

**THE USE OF BROADCAST BURNS
TO ENHANCE WILDLIFE HABITAT
ON VANCOUVER ISLAND.**

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THE USE OF BROADCAST BURNS TO ENHANCE WILDLIFE HABITAT ON VANCOUVER ISLAND.

1.0 INTRODUCTION

1.1 Scope of the Review

This review was undertaken to provide background information on the potential for broadcast burning to enhance wildlife habitat on logged lands on Vancouver Island. The background material, prepared with HCTF seed funding, was intended to aid in preparation of more detailed and comprehensive HCTF submissions with respect to broadcast burns which could be carried out in 2001 and/or 2002. The review was done by D. A. Blood and Associates Ltd. for Mr. Kim Brunt, MELP, Wildlife Program, under MELP Contract No. 1070-20/01-11.

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1.2 Fire and Wildlife on Vancouver Island

Wildfire has probably been an integral part of the environment of Vancouver Island wildlife for several centuries, particularly on the drier, eastern side of the island. On the West coast, blow-down has been the most significant natural disturbance factor. These have been the main forces creating the early successional stages to which a few Vancouver Island wildlife species are at least partially adapted. Historically, native people used fire to maintain herbaceous plant communities such as camas stands in the understory of Garry oak forests (Ussery, 1993). For the most part these ground fires did not set back forest succession, but maintained old-growth oak trees in a park-like setting. Garry oak meadows are quite restricted in extent on the Island so that historical management of them has probably done little to shape the island fauna.

Historically, wildfires on Vancouver Island would have been most frequent in the Leeward Island Mountains Ecosection and adjacent valleys such as that of the Nimpkish River. That area belongs to Natural Disturbance Type (NDT) No. 2; includes the CDF

Zone and the ten driest CWH Subzone/Variants; has had fires of moderate size (20 - 1,000 ha); and has a return interval for fire disturbance averaging about 200 years (Forest Practices Code, 1995). That fire frequency was not great enough to result in permanent grassland, or savanna landscapes (although this may not be true for the Hypsithermal period) so that fires have not provided an opportunity for true grassland wildlife species to become established on the island. The two mammals with strongest affinities for herbaceous plant communities — Townsend's Vole and the Vancouver Island Marmot — may be relics from a time when herbaceous communities were more widespread.

With the advent of intensive control of wildfires, early successional stages now result almost entirely from logging. Logging has probably resulted in a larger area of disturbed forestland than was previously created by wildfire, however the logged habitats are not identical to burns, even if subject to slash burning. It should be noted that broadcast burns on logged sites do not set back succession in the same sense as wildfires in standing timber; they merely consume some of the debris which has been left behind. Some wildlife species such as black-tailed deer and blue grouse benefit from the early seral stages created by logging, however the extent to which those effects are further enhanced by broadcast burning has apparently been little studied.

The positive role of fire on Vancouver Island has been flavored by the impact of large man-caused wildfires in the Quinsam, Elk Falls and Sayward forest areas, primarily in 1938 and 1952. These resulted in temporarily high black-tailed deer and blue grouse populations in succeeding years (Robinson, 1953; Fowle, 1960). Such fires are unlikely to occur again. Extensive slash-burning prior to the 1980's, especially on low-elevation clear-cuts, probably resulted in higher deer numbers than would have occurred in the absence of burning (Gates, 1968; Smith, 1968). In recent years broadcast burning has been greatly reduced due to concerns for air quality and possible escape of fires. Future opportunities to employ fire to benefit biodiversity on Vancouver Island appear to be limited to the following activities:

1. broadcast burns ~~on~~ clear-cut blocks,
2. prescribed ~~wildlife~~ to control forest encroachment into alpine/subalpine habitats (V.I. marmot),
3. maintenance of Garry oak meadows.

2.0 BROADCAST BURNS AND WILDLIFE

2.1 *Historical Overview*

MacBean (1967) provides a historical perspective on the use of broadcast burning in coastal British Columbia. He notes that broadcast burning in coastal British Columbia dates from the 1920's, longer than in any other region in Canada. Early coastal logging practices tended to generate large slash volumes due to a high incidence of breakage, while economic conditions dictated the use of lumber-grade material only.

