environmental Quality Board for preparation of a generic environmental impact statement.

APID For LCMR Funds FY 1992-93: 12001 09 03

Project Budget:

Consultant Services	\$ 843,000
Facilitation/Mediation Services	\$ 47,000
Advisory Committee/Project Administration	\$ 32,000
Total Project Budget:	\$ 922,000

B. During the biennium ending June 30, 1993, the data collected by the projects funded under this section that have a common value for natural resource planning and management must conform to information architecture as defined in guidelines and standards adopted by the Information Policy Office. Data review committees may be established to develop or comment on plans for data integration and distribution and shall submit semiannual status reports to the Legislative Commission on Minnesota Resources on their findings. In addition, the data must be provided to and integrated with the Minnesota Land Management Information Center's geographic data bases with the integration costs born by the activity receiving funding under this section.

II. NARRATIVE

Minnesota has experienced significant increases in timber harvesting activity within the past decade. Additional capital investments in forest products manufacturing facilities that are either planned or under study suggest the demand for wood fiber from the state's forests could increase significantly in both the near and long term. Such an increase in timber harvesting, coupled with growing demands for other forest uses and outputs (e.g., recreation, fish and wildlife, water quality), will undoubtedly elevate the competition for use of Minnesota's forests. To date, no comprehensive examination of the environmental consequences of expanded timber harvesting has been undertaken in this state.

The Environmental Quality Board (EQB) ordered a Generic Environmental Impact Statement (GEIS) on Timber Harvesting in Minnesota to examine the environmental and, to some extent, economic and social ramifications of increased timber harvesting activity. Because a GEIS is specifically identified in Minnesota's administrative rules (part 4410.3800) as an alternative form of environmental review, its preparation will follow all applicable rules and statutes guiding preparation of environmental assessment documents. Through a formal proposal request and review process, a major forestry consulting firm (Jaakko Poyry Consulting, Inc.) has been hired by the EQB to prepare the GEIS. The EQB has established a citizen's advisory committee to provide it consensus advice on overall study direction, and has retained the services of a professional facilitator to help this advisory committee reach consensus. The Timber Harvesting GEIS is viewed by the EQB as an important planning tool to identify strategies for enhancing and sustaining the economic importance of the forest without compromising its environmental integrity.

III. OBJECTIVES

The EQB's Final Scoping Decision explicitly identifies three overarching objectives for the Timber Harvesting GEIS. These three objectives are to:

- 1) Develop a basic understanding of the status of timber harvesting and related timber management activities in Minnesota, and how this level of statewide activity relates to long-term sustainable levels of timber removals.
- 2) Identify and assess the environmental and related (i.e., economic and social) impacts associated with current and potential future elevated levels of statewide timber harvesting and management activity.
- 3) Develop strategies to mitigate such impacts where existing or potential significant adverse impacts are identified.

To accomplish these objectives, the GEIS study process has identified a series of deliverable products required of the contractor. The following describes the various work products required of the contractor to accomplish the study's major objectives.

A. Work Product - Feasibility Assessment.

A1. Narrative - The first work product required of the contractor is a Feasibility Assessment. Because final funding decisions for the GEIS were not known at the time the proposal request was solicited by the EQB, the request identified an initial study cost of \$250,000. It was recognized by the EQB, however, that this level of funding would not be adequate to allow all issues identified in the Final Scoping Decision (FSD) to be addressed in a complete and thorough manner. Given the uncertainty regarding the work effort and associated costs necessary to prepare a comprehensive GEIS, the EQB required the contractor to prepare a Feasibility Assessment.

The Feasibility Assessment provides the EQB information on what level of study effort and expenditures would be necessary to fully address all issues. In the event additional funding became available, the EQB could use the completed Feasibility Assessment as a guide for determining what additional work effort would be accomplished up through a fully-scoped study.

A2. Procedure - Using the EQB's Final Scoping Decision as the basis for preparing the GEIS and constrained only by the EQB's requirement of having a final GEIS document completed by July, 1992, the contractor prepared a document (Feasibility Assessment) that identified the work effort, methodology, and funding required to fully address all issues.

