FC 3.1.18.2

Adding a Dimension to Natural Disturbance Modeling: First Nations' Resource Management in the Foothills Model Forest

by
Patricia Bailey and Dr. E.S. Higgs*

Advisory Committee

Art Bailey
Professor Emeritus, Department of Renewable Resources, University of Alberta

Henry Lewis
Professor Emeritus, Department of Anthropology, University of Alberta

Peter Murphy
Professor Emeritus, Department of Renewable Resources

"Wherever climate allowed a sliver of dryness and wherever pyrophytes salted biomes, humans could drive a wedge of fire to crack open the ecosystem and cook it into more palatable forms."

Stephen Pyne, *Vestal Fire*, 1997
(courtesy of Dr. P. Murphy)

* Associate Professor, Department of Anthropology, University of Alberta, 14-14 HM Tory Building, Edmonton, Alberta, T6G 2H4; 780/492-5469; 780/492-5273 (fax); eric.higgs@ualberta.ca

Introduction

Did the First Nations peoples of the Foothills Model Forest (FMF) region set controlled fires? If so, were these fires used in resource management? Were these fire regimes sufficient to shape the disturbance dynamics of the foothills ecosystems? These three questions guide our proposed research. Research in both like regions of Canada and internationally (notably Henry Lewis' work in northern Alberta, Australia, California) suggest that First Nations peoples used fire extensively and variously to achieve specific objectives (Boyd 1999). If the same is true in the foothills region, then anthropogenic fire is a critical element in landscape disturbance dynamics. *No account of forest disturbance is complete without an understanding of cultural practices.* Our research aims at assembling the dispersed and fragmentary data into a composite picture that will make it possible to understand the role of First Nations' resource management, specifically anthropogenic fire. This is the first step in a larger process of revising our understanding of "natural" disturbance to include human agency, or what we call "ecological" disturbance.

Hypotheses

We begin with five working hypotheses that we aim to test in the proposed project:

1. The First Nations peoples of the FMF region markedly influenced particular areas of the landscape through the use of controlled burning.

2. These prescribed burning practices were a part of overall resource management strategies to advance a variety of immediate and long term objectives.

3. There were management practices specific to the FMF region, as strategies varied widely among peoples and regions depending on the resources, population densities, settlements and trade routes, economic changes (e.g., introduction of the fur trade), and historical pressures (e.g., disease, displacement).

4. Controlled burning affected ecotones in the FMF region differentially.

5. First Nations burning was sufficiently intensive and extensive to affect historical disturbance dynamics, particularly in maintaining prime resource areas and reducing accumulation of fuels therein.

Background: Aboriginal Resource Management and Fire Technology

There has been growing interest in the resource management strategies of First Nations peoples in the last several decades. The activities of humans on the landscape prior to European settlement are believed by some to offer information about sustainable human use today. A wide array of both plant and animal species was necessary for human populations. This required a diversity of ecosystems, and especially ecotones where a large number of different species could utilize an area. Natural processes could not always be counted on to provide either the quantity or quality of resources necessary for a group of people to flourish. The question that puzzled ecological anthropologists and ecologists for years was: How can a relatively small number of people create and/or maintain a variety of ecosystems (Pyne 1997; Blackburn and Anderson 1993)? The answer in many regions is that fire was a central management technology in conjunction with the harvesting of particular plant and animal species (Lewis 1982). The management practices of the First Nations peoples probably assisted in the establishment of landscape patterns of forests, grasslands and wetlands in the ancient and recent past.

Why was burning a method of management by First Nations peoples? What does the use of fire indicate about the interrelation of humans and ecosystems? Fire is a form of disturbance to which many plants and animals of the Eastern Slopes of the Rocky Mountains are adapted. An understanding of fire, and an ability to utilize fire in a manner that benefits human land use patterns, significantly increases the return humans may realize from the land. Fire improves not only the forage quality of grasses and forbs, it can also improve productivity (Biondini et al., 1999).

Many First Nations peoples used fire as one of the tools for both ecosystem management and social benefit. The use of fire could provide a broad resource base for gatherer-hunter peoples (Lewis, 1985). Frequently, fires prevented the spread of forests into grasslands and meadows, which kept these areas open for both human and animal use and travel. Open grasslands are easier to travel in then congested forests, while many of the "forest-edge" animals are actually dependent on the grassland-shrub areas for sustenance - such as many small mammals, birds, elk, big horn sheep, deer and the animals that prey upon them. In addition, there are many other plants in grasslands than grass, many of the forbs and fungi are edible or have medicinal properties, which made them essential to provide a balanced diet for humans. The young shoots of certain trees and shrubs (i.e. willow) were used for basketry and storage (Blackburn and Anderson, 1993). In the absence of fire, plants adapted to the early seral stages would not remain as a long-term feature of the landscape (Wright and Bailey, 1982, pers. comm. Dr. L. Johnson). This could be disastrous for humans if the plant was relied upon for food or medicine.