Broadcast burning was initially carried out to reduce fuel volumes and to assist in fire control. In 1938, a high level of concern over slash accumulation led to an amendment of the B.C. Forest Act making broadcast burning compulsory in the Vancouver Forest District. However, the advent of truck logging and water bombers in the 1940's facilitated the response to forest fires, thereby reducing the level of concern over fuel loading in some areas. These factors, combined with an increasing demand for pulp, resulted in higher utilization rates and reduces the overall volume of slash (MacBean, 1967). However, broadcast burning has been much reduced in coastal B.C. in recent years.

2.2 *Broadcast Burning as a Silvicultural Tool*

Silvicultural goals supplanted the reduction of fire hazard as the primary rationale for broadcast burning. This is particularly relevant to Tree Farm License operators, who are legally responsible for providing suitable conditions for regeneration (MacBean, 1967). The four main silvicultural applications of broadcast burning in British Columbia are: 1). to facilitate planting; 2). to provide a favorable environment for seedling establishment and growth; 3). to reduce competition from brush or undesirable advanced regeneration, and 4). to eliminate disease or insect problems (Feller, 1982). A more extensive list of reasons for using fire for site preparation in British Columbia was given by Hawkes *et al.* (1990) as follows:

- to reduce the fire hazard,
- to facilitate planting, surveys, and stand tending,
- to provide an environment favorable to seedling establishment and growth;
- to reduce brush competition or undesirable advance regeneration,
- to eliminate disease or insect problems,
- to enhance browse or grazing potential, and
- to improve an area for use by some wildlife species, primarily ungulates.

2.3 *Broadcast Burning as a Wildlife Enhancement Tool*

As noted in the above list, broadcast burning may have beneficial effects for wildlife as well as for forest management. However, many reports on the "effects of fire on wildlife" make generalized statements about benefits without clearly stating if they are based on broadcast burning of logged sites, or wildfires in standing timber. This makes it difficult to determine exactly what benefits have been achieved by broadcast burns.

The ecological effects of slashburning in B.C. have been reviewed by Feller, 1982. He notes that in the context of wildlife habitat enhancement, broadcast burning has been used primarily for ungulates. There is little information regarding its use in coastal B.C., and less still on the use of broadcast burning to enhance habitat for species other than ungulates.

Ungulates

Despite the widespread use of broadcast burning in coastal B.C. in the 1950's and 1960's, few studies involving its implications for wildlife appear to have been completed in this period. Daubenmire (1959) discusses the use of prescribed fire to benefit browse production for ungulates, although no specific reference is made to studies conducted in coastal B.C. or the U.S. Pacific Northwest. He notes that fire may improve browse production by stimulating production of more nutritious new sprouts, and by making them available at a height more easily reached by browsing animals. Similar findings were reported by Garrison and Smith (1974; cited in Bookout, 1994).

Some general effects of fire on plant life are also provided in ^DDaubenmire (1959). He cites studies finding that vegetation in burned areas "green-up" earlier in spring than unburned sites. He also notes that low intensity burns generally increase soil fertility for a period of a few years. He relates the higher fertility to changes in the soil pH, which in turn provides suitable conditions for nitrogen-fixing bacteria, and facilitates the establishment of plants with high nitrogen requirements.

Short-term effects of prescribed burning on the nutritional content of ungulate browse were also reported in the Southern Rocky Mountain Trench by Demarchi and Lofts (1985). Their findings may be relevant to the drier Biogeoclimatic Subzones of the B.C. coast (e.g. CDFmm, CWHxm), since three of the shrubs studied are also widely distributed on eastern Vancouver Island. These researchers found nitrogen levels in saskatoon, baldhip rose, and kinnickinnick were elevated for one year after burning. Phosphorus levels were also elevated in the two latter shrubs the first year following burning. In most cases, the increase in nutrient levels had leveled off within three years after the initial treatment. Given the complexity of interactions between browse plants and site factors, prescribed fire intensity and degree of browsing, these authors recommended managers approach the management of several browse species concurrently with a degree of caution. In a similar vein, Bookout (1994) reported adverse effects on forage production when prescribed fires occur at a high frequency and/or intensity.

