



# **Interim Progress Report on the EMEND Project**

**(unpublished)**

**January 1, 2003 – October 30, 2003**

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## **Executive Summary.**

The past 6 months of research conducted by the EMEND Core Crew have focused on the following tasks: i) slash burn compartment plot establishment and related study assessments; ii) mensuration and forest health survey; iii) standing coarse woody debris survey; iv) aspen regeneration survey; v) provision of assistance to research projects being conducted by graduate students and Canadian Forest Service personnel; vi) working closely with CFS and ALFS personnel to attempt more experimental burns. In addition to data collected by Core Crew, data has been collected and processed by other researchers involved in experiment-wide studies of fire ecology, hydrology, silviculture, soils and nutrient cycling, and climate. This report provides details on the work conducted by the Core Crew during summer 2003 and updates any EMEND related activities.

## **1. Overview of EMEND Research 2003.**

There are two principal components to field research at the EMEND site: 1) collection of experiment-wide or "Core" data, done primarily by the centralized research group ("Core Crew"), as required to ensure that comparisons of all treatments can be made over all 4 forest types (this year's work summarized in Table 1); and 2) research planned and executed by researchers interested in using EMEND as a template for their work. Work done under category 2 is comprised mostly of projects by graduate students and by research scientists interested in questions other than the experiment-wide questions addressed in the core research. Support provided by FRIAA is aimed mainly at the Core work although limited financial support is provided for category 2 projects through i) Core Crew assistance to individual projects (Table 2), ii) provision of the majority of camp costs, and iii) a number of small top-up grants for researchers working at EMEND to encourage a full research profile. FRIAA support is the essential basis for the experiment-wide work at EMEND but it also encourages an extensive range of (category 2 type?) work at our site.

Camp services this summer were provided by Whitemud Wilderness Outfitters of Peace River, Alberta. Camp was open from 5 May until 5 September. Overall, 14 principal researchers and 29 associated research personnel (including 5 graduate students, and 24 technicians, volunteers or visitors) used the EMEND facilities in addition to the 10 people comprising the Core Crew (Tables 3 and 4). The total number of EMEND camp users was up c. 43% from the number of users last year. Overall, the camp was used for 1131 nights, up c. 35% from 2002. There were also a number of people who used the camp facilities during technology transfer activities at EMEND (Table 5).

Work done this year represented the fifth year of post-harvest data collection for most projects. Renewed field activity, involving large numbers of researchers, will follow completion of experimental burns or will be initiated for the next round of periodic post-harvest assessment anticipated for 2004.

## **2. Core Crew Activities.**

Core Crew worked a total of 536 person-days at the EMEND site during summer 2003. This time was spread among several activities including site orientation, safety training, working on experiment-wide projects, and assisting with category 2 research. The following three sections of this report describe Core Crew activity for summer 2003.

### **2.1. Experiment-wide Projects.**

The majority of Core Crew time (approximately 71%) during summer 2003 was spent working on four experiment-wide projects. Core Crew 2003 began no new experiment-wide projects. A large proportion of work was dedicated to the new slash burn compartments harvested in fall 2002 (see **Changes to Project Design and Methodology** section). Below are descriptions of the work completed on these projects.

#### *i) Slash burn compartment work.*

All plots deemed unusable due to landings, compartment split roads, or other unusual harvesting disturbances were replaced elsewhere within the compartment. All plot start and end points were recorded using a hand-held Garmin 12XL GPS unit. 27 person days

were allocated to the re-establishment of mensuration plots in the new slash burn compartments. The downed coarse woody debris (CWD) survey, shrub biomass assessment, and understory vegetation survey were completed for each plot in all 14 slash burn compartments (see Interim Report 2001 and Interim Report 2002 for study details). Each study used 28 person days, 19 person days, and 3 person days respectively. In addition, all plot trees and snags were mapped for easy location after slash is burnt.

*ii) Mensuration and Forest Health survey.*

The forest health survey was combined with the tree mensuration survey for 2003. All trees on the 600 mensuration plots were assessed for diameter, height, and health.

*iii) Fate of Standing Coarse Woody Debris (Snags).*

To keep track of the rate of death and fall-out of trees, the snags from all 800 snag plots were assessed to see if they were standing or fallen. Any new snags were added to the snag dataset. New snags were not assessed for height or decay during this survey as the complete Fate of Snags and Dynamics of Coarse Woody Debris survey will occur in 2004. The new snags will be assessed then.