A3. Budget:
a. Amount Budgeted \$ 25,000
b. Balance \$ 0

A4. Timeline:

	July 91	Jan 92
Examine FSD	I-I	
Assess Existing Data	I-I	
Prepare Feas. Assmt.	I--I	

A5. Status - The Feasibility Assessment, submitted to the EQB in May 1991, identified in general structure, methodology, outputs and cost to prepare a fully scoped Timber Harvesting GEIS. Information contained in this document includes detail on the extent of data, research and analysis, staffing and budget necessary to fully address all aspects of each issue identified in the Final Scoping Decision for the GEIS. The Feasibility Assessment was the first GEIS work product that suggested overall study approach and methodology.

A6. Benefits - The Feasibility Assessment identified the structure for preparing a GEIS at a study effort exceeding \$250,000 up to the amount indicated as being to fully address all issues identified in the Final Scoping Decision. Because funding was provided to prepare a fully-scoped GEIS, the Feasibility Assessment became, in effect, the blueprint for preparing the Work Plan.

B. Work Product - Work Plan.

B1. Narrative - Once final funding decisions for the GEIS were known, the contractor was instructed to prepare a detailed Work Plan at a level of funding commensurate with a fully-scoped GEIS as outlined in its completed Feasibility Assessment. This Work Plan is a complete and thorough plan that specifically describes the extent and nature of specific tasks to be completed, methodology employed to complete all tasks, organization of the contractor's employees to complete all tasks, and the timing of these tasks as well as the associated costs required to complete each. The Work Plan identifies the contractor's scientists working on this project being segregated into six study teams facilitate the analysis of all issues identified in the Final Scoping Decision. In addition, the contractor has established a core study team to provide overall direction and management related to preparation of the Timber Harvesting GEIS.

B2. Procedure - Because funding was provided at the level necessary to conduct a fully-scoped GEIS, the Feasibility Assessment became the basis for preparing the Work Plan.

B3. Budget:
a. Amount Budgeted \$ 73,000
b. Balance \$ 0

B4. Timeline:

	July 91	Jan 92
Funding Decisions Known	I-I	
Examine Feas. Assmnt.	I-I	
Prepare Work Plan	I--I	

B5. Status - The Work Plan, submitted to the EQB in June 1991, detailed the specific tasks and their respective outputs needed to complete the GEIS study process. The detail provided by the consultant's work plan proved to be an important part of the GEIS study process as it gave the EQB, its citizen advisory committee and the general public detailed information on the study's overall structure, process and methodology. Except for the timelines, the work product was closely followed and hence served an important role in development of the draft Timber Harvesting GEIS.

B6. Benefits - The Work Plan provided a detailed explanation on how the GEIS will be prepared, and proved to be a valuable asset in tracking the contractor's progress in completing this study.

C. Work Product - Alternative Statewide Timber Harvesting Scenarios.

C1. Narrative - The Final Scoping Decision states that impacts will be evaluated from three (3) specified levels of statewide timber harvesting activity. In order to be able to assess these impacts, an understanding of the characteristics associated with each level of statewide harvesting activity must be attained. A sophisticated forest harvesting and scheduling model will be used by the contractor to accurately and realistically depict the temporal and spatial distribution of timber harvesting activities in Minnesota at the three alternative levels of harvest intensity.

C2. Procedure - Using the USDA Forest Service's recently completed forest inventory data (1990) as the primary data input, and linking to that information a variety of other physical, biophysical and economic attribute information on Minnesota's forests and forest industries, a detailed forest change and scheduling model will be used to generate the three timber harvesting levels specified.

C3. Budget:

- a. Amount Budgeted \$ 92,000
- b. Balance \$ 0

C4. Timeline:

	July 91	Jan 92	June 92
Collect required data	---		
Formulate model	--		
Conduct model runs	---		
Analyze/Summarize results	----		

C5. Status - The Timber Harvesting Scenarios, submitted to the EQB in October 1991, described in great detail the spatial and temporal distribution of timber harvesting activity that might occur over the study's 50 study period under three different levels of statewide harvesting activity. The development of these scenarios was critical to providing a fundamental piece of information needed to conduct a broad-scale impact assessment that examined a wide range of resource outputs and attributes.