The use of fire in Aboriginal resource management required precise knowledge of timing. In the boreal forest region of northern Alberta this normally meant

burning in the first weeks of spring, when the grasslands are just dry enough to burn and it remained quite wet in the brush. The goal was not to have fires raging out of control, but to create "fire mosaics" on the landscape. Fire regime management was directed at the areas of the landscape that were used as resource areas, to fireproof settlements- permanent and temporary, and to keep trails, trade and travel routes accessible (Lewis 1982).

Local knowledge was a key ingredient in traditional management. Local knowledge varied considerably across time and space. While some traditional management practices in one region are analogous to those in another, ecological conditions and cultural practices created variation. It is within this context that the controlled fires of First Nations peoples should be placed. The landscape is by no means static, understanding one ecosystem is not understanding all. Thus, piecing together an understanding of traditional resource management practices for the benefit of contemporary resource management objectives requires the same kind of comprehensive and intensive approaches taken in understanding all other dimensions of ecological history (e.g., stand origin). As Baker et al comment, "Even an extensive field trip of many months by a scientist would be considered a brief foray on the land by any adult Aboriginal person living in the area today."(1992, p. 66)

From a cultural perspective Lewis and Ferguson (1988) observed in the boreal forest that First Nations peoples focused on creating yards and corridors, which in turn produced a complex landscape mosaic. We expect a similar pattern in the Foothills region, or at least we anticipate areas of concentrated historical human activity. As Murphy writes, "There is growing evidence that Aboriginals significantly affected landscapes through their use of fire, but their use appeared to be tempered by an understanding of the ecosystem, their place in it, and the need to constrain fires to the areas that they wanted to burn." (1996, p. 3) The archaeological record indicates that the Foothills region has been prime for settlement for over 10,000 years (pers. comm. Dr. C. Schweger).

Did the First Nations peoples of the FMF region set controlled fires? If so, how were they used in resource management? These are questions that need thorough research if we are to understand the full range of disturbance dynamics of the Foothills ecosystems. Unfortunately, little background material is available. There have been no ethnographic studies on the resource management practices of the First Nations peoples of the FMF region. Some oral histories are available, but these typically don't focus on fire management. The written historical record is important, but as Higgs et al. discovered in their study of ecological and cultural history in the montane ecoregion of Jasper National Park (1999) only a small amount of carefully interpreted historical documentation is available. Painstaking research is required.

Natural Disturbance Research

The current philosophy of natural disturbance management is based on the view that landscape patterns are dynamic. Mimicking natural disturbances is considered a relatively safe manner of managing forest ecosystems which have evolved with disturbance conditions. Baskerville (in Andison, 1999) identified several risks associated with management based on natural disturbance regimes. "... we may create forests that 'look like' but don't 'function like' the natural forest dynamics we seek to mimic. The second and greater risk is that we create forests that conform to a contemporary popular perception of what a natural forest should look like, but which do not function as did historic natural forests" (Andison, 1999, p. 5).

An understanding of the natural disturbance history of the area, encompassing both time and space would provide essential forest management information. However, a knowledge of forest history for 20 years is not sufficient, the disturbance processes over several centuries are necessary (Andison, 1999, p. 7, 8). From this perspective an understanding of the local First Nations resource management practices, especially the fire regimes, may provide an additional source of knowledge. Perhaps this knowledge could also be a factor in establishing a "reference condition" for the FMF. What did the FMF region look like in 1650 or 1800? "Moreover a central tenet of the expanding field of restoration ecology is that reference conditions are useful for deciding upon ecologically justifiable goals for restoration programs" (Swetnam et al., 1999, p. 1190). Attention is turning also to understanding cultural processes in setting reference conditions, and expanding activities such as forest management into a restorative activity (Higgs 1997). What role did the First Nation fire regimes play in the pre-European landscapes of the Foothills Model Forest? Were they minor and related only to river valleys, warm south-facing slopes and travel and trade routes, or did people also ignite some of the widespread burns of summer?