A study conducted by Wood (1988) on the effects of prescribed fire on deer forage and nutrients in the southeast United States reported changes in forage quality and availability associated with prescribed burning to be of short duration. He reported minor increases in forage production and nutrient levels lasting only a few months when burning was carried out over a three to five year interval. His observations, of those and other workers (e.g. Garrison and Smith, 1974; cited in Bookout, 1994), suggest that one of the primary benefits associated with prescribed burning is the removal of litter.

Few references to the use of prescribed fire to improve ungulate habitat in the coastal context were found during this review. Smith (no date) recorded a dramatic increase in the density of black-tailed deer (from 6 - 150 deer/sq. mi.) within his Northwest Bay study area following logging and broadcast burning, peaking about 5-years after clearing. He attributed the higher densities to the increased production of

blackberry, huckleberry, willows and grasses following fire, and their higher protein content compared to typical understory species occurring in mature forest (e.g. salal). Spek (1983) made passing reference to debris elimination and an increase in available elk browse through "controlled burning" in an unpublished progress report submitted to the Habitat Conservation Fund. The burning was carried out in Tlools Creek area (tributary to the Elk River) of Strathcona Provincial Park. Details of the area treated and methods used are not provided, although the intention to continue with the burning program was clearly stated.

With respect to broadcast burning of deer and elk habitat in south-coastal B.C., Nyberg (1990) stated that "... lush and diverse herbaceous vegetation dominates many burned areas for several years after fire, providing spring and summer forage for deer to equal the best found in natural openings. The low albedo (reflective power) of fire-blackened ground further enhances the value of the south-facing clearcuts to deer because the soil warms quickly after snow melt, encouraging early plant growth. Because of their diet preferences, elk make less use than deer of post-fire vegetation". Nyberg noted that shrubs may initially respond less favorably than herbs to fire, but that after a few years burned sites support "... a more abundant and diverse shrub community than existed before the fire". He concluded (with respect to coastal forests of southern B.C.) that the combined effects of reducing slash and stimulating forage growth usually provide a 10 to 15 year benefit to forage production.

Black Bear

Although high levels of bear use are associated with early seral forests (Poelker and Hartwell, 1973; Lindsey and Meslow, 1977) few references were found regarding the use of broadcast burning as a habitat enhancement technique for this species. The apparent dearth of material in the scientific literature is likely related to the historical emphasis on hunting as the principal bear management tool (Lindsey and Meslow, 1977). In Wyoming, Irwin and Hammond (1985) suggested prescribed burning in avalanche chutes and aspen stands as a means of maintaining bear forage plants. Hamilton (1981, cited in Bookout, 1994) found that burning enhanced berry production in the southern United States, and may facilitate the creation of bear den sites by fire-scarring large diameter trees. The previous comments of Daubenmire (1959) regarding advanced green-up in burned areas suggests that burns could be beneficial to coastal black and grizzly bears, particularly in spring when other forage is relatively scarce (Lloyd, 1975). Increased herbage production in burns on Vancouver Island (Nyberg, 1990) and increased abundance of berry-producing shrubs such as red huckleberry, black raspberry and trailing blackberry, should benefit black bears.

Blue Grouse

One of the earliest studies which demonstrated beneficial effects of fire for wildlife in coastal B.C. was carried out by Fowle (1960). He studied blue grouse food habits in the vicinity of Campbell River following burns in 1938 and 1951. Fowle found that plants abundant in burned areas (e.g. bracken fern, hairy cat's ear) made a major

contribution to the summer diet (about 40%). He hypothesized that, unlike ruffed grouse, this species may be adapted to absence of free water in summer, provided berries and other succulent foods are present. Later, researchers working in the same region (Middle Quinsam Lake) demonstrated habitat selection among new adult and yearling blue grouse for "very open" versus "very dense" habitats (Bendell and Elliot, 1966). They recorded a preference in blue grouse for burned areas during the breeding and brood-rearing period. At times, burns were found to support very high densities of blue grouse. These workers hypothesized that natural burns were probably a feature of the blue grouse home range before the era of widespread fire suppression. It should be noted that the positive effects demonstrated in these studies resulted primarily from wildfires, rather than broadcast burns. Nevertheless, broadcast burns should also stimulate some of the food plants found in the wildfire burns, and thus benefit blue grouse to some extent.