C6. Benefits - The timber harvesting scenarios provided the basic input to the contractor's scientists for analyzing and assessing the extent and significance of impacts associated with a given level of statewide harvest activity.

D. Work Product - Criteria for Determining Significant Impacts, Developing Mitigation Alternatives, and Recommending Preferred Mitigation Strategies.

D1. Narrative - Unlike site-specific EIS's, a major component of a generic EIS is the development of recommendation(s) to mitigate possible adverse impacts identified in the analysis. In order to develop such recommendations, criteria is needed for determining the significance of impacts, identifying possible measures to mitigate these impacts, and judging the merits of these mitigation options.

D2. Procedure - The contractor's scientists assessing the impacts resulting from a particular level of timber harvesting will, through a workshop setting, collectively develop draft criteria. The significant impact criteria will be based on existing state and federal criteria or standards, internationally recognized criteria, and some developed by the various groups of scientists. The workshop will also identify appropriate ameliorative and preventative measures to mitigate the impacts identified by this process. These scientists will also develop criteria to guide in the selection and implementation of the mitigation strategies. The basis for selecting each criteria will be documented. All draft criteria developed will be reviewed by the EQB and Advisory Committee.

D3. Budget:

- a. Amount Budgeted \$ 77,000
- b. Balance \$ 0

D4. Timeline:

	July 91	Jan 92	June 92
Develop Draft Criteria	---		
Review w/ Advis. Cmte.	-----		
Develop Final Criteria		---	

D5. Status - The Criteria For Determining Significant Impacts, submitted to the EQB in February 1992, established specific thresholds against which identified impacts were judged in the draft Timber Harvesting GEIS. The development of these criteria allowed for a systematic approach to assessing impacts, and the ability to develop sound and objective alternatives needed to minimize those impacts considered significant. In total, 21 separate criteria were developed to determine when an impact is considered to be significant. Both technical considerations (e.g., standards) as well as social dimensions provided by the EQB's citizen advisory committee were considered in the development of these criteria.

D6. Benefits - The criteria developed the basis for assessing the significance of impacts associated with a given level of statewide harvest activity, and developing appropriate options for dealing with these impacts.

E. Work Product - Technical and Background Papers.

E1. Narrative - The contractor's six study groups will prepare technical papers covering their areas of responsibility as expressed in the ten issue areas identified in the Final Scoping Decision. These technical papers will contain the basic information regarding what impacts timber harvesting has on a particular area of concern (e.g., water quality), as well as recommended strategies to mitigate those impacts considered significant. Five background papers providing information necessary to conduct the analysis or required in the Final Scoping Decision will also be prepared.

E2. Procedure - Each technical paper will provide a clear and concise discussion of each issue or subissue identified in the Final Scoping Decision; identify and explain the appropriate information source(s) and method(s) used to examine each issue; examine each issue for impacts according to the alternative statewide timber harvesting scenarios and identify and quantify all impacts identified; identify and describe possible actions to mitigate all significant impacts, including those that cannot be mitigated; and recommend and justify the preferred action(s) to mitigate those significant impacts.

E3. Budget:
a. Amount Budgeted \$ 237,000
b. Balance \$ 0

E4. Timeline:

	July 91	Jan 92	June 92	Jan 93
Background Review/Dvlpmnt.	-----			
Assess Impacts		----		
I.D. Significant Impacts		--		
I.D. Mitigation Alternatives		-----		
Analyze Impacts of Mitig.			---	
Develop Mitig. Recommendations.			-----	
Prepare Tech & Bckgnd Papers		-----		

E5. Status - The nine technical and five background papers submitted to the EQB in December 1992 proved to be an extremely important work product in the GEIS study process. In addition to serving as the foundation from which the draft GEIS was developed, these papers are also valuable technical resource documents for land managers and policy makers. Prior to being finalized, each technical paper was peer reviewed by a panel of independent scientists to provide comment on overall research methodology and document quality. This outside review proved to be an especially important step in the preparation of these documents.

E6. Benefits - The technical and background papers generated the basic information and analysis that was used to prepare the Draft and Final GEIS on Timber Harvesting.