*iv) Aspen Regeneration Study.*

Core Crew took over the aspen regeneration survey from Dr. Ken Greenway (ARC) for 2003. 50.5 person days were spent on the survey. Only a portion of the EMEND compartments were sampled as many issues regarding the study were discovered. The decision was made to leave the survey for completion in 2004 to provide time to resolve the issues.

## **2.2. Assistance for Category 2 Research.**

About 29% of Core Crew time was spent assisting category 2 projects. Time commitments to each project are summarized in Table 2. Below are descriptions of the assistance provided to category 2 research projects by the Core Crew.

*i. Hydrology.*

Core Crew assisted the CFS hydrology research team (G. Hillman) with the weekly collection of hydrologic well data. It took two core personnel approximately 3/4 of a day once per week to collect the data for a total of 16 person days.

*ii. Moth Biodiversity.*

Core Crew 2003 was responsible for the collection of moth biodiversity data this summer. Traps were set up and collected once per week from the start of May to the end of August. The moth biodiversity study concentrated on the slash burn compartments this year. Due to equipment and personnel limitations we were not able to conduct the usual experiment-wide moth biodiversity study and capture the pre-burn data for the slash burn compartments as well. As such, one light trap was set in each of two slash burn compartments and one control compartment in the each of the conifer dominated stands, aspen dominated stands, and aspen with spruce understory stands. The mixedwood stands were not studied this year. A total of 37 Core person days were used for the moth biodiversity study.

iii. *White Spruce Regeneration Study* (Silviculture research group).

Core Crew assisted the silviculture research group (Jim Stewart, Canadian Forest Service and Dan Gilmore, University of Minnesota) in moving the seedling boxes established for the winter survival of spruce seedling study. Core Crew also assisted with silviculture plot microsite evaluations. These tasks used 8 person-days.

iv. *Graduate Student / Postdoctoral Research Assistance.*

Assistance by the Core Crew was given to a number of graduate students conducting research at the EMEND site. Colin Bergeron (PhD. candidate, University of Alberta) required assistance with collecting the 600 arthropod pitfall traps established on the EMEND landscape. Core Crew also assisted Pedro Lara Almuedo (MFC student, University of Toronto) with his slash loading and fuel moisture study. Tim Work (Postdoctoral Fellow, University of Alberta) required assistance for the collection of a number of pitfall traps located throughout the EMEND experimental blocks. Colin and Tim shared 83 person days of Core Crew assistance and Pedro used 13 days.

### **2.3 Other Core Crew Tasks.**

In addition to conducting experiment-wide projects and assisting other researchers, Core Crew re-painted the fading paint along the navigational baselines located throughout the experiment and placed long metal poles at the start and end of mensuration plots in the 50% and 75% retention compartments. These activities were deemed necessary to aid the Core Crew and other researchers navigate within the EMEND compartments and they used about 25 person days.

EMEND makes it a priority to render the worksite as safe as possible. As such, a significant portion of Core Crew time (about 50 person days) was spent on training activities this summer. Training included site orientation, quad certification, bear awareness, mock emergency response drill, and monthly safety meetings.

An additional 15 person days was dedicated to quad and vehicle maintenance activities and on providing site tours.

### **3. Core Personnel.**

The summer Core Crew positions remain highly sought after by university and college students. This year there were over forty applications from students in Alberta, British Columbia, and Quebec.

The 2003 Core Crew consisted of eight personnel. Jason Edwards served a third summer as EMEND Field Coordinator and Charlene Hahn carried out her second summer as EMEND Data Coordinator. The remaining core members were Zachari Bergeron (Sherbrooke College, Quebec), Anna Brown (University of Alberta), Melissa Tesche (University of Alberta), Kylee Pawluk (University of Alberta), Jessica Snedden (University of Alberta), and Petra Syriste (University of Alberta). Pedro Lara Almuedo assisted the core crew when not working on his slash loading and fuel moisture study.

Michael Willing and Erika Brown, both from Peace River High School, joined the core crew for six weeks and three weeks respectively. These two positions were created to develop awareness of the EMEND project in the surrounding communities of Northwest Alberta. The positions were made possible through collaboration with the Boreal Forest Research Centre of Fairview College, Peace River Campus and Peace River High School.

### **3.1. Details on EMEND Coordinator activities for 2003.**

Jason dedicated most of February to end of April to grant development. Three grants were prepared; one to Canadian Foundation for Innovation, one to the Forest Resource Improvement Association of Alberta, and one to the Sustainable Forest Management Network.