Other Wildlife

In his review of the ecological effects of slashburning, Feller (1982) notes that slashburning results in little direct loss of wildlife, with the possible exception of some small mammals. Deer mice populations are reported to decrease following broadcast burns, however, they usually recover relatively quickly and increase in subsequent years. Other small mammals, including shrews and chipmunks may be adversely affected for many years after a burn. Ground-nesting birds are likely to benefit from vegetation changes following slashburning, while those that nest in shrubs are likely to be disadvantaged. Fire-hardening may render logs unsuitable for some burrowing mammals and members of the woodpecker family. It is expected that most terrestrial amphibians such as the red-backed and clouded salamanders would perish on sites subject to broadcast burning.

2.4 *Planning for Broadcast Burns*

The only logical opportunities for broadcast burns which would benefit wildlife involve cut blocks where burning is desirable first and foremost for silvicultural purposes. It is likely that most silvicultural burns would also benefit herbivorous wildlife, although this would undoubtedly vary from place to place. It is expected that such blocks will be in the drier CWH subzones in the central valleys of Vancouver Island.

The names of three licensees which had expressed an interest in broadcast burns for combined silvicultural and wildlife purposes were provided to us by Mr. Kim Brunt. Forestry staff of those firms were contacted (Appendix 1) to determine if they could identify future cut-blocks which were amenable to post-harvest burning, and provide some characteristics of the blocks which would enable us to assess their wildlife capability. We were contacted by telephone and able to discuss this matter with them, but the licensees were not able to provide the locations or characteristics of specific blocks at this time. This is because more lead time is needed if burns are to be incorporated into their silvicultural planning schedules. Silvicultural plans have already

been prepared for those blocks which will be logged in 2001 and it is not desirable to alter those plans. The earliest opportunity to carry out broadcast burns would appear to be in 2002.

The next steps in the planning process should include:

- 1). meet with licensees to review 2002 cutting plans and determine which, if any, cut-blocks may be suitable for broadcast burns which would benefit both silviculture and wildlife.
- 2). compile wildlife suitability/capability information for any blocks which have potential for burning (e.g. subzone/variant; elevation; aspect; steepness; site series).
- 3). provide input into a burn plan (it is expected that the burn plan would be primarily the responsibility of the licensee). Burn plans typically include a burn schedule, burn prescription, ignition plan, organization chart, safety and communications plan, smoke management plan, and budget (Gray Consulting, 2000a, 2000b). Wildlife related input would include material on burn objectives, and a plan for monitoring results of the fire such as changes in forage production. Typical contents of a burn plan are indicated in Appendix 2. Typical MOF requirements for a burn plan are indicated in Appendix 3.

The primary responsibility for burn planning and execution on TFL lands would be that of the tenure-holder, subject to Ministry of Forests guidelines or regulations. Obligations of the MELP Wildlife Program have been alluded to above with respect to the next steps in the planning process, and would generally include:

- advising the licensee, based on office review and field inspection, which proposed cut-blocks are likely to be enhanced for wildlife by means of post-harvest broadcast burning,
- development of wildlife objectives for the burn plan,
- development of and carrying out long-term monitoring of wildlife benefits achieved by the burn, and
- cost-sharing based on anticipated wildlife benefits.

The costs of detailed planning and carrying out broadcast burns can vary greatly from place to place. Direct costs include fireline construction, ignition resources (driptorches and fuel) and holding/mop-up resources. Gray Consulting (2000) estimated costs of \$13,365.00 for direct costs of a 41 ha burn near Darcy, B.C. this amounts to a cost of about \$326./ha. Information received from Western Forest Products indicates an average cost of about \$500./ha when no escapes are involved (Appendix 4).