F. Work Product - Draft GEIS.

F1. Narrative - The Draft GEIS will fully synthesize and integrate the information contained in the technical and background papers. The purpose of the Draft GEIS is to clearly and concisely identify and describe the impacts associated with statewide timber harvesting and associated management activities, and identify and describe any recommendations to address those impacts identified.

F2. Procedure - The Draft GEIS will be prepared so that it contains a complete description of each alternative statewide timber harvesting scenario examined; a clear and concise discussion of how statewide timber harvesting and associated management activities will impact the issues and subissues of concern identified in the Final Scoping Decision; a clear and concise description of significant impacts (existing or potential) identified in the analysis; a description of possible means of alleviating or minimizing the identified impacts; and recommendations for mitigating those identified impacts, including the rationale for such recommendations. Prior to being submitted to the EQB, the contractor will organize and conduct a technical review of the Draft GEIS. The purpose of the technical review will be to obtain an independent, objective, and critical review of the preliminary Draft GEIS by experts not involved in conducting this study.

F3. Budget:
a. Amount Budgeted \$ 167,000
b. Balance \$ 0

F4. Timeline:

	Jan 92	June 92	Jan 93	June 93
Synthesize T. & B. Papers			--	
Prepare Prelim. D. GEIS			----	
Conduct Outside Peer Review			---	
Finalize Draft GEIS			---	

F5. Status - The Draft Timber Harvesting GEIS was released for public review and comment on May 20, 1993. This draft identifies and describes environmental and related impacts that can be expected to occur over a 50 year study period at each of the three different levels of timber harvesting analyzed. In addition, the Draft GEIS identifies those impacts considered to be significant, and suggests mitigation strategies to minimize or eliminate those impacts. Finally, the Draft GEIS suggests the state establish comprehensive site-level and landscape level forest resource programs, a supporting research coordination program and a state board of forest resources. Prior to its public release, the Draft GEIS was reviewed by three independent groups of scientists and professionals to obtain critical feedback early in the document's development about its overall quality. As with the peer review process used on the GEIS technical papers, having independent reviewers examine a preliminary draft of the GEIS proved extremely useful to the study process.

F6. Benefits - The Draft GEIS is a comprehensive assessment of the impacts of statewide timber harvesting activities at both present as well as potential future harvest levels, and suggests recommendations for addressing those adverse impacts identified as significant.

G. Work Product - Final GEIS.

G1. Narrative - Preparation and submission of the Final GEIS by the contractor represents the last phase of the GEIS preparation process. The Final GEIS will incorporate the basic information and format contained in the Draft GEIS, as modified through the public review process.

G2. Procedure - Prior to issuing the Final GEIS, the EQB will conduct a public review of the Draft GEIS. This review will consist of a public comment period in which individuals can provide the EQB with written comments on the proposed GEIS. During the public comment period, the EQB will hold a series of public meetings to explain the findings of the Draft GEIS, and solicit comments on that document. All public comments on the Draft GEIS will be reviewed and considered in preparing the Final GEIS.

G3. Budget:

- a. Amount Budgeted \$ 172,000
- b. Balance \$ 172,000

G4. Timeline:

	Jan 93	July 93	December 93
Public Comment Period		-----	
Conduct Public Meetings		--	
Public Comment Response			-----
Prepare Final GEIS			----
Determine Adequacy			--

G5. Status - In conjunction with releasing the draft Timber Harvesting GEIS, the EQB established a 90 day comment period commencing on June 14, 1993, at which time individuals can submit written comments on the draft to the EQB. During this comment period, the EQB will be holding six public information meetings on the draft GEIS to explain the study's draft findings, recommendations and conclusions, and inviting public comment on the draft. Once the public review process is complete, the EQB (and its contractor) will respond to substantive comments. Working through its advisory committee, the EQB will identify and make needed changes to the draft Timber Harvesting GEIS. It is anticipated the Final GEIS will be submitted to the EQB for approval in January, 1994.