Jason spent part of April preparing for the 2003 summer field activities. These activities included arranging camp facilities, equipment maintenance and purchasing, interviewing and hiring of the 2003 Core Crew, and updating the due diligence safety manual for all EMEND personnel using the EMEND site. Jason also organized the 2003 EMEND Workshop held May 2-3 in Edmonton.

From the start of May through the end of August Jason ran and operated the EMEND research camp and supervised the Core Crew work. Much time was spent delegating tasks for the Core Crew and maintaining and repairing quads. Jason also spent many days in the field collecting data and leading tours.

In September, Jason assisted the data manager in proofing the summer's data in addition to preparing this report. Jason also updated the EMEND maps with the new post-harvest plots established in the slash burn compartments.

### **3.2. Details on EMEND data manager activities for 2003.**

Through most of the spring Charlene Hahn continued analysing the Forest Primary Productivity data. Allometric equations have been developed for both above- and below-ground sections of trees. Shrub data is currently being analysed and equations will be developed by spring of 2004.

Starting in April, Charlene worked primarily on preparations for the 2003 summer field season. Charlene compiled the data required for the field work and created appropriate data collection sheets required for summer data collection. She also assisted Jason with organizing the 2003 EMEND Workshop, Core crew interviews, and with the purchase of field equipment required for the summer.

For May through August, Charlene spent many days collecting, entering and proofing data at the EMEND field research site. This task was continued for most of September. Charlene was also responsible for keeping a running tally of camp users and the work completed by Core Crew and acting as Field Coordinator while Jason was away from camp. Charlene completed numerous other tasks as assigned by the EMEND coordinator. During September Charlene continued to enter, proof, and organize data collected during

the summer. Approximately 60 days from 5 May to 30 October, 2003 were spent on data management activities.

### **3.3 Details on the EMEND Database manager activities for 2003.**

Brad Tomm, CFS, continued to compile the EMEND data into a comprehensive database. Brad has thus far completed data basing all core crew data sets with the exception of the Coarse Woody Debris surveys. He is currently compiling this summer's forest health and mensuration survey data. It should be noted that Brad Tomm is an employee of the Canadian Forest Service thus his position is not technically core crew. The EMEND database will contain the finalized datasets used for all EMEND data analyses.

### **4. Research Personnel.**

A total of 3 graduate students conducted fieldwork at EMEND during 2003. Many students have successfully completed the data collection phase of their projects and are currently writing their theses or have recently defended (see Table 6 for the status of EMEND graduate students). One MSc. student, Josh Jacobs, and four PhD. students, David Shorthouse, Kirsten Hannam, Lucie Jerabkova, and Colin Bergeron, remain active.

One new Postdoctoral Fellow, Lucero Mariani (University of Alberta), has initiated research at the EMEND site and Pedro Lara Almuedo (University of Toronto) conducted the work experience portion of his Masters of Forest Conservation (MFC) program at EMEND this past summer. Colin Bergeron has upgraded his study program from a MSc. to a PhD.

There has been a number of changes to senior researcher involvement since January. EMEND is pleased to welcome Dr. John Diiwu (Alberta Research Council) to the project. Diiwu is a hydrology research scientist and will be taking over the hydrology studies at EMEND from Dr. Graham Hillman, who retired in July 2003. Dr. Ken Greenway is no longer a Silvicultural Specialist with Alberta Research Council, having taken a new position with Alberta Sustainable Resource Development. As such, Greenway has handed over the EMEND Aspen Regeneration Study to the Core Crew. Greenway hopes to remain active in the project and has committed to analyzing the data on his own time. Dr. Scott Chang (University of Alberta) joins the EMEND project as Lucero Mariani's supervisor.

### **5. New Research.**

**5.1 Lucero Mariani** (Postdoctoral Fellow, Department of Renewable Resources, University of Alberta)

#### Effects of soil faunal activities and humus profiles on organic matter mineralization in boreal forest soils.

This summer at the EMEND experiment, I performed samplings of the forest floor in order to study the effects of soil faunal activities and humus profiles on soil organic matter mineralization in the deciduous dominated and coniferous dominated control forests. With one sampling, I will study the micro-morphology of the humus profile which is the analysis of the topsoil composition (the volumetric percentage of plant fragments, roots, amorphous organic matter and mineral particles) and structure (spatial disposition and



degradation of fecal pellets and other elements) by laboratory direct micro-observation of small samples preserved in pure alcohol. With a second set of samples I will sort the fecal pellets from the forest floor and assess their functional and structural properties (respiration, structure of the organic matter by  $^{13}\text{C}$  NMR and microbial functional diversity by community-level catabolic profiles). With the last three sets of samples, I will extract three different groups of soil fauna: the macrofauna (animals  $\Rightarrow$  2 mm), the mesofauna and the enchytreids.