FMF natural disturbance research has focused on the processes of natural disturbances. If it is the case, as we propose, that First Nations resource management practices influence the structure and patterns of ecosystem in the FMF region, then it is prudent to expand the view of what counts as "natural" disturbance. The paradigm of natural disturbance, while useful for many purposes in understanding and setting objectives for ecosystems, excludes human agency. This view of ecological history presupposes a distinct separation of humans and nature, a divide that may speak more pointedly to contemporary realities than what existed in the past. Hence, the term "natural" disturbance serves to exclude what may turn out to be an important feature of historical disturbance dynamics: First Nations resource management. We propose substituting the term "natural" for "ecological," which results in a more inclusive view of disturbance.

Non-forested ecosystems are an important starting point for any investigation of traditional resource management. The non-forested areas in the Upper and Lower Foothills sub-regions are over 10% of the forested areas (Andison, 1998, p. 544). What is the rate of disturbance in the non-forested areas? Have these areas historically expanded or decreased? Were First Nations fire regimes instrumental in the maintenance/creation of these non-forested areas? Did these non-forested areas occupy a lesser or greater portion of the landscape 100, 1000 or 5000 years BCE?

Research Plan and Methodology

The proposed research is a reconnaissance project that fits neatly into the existing FMF disturbance program and sets the stage for a longer term study of cultural processes that can be given direct spatial references. With sufficient information it will be possible in the future to create cultural activities GIS layers similar to the Human Activity Database project developed for the montane ecoregion of Jasper National Park (Higgs et al. 1999). This means that ecological and cultural disturbance processes can be brought together for interpretation, planning and management.

However, the first step is to assemble the widely disparate historical materials and the faint trails of human accounts in this region. Given the paucity of data, the proposed research is limited to assembly and preliminary interpretation, which includes:

- exhaustive search for archival materials (travel narratives, journals, official correspondence, interviews, etc.);
- interviews with First Nations and Métis peoples living in and around the FMF region;
- locating the temporary and permanent settlements, resource areas, trails and trade routes of the local First Nations peoples.

The primary emphasis of this research will be upon the recent past (ca. 200 years) with a secondary investigation into the more distant past. A variety of research methods will be necessary in striving for independent verification from each source. Research tactics will include: archival research into the historical evidence - i.e. early historical record; and analysis of scientific evidence - i.e. fire histories (Tande 1977, others), age-class data, ethnographic evidence, and archaeological evidence. Collection of current oral knowledge will be essential.

Local First Nation and Métis community interviews may provide first-hand and historical knowledge of fire regimes at work. This will involve research into extant oral histories from previous work, for example those of Dr. H.T. Lewis and Dr. P. Murphy. Interviewing people from the present settlements of Fox Creek, Sunchild I.R., Big Horn I.R., Grande Cache, and the non-status and Métis

communities around Hinton will be required to survey local knowledge. Elderly women would be the best source for information relating to the fire regimes for the gathering of important plants. Elderly women will be more responsive to a female interviewer than to a male (pers. comm. Dr. H.T. Lewis). The social practices relating to oral traditions mean that even if elderly women have not personally burned for gathering purposes, their grandmothers and mothers who burned would pass down such essential information (Blackburn and Anderson 1993).

Place-names can also be indicators of landscape history. The history of such places as Prairie Creek, Wildhay River, Smoky River, and the Cardinal River will provide additional information into management practices (pers. comm. Dr. P. Murphy).

The archaeological record will also be of assistance. An excavation near Entrance, Alberta revealed obsidian glass sourced to the Northwest Coast (pers. comm. Dr. C. Scheweger). Such an artifact is indicative of trade routes through the mountains. Other archaeological research conducted in Jasper National Park and the eastern slopes will shed light on historical and pre-historical patterns of use and movement.

The locations of trails and information relating to their use may be found in Forest Service records, as the early Forest Rangers often used established First Nations trails (pers. comm. Dr. P. Murphy).

Analysis of these materials, which will lead to M.A. thesis in anthropology and a summary report, will be informed by the five hypotheses presented earlier:

1. The First Nations peoples of the FMF region markedly influenced particular areas of the landscape through the use of controlled burning.

2. These prescribed burning practices were a part of overall resource management strategies to advance a variety of immediate and long term objectives.

3. There were management practices specific to the FMF region, as strategies varied widely among peoples and regions depending on the resources, population densities, settlements and trade routes, economic changes (e.g., introduction of the fur trade), and historical pressures (e.g., disease, displacement).