F6. Benefits - The Final GEIS will provide a comprehensive assessment of the impacts of statewide timber harvesting activities at both present as well as potential future harvest levels, and provide recommendations for addressing those adverse impacts identified as significant. The Final GEIS will reflect consideration of public comment on the Draft GEIS. The Final Timber Harvesting GEIS will likely have a substantial impact on the future policies and programs directed at using, managing and protecting Minnesota's forest resources.

EVALUATION

The GEIS will be evaluated from two distinct perspectives. The first is the timely review of all work products submitted to the EQB by the contractor, as specified in the contract to prepare the GEIS. Payment for the completion of specified work products will not occur until after review and approval by the EQB Chair, acting as the Authorized Agent for the State. The Timber Harvesting GEIS Advisory Committee will also be reviewing and evaluating all work products produced by the contractor, and providing their recommendation(s) on the adequacy of that work product to the EQB. Therefore, both the EQB and its Advisory Committee will have a direct role in evaluating all work products prepared by the contractor throughout the GEIS study process. The Work Plan to prepare the GEIS, as approved by the EQB, along with the Board's Final Scoping Decision will be the primary criteria by which these evaluations will be conducted.

The second form of evaluation will be a formal Determination of Adequacy by the governmental unit responsible for preparing the EIS. Because the EQB is the Responsible Governmental Unit (RGU) for this study, it will have the authority to determine whether the Final GEIS is determined to be adequate. The process and criteria for determining adequacy of the Final GEIS are specified in MN Rules, Part 4410.2800, subp. 4.

From a broader longer-term perspective, the Timber Harvesting GEIS will also be evaluated according to its usefulness in shaping public policy regarding management and use of the state's forest resources. The EQB does not view the Final GEIS as the last step in this study process, but rather a transition from an analytic to an implementation phase. To that end, the EQB is committed to working with appropriate entities to ensure that policy recommendations identified in the GEIS are carefully examined, and if deemed necessary, implemented in a timely manner. While no formal implementation strategies have yet been developed, the EQB is presently examining a variety of approaches to implement those recommendations forthcoming from the Timber Harvesting GEIS.

CONTEXT

- A. To date, a comprehensive assessment of the implications associated with increased timber harvesting activity on a variety of resource values and outputs has never been conducted in this state. The GEIS provided an opportunity to systematically examine these impacts from a statewide perspective, not only on what impacts might be occurring based on current harvesting levels and practices, but also what those impacts might be at more intense levels of timber harvesting. The GEIS also provides an means for developing policy and programmatic responses to deal with those impacts identified through the GEIS study process as being significantly adverse.
- B. The \$400,000 appropriation by the LCMR from the Environmental and Natural Resources Trust Fund ensures that all issues identified in the EQB's Final Scoping Decision will be addressed in the GEIS. Absent this funding, the GEIS would not have been able to address all issues in sufficient detail, but rather required the EQB to prioritize those issues it felt were most important.
- C. While there have been no past LCMR funds used in this area, the LCMR has funded previous projects that provide some of the information base and technologies used in this study.

D. The following appropriations have been made for preparation of the Timber Harvesting GEIS during FY 1990-91.

<u>Source</u>	<u>Amount</u>
General Fund (1991 Supplement)	\$100,000
IRRRB	\$100,000
Cuyuna Range Economic Development Corp.	\$ 75,000
Northwest Area Foundation Grant	<u>\$ 47,000</u>
Total:	\$322,000

* To be used only for retaining professional facilitation services to help the Advisory Committee develop consensus advice to the EQB.

E. The following appropriations have been made for preparation of the Timber Harvesting GEIS for FY 1992-93.

<u>Source</u>	<u>Amount</u>
General Fund (thru OSLRP budget per Governor's 1992-93 Budget Recommend.)	\$200,000
Environmental & Natural Resources Trust Fund	<u>\$400,000</u>
Total:	\$600,000

VI. QUALIFICATIONS

1. Program Manager:

Dr. Michael A. Kilgore
GEIS Project Manager
Office of Strategic and Long-Range Planning
300 Centennial Office Building
658 Cedar Street
St. Paul, Minnesota 55155

Relevant Education and Work Experience

B.S. Forest Recreation Management
M.S. Forest Economics, Administration and Policy
Ph.D. Forest Economics, Administration and Policy

4 Years: Natural Resources Policy Analyst, MN State Planning Agency.
* Lead Staff: Governor's Blue Ribbon Commission on Forestry and Forest Products.
* Coordinator and Administrator: Governor's Select Committee on Paper Science and Engineering.
* Coordinator, Minnesota Environmental Quality: Trends in Resource Conditions and Current Issues. Environmental Quality Board, 1988.