These studies will allow me to 1) assess the importance of fecal pellets in humus formation by describing the humus profiles; 2) assess the functional and structural properties of fecal pellets; 3) identify the animal producing the fecal pellets. I aim to correlate the fecal pellet attributes with the whole soil organic matter functional characteristics (studies conducted by Drs. Barbara Kishchuk, Cindy Prescott and Sylvie Quideau) in order to test the hypothesis that biological regulation systems, i.e. faecal pellets, determine organic matter mineralization at a local scale.

## **5.2 Pedro Lara Almuedo** (MFC Student, Faculty of Forestry, University of Toronto)

### Surface fuel characteristics in boreal mixed wood forest of northwestern Alberta.

Using prescribed fire as a site preparation method in order to remove logging slash, improve planting accessibility, and remove organic material has been an acceptable practice for decades. However, this system has primarily been used in British Columbia and central eastern Canada, where slash loads are comparatively high, and forest floor organic layers are typically more shallow than those found in the western boreal mixed woods. The ease of ignition and fire spread in the boreal forest is strongly dependent on local fuel moisture conditions. These conditions are accounted by applying the Canadian Forest Fire Weather Index (FWI) system, which uses daily observations of wind speed, temperature, relative humidity and 24-hour precipitation as inputs. At the EMEND site, the implementation of prescribed fire has proven challenging, since fire weather conditions based on the FWI system that normally promote successful prescribed fire operations have not corresponded with adequate fuel moisture conditions for fire spread and prescribe burn completion. This study aims to correlate duff moisture to the FWI system codes and indices in order to provide a calibration for the EMEND site, as well as to quantify the fuel loading (slash and duff) in the different cover types representative of the boreal mixed wood forests of northwestern Alberta. In order to achieve these goals, two surveys have been implemented during the summer of 2003: a duff survey, applying a protocol specifically designed for this project; and a slash survey, applying a line intersect fuel sampling method. Both surveys have been implemented in four characteristic cover types of these forests with three replicates per cover type.

## **6. Changes to the project design and methodology.**

No changes to the project design and methodology have occurred this year.

## **7. Prescribed Fire Status.**

### **7.1. Standing Timber Burns.**

To date only three standing timber burns have been attempted: 1) Conifer dominated compartment 926 on 19 July 1999, 2) Deciduous dominated compartment 943 on 26 April 2000, and 3) Deciduous dominated compartment 856 on 12 May 2001. The burn in compartment 856 was deemed unsuccessful due to lack of flame spread and low tree mortality.

Burn conditions at the EMEND site were monitored continuously by CFS and ASRD personnel throughout the 2003 summer. So far, the conditions have not been appropriate for a safe or successful controlled standing timber burn. Peter Bothwell (CFS), with assistance from Alberta Sustainable Resource Development, has developed new standing timber burn prescriptions. This new prescription manual is available by request to Peter.

## **7.2. Slash Burns.**

Eleven slash burn compartments were successfully burnt in October 2003. Compartments 916, 885, 878 were burnt October 3, 2003; compartments 897 and 923 were burnt October 4, 2003; compartments 870, 936, and 938 were burnt October 5, 2003; compartments 904, 925, and 958 were burnt on October 6, 2003. All three aspen dominated slash compartments (856, 858, and 942) did not contain enough fuel for fire spread and were left for a later date. The slash burn prescription manual is also available by request to Peter Bothwell.

## **8. Administrative and Organizational Items.**

### **8.1. Awards.**

EMEND has recently been honored with two prestigious awards. The first was an Emerald Award from the Alberta Emerald Foundation for Environmental Excellence. It was awarded to Diashowa-Marubeni International for its role and contribution to the EMEND Project. The EMEND Partners have also been honored with the Alpac/ASTech Innovation in Integrated Landscape Management Prize from the Alberta Science and Technology (ASTech) Leadership Awards Foundation. These awards indicate the growing recognition EMEND is receiving within the Alberta forestry and science sectors.