4. Controlled burning affected ecotones in the FMF region differentially.

5. First Nations burning was sufficiently intensive and extensive to affect historical disturbance dynamics, particularly in maintaining prime resource areas and reducing accumulation of fuels therein.

Deliverables

The archival research will provide information relating to the ancient and recent past history of resource management in the FMF region. Interviews will provide information regarding local First Nations resource management practices and fire regimes. The primary deliverable will be a Master's thesis, with secondary deliverables such as maps, archival records, and transcripts.

1. Master's thesis (Patricia Bailey) respecting the resource management and fire regimes of the First Nations peoples of the FMF region.

2. Descriptions, maps, and/or data of specific Aboriginal fire managed locations and landscapes within the FMF. Including both known areas burned and suspected areas burned.

3. Archival copies of the historical sources examined.

4. Transcripts (subject to permissions of those interviewed) of the interviews with local First Nations people.

Ethical Conduct of Research and Cooperation with First Nations and Métis Peoples

The proposed research will be conducted under the auspices of the Tri-Council Ethics Guidelines recently introduced to ensure the highest level of integrity in research dealing with people.

We plan on working with a wide variety of First Nations and Métis consultants, some of whom will no doubt have an important stake in the long term integrity of the region. Typically a research project of this kind would focus on a specific community and make formal contact with that community prior to commencing research. The geographic and historical character of the FMF make this difficult. There are several hundred non-status First Nations people living in the region (Pers. comm. Jimmy Ochese, 30 September 1999). A community of traditionalists now live in the Smallboy Camp in the southern part of the FMF. Some residents of Grande Cache are descendants of Métis peoples who farmed in the Athabasca Valley in what is now Jasper National Park prior to 1907. It is prominent in our minds as we approach this work that the land now managed under the FMF is land that ancestors of First Nations peoples still living in the region once used extensively and intensively. We hope to encourage active cooperation with First Nations and Métis people in this research project as it evolves.

Personnel

The principal investigator is **Eric Higgs**, is an Associate Professor of Anthropology at the University of Alberta. His primary focus is ecological anthropology, and has for the last five years been working in Jasper National Park on a variety of projects, including the Culture, Ecology and Restoration project, the Bridgland Repeat Photography project, and the FMF Montane Disturbance project.

Patricia Bailey is hoping to undertake an M.A. program in Anthropology commencing September 2000. She has worked as an ethnohistorical research consultant and writer in British Columbia and Alberta since 1994, with specific experience in resource use by First Nations peoples, linguistic origins of placenames, land claims and entitlement histories, and archival research. More recently she has worked on several reclamation and restoration projects, manifesting a growing interest in botany and ethnobotany.

Art Bailey, Henry Lewis and Peter Murphy, all Professors Emeriti at the University of Alberta, have agreed to serve on an **advisory committee** for this project. It would be difficult to find a stronger and more remarkable group of scholars with an interest in traditional fire management. Prof. Bailey is a specialist in range management and author of a definitive text on the subject. Prof. Lewis is renowned internationally for his studies of aboriginal fire management. Prof. Murphy is well known to the FMF group, having led a number of historical studies in the region and being a prime mover for a great deal of forest research and management in Alberta over the last three decades. Retirement has not slowed these three down, which is why we have allotted field expenses and honoraria for their consultation on different aspects of this project.

Schedule

May – August 2000	Detailed study design; initial field reconnaissance (Higgs and Bailey, with the assistance of advisory committee), identification of key First Nations and Metis consultants, archival research planning.
September – April 2000/01	Trish Bailey's course work; detailed thesis proposal; some interviews likely.
May – August 2001	Intensive field work (Higgs and Bailey, with help from advisory committee)
September – April 2001/02	Intensive archival research (Fall); thesis write-up (Winter)

May – August 2002	Thesis defense; completion of final report including research documentation.

Budget

A note on costs: Some costs are fixed (e.g., Graduate student stipend, advisory committee), but other costs could be reduced through alternatives (e.g., field accommodation) or in-kind support (e.g., field vehicle).