3 Years: Agricultural Economist, MN Dept. of Revenue
* Chair, Governor's Forest Tax Policy Team.

Researcher: University of Minnesota's Department of Forest Resources.

Field Forester: Pine County Land Department.

Jaakko Poyry Consulting, Inc.

The following identifies the individuals (and their qualifications) serving on contractor's Core Group that provides overall study management and administration:

Dr. James A. McNutt, Project Manager

Dr. McNutt is Executive Vice President and Executive Vice President and COO of Jaakko Poyry Consulting, Inc. in Tarrytown, New York. Prior to this, he held senior planning and managerial positions with Great Northern Nekoosa, Container Corporation of America and Potlatch Corporation. This extensive experience in the management and oversight of large-scale forest industry projects and operations is supplemented by teaching and research conducted as an Assistant Professor of Forest Engineering and Quantitative Sciences at the University of Washington.

Doug Parsonson, Project Coordinator

Mr. Parsonson is Managing Director of the consulting firm, Margules Groome Poyry Pty. Ltd., in Australia which is part of the Jaakko Poyry Global Consulting Network. He has participated in many major environmental impact assessment projects, dealing with a variety of subjects, as team leader and senior author. The emphasis of these studies has been assessment of the impacts of forestry activities on the natural cultural and socioeconomic environment. In addition, he has fulfilled the role of project manager for major study projects including: an EIS for the Forestry Commission of New South Wales concerning harvesting activities on state lands; an impact and demand analysis of proposed ski area in a national park for the Tasmanian Department of Parks, Wildlife, and Heritage; a riparian vegetation survey and management recommendations for the Murray-Darling Basin Commission.

Dr. Alan Ek, Study Group Coordinator

Dr. Ek is Professor and Head of the Department of Forest Resources, College of Natural Resources, University of Minnesota. He has a Ph.D. in forest measurements from Oregon State University and other degrees from the University of Minnesota. Prior to joining the faculty in 1977, he served on the forestry staff of the University of Wisconsin, Madison and earlier as a research officer with the Canadian Forestry Service in Ontario. Recently he served as chair of the Society of American Foresters Forest Science and Technology Board. As a consultant, he has assisted USAID and UNFAO projects in research planning and resource survey and modelling in several developing countries. He has authored more than 130 technical publications on forest sampling, forest growth modelling and planning methodology.

Louis Carbonnier, Forestry Issues Leader

Mr. Carbonnier is Senior Vice President, Natural Resource Management, Jaakko Poyry (U.K.) Ltd., London. He is responsible for the business area "Management of Natural Resources" within the Jaakko Poyry Consulting Network. As project manager, he has conducted studies in a variety of

subject areas, including forest inventory and wood consumption, forest planning systems, plantation establishment and management and pulpwood supply and demand studies. Fluent in several languages, Mr. Carbonnier has work with clients in Indonesia, Portugal, Spain, Ireland, Vietnam and many other countries throughout the world.

Dr. Reino Pulkki

Dr. Pulkki is Associate Professor in Forest Harvesting and Transport at Lakehead University, Ontario, Canada, and a Senior Consultant in the Transport Systems Department of the Jaakko Poyry Group. He had held central roles in several studies concerning wood supply and cost, harvesting systems and operational planning systems in Norway, Finland, various Canadian Provinces and seven U.S. states.

VII. REPORTING REQUIREMENTS

Semiannual status reports will be submitted not later than Jan. 1, 1992, July 1, 1992, January 1, 1993 and a final status report by June 30, 1993.

The EQB has required the Contractor to submit monthly progress reports to the EQB each month until submission and approval of the Final GEIS. Copies of all monthly progress reports will be provided to the Commission's Director.