### **8.2 Annual EMEND Workshop.**

The annual EMEND Workshop was held on 13-14 March 2003 at the Northern Forestry Centre, Edmonton, Alberta. This workshop brings together all the researchers, graduate students, and industry personnel involved in the EMEND project to discuss important matters regarding the EMEND project. The workshop featured six collaborative presentations outlining the immediate post-harvest effects of harvesting at EMEND as well as nine presentations from graduate students and new researchers. This year a dinner and introduction to EMEND was held on 12 March for invited guests from Alberta forest industry and Alberta Government. Dr. Ken Higginbotham, Vice President of Forestry and Environment for Canadian Forest Products Ltd., was the keynote speaker for the dinner. Many of the guests attended the EMEND annual workshop the following day.

### **8.3. Technology Transfer Activities.**

i) *EMEND Tours.*

One of the prominent goals of EMEND is to develop public interest in the forestry sector and to provide an unique teaching tool for teachers and students. This summer approximately 60 high school students from Fairview and Manning toured the EMEND research site. In addition to the standard EMEND site tour, the Fairview students conducted a boreal amphibian survey, a task expected to continue for years to come. John Stadt, Ecology Specialist for Alberta Sustainable Resource Development, also toured EMEND to gain first-hand insight into the project.

ii) *EMEND Web Site.*

The EMEND website is operated and maintained by EMEND Field Coordinator, Jason Edwards. Updates and new features are being added to the website on a continual basis. The website continues to be one of the project's prominent methods of information distribution. The EMEND website address is as follows:  
<http://www.biology.ualberta.ca/emend/index.htm>

iii) *EMEND Compendium.*

Derek Sidders (Canadian Forest Service) has nearly completed the new EMEND compendium and updated Research and Study Guide. The compendium includes updated project descriptions, summaries of preliminary results, and any other information useful to aid the transfer of technology to EMEND partners. The compendium will be distributed to all researchers and partners involved with the project.

iv) *Innovation Alberta radio broadcast.*

EMEND was featured on the Innovation Alberta program aired June 3, 2003 by the CKUA Radio Network. John Spence, Jan Volney, and Josh Jacobs were interviewed for the half-hour long program entitled "EMEND, Beetles, and Woodpeckers".

v) *SFMN commercial.*

A two minute commercial outlining EMEND was aired on *ACCESS Television* during the spring and summer of 2003. The commercial was sponsored by the Sustainable Forest Management Network (SFMN). In early September, a second commercial was filmed at the EMEND site. It is expected to air on *ACCESS Television* and *The Canadian Learning Channel* in the fall of 2003.

**8.4. Talks of Interest** (1 January 2003 – 30 October 2003; list is not complete).

Hannam, Kirsten. 2003. Forest floor organic matter composition in the boreal mixedwood as revealed by CPMAS 13C-NMR. Canadian Soil Science Society Annual Meeting, Montreal, Quebec, August 2003.

Stewart, James. 2003. The regeneration environments of a poplar-based and a spruce-based shelterwood. Unevenaged Forest Management: Alternative Forms, Practises and Constraints, IUFRO Conference, Finland, June 2003.

Stewart, James. 2003. Mechanical site preparation as a tool for regenerating *Picea glauca* in partial-cut neo-boreal mixedwood forests. Unevenaged Forest Management: Alternative Forms, Practises and Constraints, IUFRO Conference, Finland, June 2003.

### **8.5. Poster Presentations** (1 January 2003 – 30 October 2003; list is not complete).

Hannam, Kirsten. 2003 Soil organic matter composition in the boreal mixedwood as revealed by CPMAS 13C-NMR. Poster presented at the Canadian Geophysical Union meeting, Banff, May 2003.

Stewart, James. 2003. Ecosystem consequences of uneven-aged silviculture: the EMEND experiment in Canada's western boreal forest. Poster presented at Unevenaged Forest Management: Alternative Forms, Practises and Constraints, IUFRO Conference, Finland, June 2003.

Stewart, James. 2003. The Ecophysiological Basis for Regeneration Silviculture of Boreal picea glauca. Poster presented at the World Forestry Congress, Quebec City, Quebec, September 2003.

### **8.6. Peer Reviewed Publications & Theses**

Berger, C.A. and D.W. Gilmore. 2003. Field Note - Germination and survival of spruce seedlings following fire in Northwestern Alberta. *Northern Journal of Applied Forestry* **20**: 45-47.