1. Graduate student stipend (Trish Bailey; May 1, 2000-April 30, 2002)
2 years @ $14,000
= $28,000

2. Field costs
Travel
Vehicle rental: University of Alberta Vehicle Pool (pickup truck for 1 month in Summer 2000, 4 months in Summer 2001); 5 months @ $300/month + 6,000 km (including 5 round trips to Edmonton) @ $0.20/km =$1,700

Principal Investigator travel (vehicle rental 1 month @ $300 + 2,000 km @ $0.20/km =$700

Archival research (one trip, 2 weeks, to National Archives of Canada, Ottawa) =$1200

Accommodation
Environmental Training Centre: Eric Higgs, 30 days @$25/day; Trish Bailey, 120 days @ $25/day =$3,750

3. Advisory Board
Costs are difficult to estimate and will depend on the extent of involvement. All three members of the Advisory Committee are retired from University service, but maintain active consulting and research activities. We agreed that a modest pool of funding to defray travel and accommodation expenses, and possibly to provide honoraria, would be the most effective way of encouraging their involvement.
= $5,000

4. Field and office expenses
2 years @ $1,200/year = $2,400

Subtotal
=$42,750

Overhead
University of Alberta overhead for off-site research is 7.5% =$3,206

Total Requested	**=$45,956**

Literature Cited

Andison, D.W. 1998. Temporal patterns of age-class distributions on foothills landscapes in Alberta. *Ecography* vol. 21, no. 5, pp. 543-550.

Andison, D.W. (ed) 1999. Understanding and applying natural disturbance patterns on front range landscapes. *Foothills Model Forest Workshop, March 29-30, 1999.* Foothills Model Forest (FMF), November 1999, http://www.fmf.ab.ca.

Baker, Lynn, Woenne-Green, Susan, and the Mutitjulu Community Uluru. 1992. The Role of Aboriginal Ecological Knowledge in Ecosystem Management. In Birckhead, J., T. De Lacy and L.J. Smith (eds). *Aboriginal Involvement in Parks and Protected Areas, Papers presented to a conference organised by the Johnstone Centre of Parks, Recreation and Heritage at Charles Stuart University, Albury, New South Wales 22-24 July 1991.* Canberra: Aboriginal Studies Press,. pp. 65-73.

Biondini, M.E., Steuter, A.A., and Hamilton, R.G. 1999. Bison use of fire-managed remnant prairies. *Journal of Range Mangement* vol. 52, no. 5, pp. 454-461.

Blackburn, T.C. and K. Anderson (eds.). 1993. *Before the wilderness: environmental management by native Californians.* Menlo Park: Ballena Press.

Boyd, R. 1999. *Indians, fire, and the land in the Pacific Northwest.* Corvallis: Oregon State University Press.

Creque, J.A., Bassett, S.D. and West, N.E.1999. Viewpoint: delineating ecological sites. *Journal of Range Management* vol. 52, no. 6, pp. 546-549.

Fidler, P. 1793. Journal of a journey over land from Buckingham House to the Rocky Mountains in 1792 & 93. In Haig, B. (ed) 1991. *A southern Alberta bicentennial: A look at Peter Fidler's journal, 1792-93.* Lethbridge: Historical Trails West Ltd.

Higgs, E.S. et al. 1999. Culture, ecology and restoration in Jasper National Park. Final report of a 3-year research project. University of Alberta. www.arts.ualberta.ca/~cerj/cer.html.

---. 1997. What is Good Ecological Restoration? *Conservation Biology* vol 11, pp. 338-48.

Lewis, H.T. 1985. Why Indians burned: specific versus general reasons. In Lotan, J.E., Kilgore, B.M., Fischer, W.C., Mutch, R.W. (eds), *Proceedings, symoposium and workshop on wilderness fire.* Missoula: Intermountain Forest and Range Experiment Station, Forest Service, US Department of Agriculture, pp. 75-80.

---. 1982. *A time for burning.* Occasional Publication No. 17. Boreal Institute for Northern Studies, The University of Alberta.

Lewis, H.T. and Ferguson, T.A. 1988. Yards, corridors, and mosaics: how to burn a boreal forest. *Human Ecology* vol.16 , no. 1, pp. 57-77.

Murphy, P.J. 1996. People and fire in the western boreal forest environment. *Swedish-Canadian Academic Foundation Conference*, Faculty of Environmental Studies, York University.

Pyne, S.J. 1997 *Vestal fire: an environmental history, told through fire, of Europe and Europe's encounter with the world.* Seattle: University of Washington Press.

Swetnam, T.W., Allen C.D., and Betancourt, J.L. 1999. Applied historical ecology: using the past to manage for the future". *Ecological Applications* vol. 9, no. 4, pp. 1189 -1206.

Tande, G.F. 1977. *Forest fire history around Jasper townsite, Jasper National Park, Alberta.* M.Sc. Thesis, University of Alberta.

Wright, H.A. and Bailey, A.W. 1982. *Fire Ecology: United States and Southern Canada.* New York: John Wiley & Sons.