Frey Brent R., Victor J. Lieffers, Alison D. Munson, and Peter V. Blenis. 2003. The influence of partial harvesting and forest floor disturbance on nutrient availability and understory vegetation in boreal mixedwoods. *Canadian Journal of Forest Research* **33**: 1180-1188.

Hogberg, L.K., K.J. Patriquin, and R.M.R. Barclay. 2002. Use by bats of patches of residual trees in logged areas of the boreal forest. *American Midland Naturalist* **148**: 282-288.

Lindo, Zoë and Suzanne Visser. 2003. Microbial biomass, nitrogen and phosphorus mineralization, and mesofauna in boreal conifer and deciduous forest floors following partial and clear-cut harvesting. *Canadian Journal of Forest Research* **33**: 1610-1620.

Lindo, Zoë. 2003. Forest floor properties, nutrient cycling processes, and microarthropod populations in conifer and deciduous stands of the mixed-wood boreal forest following partial and clear-cut harvesting. MSc Thesis, University of Calgary. 142 pp.

Patriquin, K.J and M.R. Barklay. 2003. Foraging by bats in cleared, thinned and unharvested boreal forest. *Journal of Applied Ecology* **40**: 646-657.

Patriquin, Krista J., Laureen K. Hogberg, Bryan J. Chruszcz, and Robert M. R. Barclay. 2003. The influence of habitat structure on the ability to detect ultrasound using bat detectors. *Wildlife Society Bulletin* 2003, **31(2)**: 475-81.

**Table 1.** Summary of core crew work completed for core (Category 1) research from May 1 – September 5, 2003.

<b>Project</b>	<b>Work Description</b>	<b>Total Number of Person Days of Core Crew Activity</b>	<b>% of Total Category 1 Person Days</b>	<b>% of Total Person Days</b>
<b>Fate of Snags and Dynamics of Coarse Woody Debris (CWD)</b> (Dave Langor/Daryl Williams)	<ul style="list-style-type: none"> <li>- downed CWD survey in slash burns</li> <li>- standing snag assessment</li> <li>- mapping standing snags in slash burn tree plots</li> </ul>	101.25	27	19
<b>Training, Orientation and Infrastructure Activities</b>	<ul style="list-style-type: none"> <li>- Bear Awareness course</li> <li>- Quad Safety course</li> <li>- Emergency Response Training</li> <li>- Orientation</li> <li>- Quad maintenance, vehicle maintenance, equipment purchases</li> <li>- Tours of EMEND</li> </ul>	65.25	17	12
<b>Tree Plot and Compartment Maintenance</b>	<ul style="list-style-type: none"> <li>- Re-establishing slash burn tree plots</li> <li>- Mapping trees in slash burn tree plots</li> <li>- Marking tree plots with poles</li> <li>- Painting baselines</li> </ul>	55.75	15	10
<b>Forest Health and Mensuration</b>	<ul style="list-style-type: none"> <li>- tree plot mortality study</li> <li>- tree plot health assessment</li> </ul>	54	14	10
<b>Aspen Regeneration</b> (Ken Greenway/Core Crew)	<ul style="list-style-type: none"> <li>- Assessments of <i>Populus</i> sp. regeneration</li> <li>- Microsite assessments</li> </ul>	50.5	13	9
<b>Office Work</b>	<ul style="list-style-type: none"> <li>- Data entry, preparation and corrections</li> <li>- Report preparation</li> </ul>	29.75	8	6
<b>Forest Productivity Estimates</b> (Jan Volney/John Spence)	<ul style="list-style-type: none"> <li>- shrub biomass data collection</li> </ul>	19	5	4
<b>Vegetation</b> (Derek Johnson)	<ul style="list-style-type: none"> <li>- Vegetation assessments in slash burn tree plots</li> </ul>	3	1	< 1
<b>Total:</b>		<b>378.5</b>	<b>100</b>	<b>71</b>

**Table 2.** Summary of core crew assistance provided for non-core (Category 2) research from May 1 – September 5, 2003.

Project	Work Description	Total Number of Person Days of Core Crew Activity	% of Total Category 2 Person Days	% of Total Person Days
i. <b>Arthropods</b> (Tim Work/Colin Bergeron)	- pitfall trap collections	83	53	16
ii. <b>Moth Diversity</b> (John Spence)	- light trap collections	37.25	24	7
iii. <b>Hydrology</b> (Graham Hillman/Cecilia Feng)	- well and piezometer data collection	16	10	3
iv. <b>Fire Ecology</b> (Pedro Lara Almuedo)	- Fuel load assessments in slash burns - Duff sampling	13	8	2
v. <b>Silviculture (White Spruce Regeneration)</b> (Jim Stewart)	- Seed trap set up - Microsite assessments	8	5	1
<b>Total:</b>		157.25	100	29

**Table 3.** Number of person-days EMEND camp was used by individuals involved in core (Category 1) research from May 1 - September 5, 2003.

Project	Camp User	Affiliation	Title	Number of Days at EMEND Camp							Total
				May	Jun	Jul	Aug	Sept			
Core Research	Bergeron, Zachari	UofA	Core Crew	0	26	23	11	0	60		
	Brown, Anna	UofA	Core Crew	23	23	21	18	0	85		
	Edwards, Jason	UofA	Field Coordinator	23	20	23	23	1	90		
	Hahn, Charlene	UofA	Data Manager	23	24	23	19	1	90		
	Pawluk, Kylee	UofA	Core Crew	22	19	20	18	0	79		
	Snedden, Jessica	UofA	Core Crew	23	0	0	0	2	25		
	Syrste, Petra	UofA	Core Crew	8	20	23	22	0	73		
	Tesche, Melissa	UofA	Core Crew	21	21	21	18	0	81		
	Brown, Erika	UofA	Core Crew	0	3	14	0	0	17		
	Willing, Michael	UofA	Core Crew	0	3	25	13	0	41		
	Volney, Jan	CFS	Project Leader	0	0	13	0	1	14		
	Tomm, Bradley	CFS	Database Manager	0	0	13	0	0	13		
	Spence, John	UofA	Project Leader	0	0	5	0	1	6		
	<b>Category 1 Research Projects - Monthly Totals:</b>				<b>143</b>	<b>159</b>	<b>224</b>	<b>142</b>	<b>6</b>	<b>674</b>	





**Table 4 (Continued).** Number of person-days EMEND camp was used by individuals involved in non-core (category 2) research from May 1 - September 5, 2003.

Project	Camp User	Affiliation	Title	Number of Days at EMEND Camp							Total
				May	Jun	Jul	Aug	Sept			
Arthropods	Bergeron, Colin	UofA	Ph.D. Student	16	25	28	14	2		85	
	Cobb, Tyler	UofA	Volunteer	0	0	3	0	0		3	
	Deshene, Andrea	UofA	Volunteer	0	0	3	0	0		3	
	Jensen, Dan	UofA	Technician	16	25	28	14	0		83	
	Koivula, Matti	UofA	Volunteer	0	0	0	3	0		3	
	Philips, Iain	UofA	Volunteer	0	0	4	0	0		4	
	Work, Tim	UofA	Researcher	4	3	6	3	0		16	
				<b>Subtotal</b>							<b>197</b>
Vegetation Structure	Chavez, Virginia	UofA	Ph.D. Student	2	0	0	0	0		2	
	Crane, Shannon	UofA	Research Assistant	3	1	0	0	0		4	
	Flynn, Erin	CFS	Technician	0	0	0	6	0		6	
	Johnson, Derek	CFS	Researcher	0	0	0	6	0		6	
	Ozeroff, Kim	UofA	Technician	3	1	0	0	0		4	
	Weitzel, Carla	CFS	Researcher	0	0	0	6	0		6	
				<b>Subtotal</b>							<b>28</b>
				<b>Subtotal</b>							<b>70</b>
Fire	Beverly, Jennifer	CFS	Researcher	0	0	2	0	0		2	
	Bothwell, Pete	CFS	Technician	4	0	2	0	0		6	
	Lara Almuedo, Pedro	UofT	MFC Student	0	16	28	14	0		58	
	Lavoie, Suzanne	CFS	Technician	4	0	0	0	0		4	
				<b>Subtotal</b>							<b>70</b>
<b>Category 2 Research Projects - Monthly Totals:</b>				<b>62</b>	<b>124</b>	<b>148</b>	<b>115</b>	<b>4</b>		<b>453</b>	

**Table 5.** Number of person-days EMEND camp was used by individuals involved in Technology Transfer Activities from May 1 - September 5, 2003.

Camp User	Affiliation	Title	Number of Days at EMEND Camp					Total
			May	Jun	Jul	Aug	Sept	
Abugov, Martin	SFMN	Communications Manager	0	0	0	0	1	1
Stadt, John	ASRD	Researcher	0	0	1	0	0	1
Verburgt, John	Verb Productions	Television Producer	0	0	0	0	1	1
Wiggins, Bruce	Access Network	Cameraman	0	0	0	0	1	1
<b>Technology Transfer - Monthly Totals:</b>			<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>4</b>

Table 6. Status of EMEND graduate students.

Master Students

Student	Affiliation	Project Title	Project Status
Berger (nee Becker), Carrie	University of Minnesota	Modeling early regeneration processes in mixed- species forests of Alberta.	Defended Spring 2002
Cuthbertson, Lisa	University of Alberta	Spatial patterns of <i>Armillaria</i> .	Defended, 25 September, 2001
Wesley (nee Dunlop), Julia	University of Alberta	Effects of forest harvesting on spruce beetle parasitoids.	Defended 19 September, 2002
Fenniak, Treena	University of Alberta	Understory vascular plant regeneration following disturbance.	Defended August 2001
Frey, Brent	University of Alberta	Effects of forest floor disturbance and canopy removal on soil nutrient dynamics and response of <i>Calamagrostis canadensis</i> , <i>Epilobium</i> <i>angustifolium</i> , and <i>Picea glauca</i> seedlings.	Defended September 2001
Harrison, Bruce	University of Alberta	Response of boreal forest birds to experimental harvest and burning.	Defended October 31, 2001
Jacobs, Josh	University of Alberta	Saproxylic beetles and coarse woody debris.	Writing Thesis
Kembel, Steven	University of Alberta	Spatial patterns of boreal canopies, understory communities, and tree regeneration.	Defended September 2001
Lazaruk, Lance	University of Alberta	The impact of silvicultural practices on the abundance and biodiversity of ectomycorrhizae in a boreal forest ecosystem.	Defended February 2002
Lindo, Zoë	University of Calgary	Harvesting effects on soil mesofauna and decomposition /nutrient cycling processes in aspen and spruce stands of the boreal mixed- wood forest.	Defended 2003
Martin, René	University of British Columbia	Reproductive responses of bunchberry ( <i>Cornus</i> <i>Canadensis</i> ) to disturbance in a managed forest.	Defended 2000
Mills, Suzanne	University of Alberta	Distribution of bryophyte species diversity in relation to microsite and moisture availability at 2 scales within conifer dominated boreal forests.	Defended August 2001

**Table 6. Status of EMEND graduate students, continued.**

<b>Student</b>	<b>Affiliation</b>	<b>Project Title</b>	<b>Project Status</b>
Morneau, Louis	University of Alberta	Lepidoptera diversity following fire and harvesting.	Defended January 2002
Park, Jane	University of Calgary	Movement and settlement of bark beetles in a heterogeneous landscape.	Defended Summer 2002
Patriquin, Krista	University of Calgary	Impacts of fire and harvesting on the foraging ecology of forest dwelling bats.	Defended June 2001

**Doctoral Students**

<b>Student</b>	<b>Affiliation</b>	<b>Project Title</b>	<b>Progress</b>
Bergeron, Colin	University of Alberta	Effect of fire behavior on dynamic associations of insects and plants at the landscape level.	Data collection
Hannam, Kirsten	University of Alberta	Linking changes in the soil microbial community with changes in soil C chemistry following timber harvesting in the boreal mixedwood forests of northwestern Alberta.	Data collection
Jerabkova, Lucie	University of British Columbia	Nitrogen transformations in boreal mixedwoods.	Data collection
Shorthouse, David	University of Alberta	Boreal spiders as bioindicators of forest disturbance and management	Writing Thesis

**Table 7: EMEND Vehicle Usage from 6 May – 5 September.**

<b>Vehicle</b>	<b>Total Mileage (km)</b>	<b>Total Fuel Use (L)</b>	<b>Days in Use</b>
<b>Trucks</b>			
UofA 298 (Suburban)	8367	?	-
Budget Van	11043	?	-
<b>Quads</b>			
DMI 223	-	116	45
DMI 224	-	105	39
DMI 225	-	149	54
Canfor 265	-	156	32
Canfor Green	-	95	29
UofA PN102	-	82	41
UofA PN103	-	81	34
UofA Green 250	-	107	47
UofA Green 300	-	43	17