3.0 CONTROL OF ALPINE/SUBALPINE PARKLAND FOREST ENCROACHMENT

3.1 Introduction

In locations where tree stands border habitats which are marginal for tree growth, i.e. dry grasslands or severe alpine/subalpine sites, tree encroachment may be held in check by fires which occur relatively infrequently. There is evidence that fires have occurred at the upper elevation of current forest growth on Vancouver Island (Milko, 1984). The major species which could benefit from such fire is the Vancouver Island marmot, although others like the Townsend's vole should also benefit. Evidence for a hypothesis that the marmots could only have survived the Hypsithermal period (when tree line was higher) due to periodic natural wildfires is presented below. That leads to conclusions that 1). wildfire control in recent years has been detrimental, and 2). prescribed fire could be used to improve marmot habitats.

3.2 Fire and the Vancouver Island Marmot

During its existence on Vancouver Island, *Marmota vancouverensis* has become sufficiently differentiated from its nearest relatives to be classified as a distinct species (Nagorsen, 1987). This suggests a quite lengthy period of isolation, although experts disagree on whether the species survived the most recent Pleistocene ice advance (the Fraser glaciation of Clague, 1981) in refugia associated with the island or colonized the island at the end of that glaciation (Hoffman *et al.* 1979; McCabe and Cowan, 1945). In any event, post-Pleistocene sea levels (Clague *et al.* 1982) suggest that colonization of Vancouver Island by marmots would not have been possible during the past 12,500 years. In other words, the marmots were continuously present through the Hypsithermal period, about 7,000 to 10,000 years BP, when the regional climate was warmer and drier than at present (Pielou, 1992; Hebda, 1994).

Although dispersing marmots have occasionally been found at low elevations, their usual habitat is in the alpine and subalpine zones (AT and MH Biogeoclimatic Zones of Green and Klinka, 1994). Colonies on southern Vancouver Island are primarily between 1100 and 1450 m in elevation on relatively steep, treeless slopes. The marmots are essentially restricted to high-elevation sites by virtue of their dependence upon open landscapes where they can communicate effectively and detect predators; their requirement for relatively dense, lush herbaceous forage; and their need for environmental conditions conducive to a long period of hibernation.

The total area of the AT and MH Biogeoclimatic Zones on Vancouver Island comprises only about 12% of the island area (Commission on Resources and Environment, 1994). This includes the continuously forested lower elevation portion of the MH, as well as extensive areas of rock outcrop and krummholz vegetation in the AT Zone and parkland subzone of the MH. The small amount of potentially suitable marmot

habitat is distributed as a number of patches of varying size that are separated by forested valleys. The limited extent of suitable habitat is considered to be a major reason for the small number of marmots inhabiting Vancouver Island (Munro *et al.* 1992).

It is a commonly held notion that the extent of alpine or alpine-like habitat on Vancouver Island has been steadily decreasing since the end of the Pleistocene period, reaching its minimal post-glacial extent at present. However, the climate was warmer and drier during the Hypsithermal interval, when Douglas-fir trees occurred on northern Vancouver Island where they no longer persist (Hebda, 1983) and fully developed trees grew in coastal sites that are above the present tree line (Archer, 1963). Based on several lines of evidence, Brooke *et al.* (1970) stated with respect to the MH zone in southwestern British Columbia: "... the climate at one time was more favorable for tree growth at high elevations than presently exists".

It is logical to predict that the extent of alpine habitat on Vancouver Island would have been less in the Hypsithermal period than today, leading to speculation about how marmots would have survived through that period. One possible explanation is that wildfires created and maintained suitable habitat in the alpine/subalpine zone. A warmer and drier climate would have been conducive to the spread of fires, many of which probably started in forested valleys and ran uphill into the alpine zone. These may have been caused by lightning, native people, or both. At high elevations the burned krummholz or other non-commercial forest stands would be very slow to recover, resulting in the persistence of early seral stages for extended periods. Fires are likely to have been of most common occurrence in the Leeward Island Mountains Ecoregion, a drier area than the Windward Island Mountains and Northern Island Mountains Ecoregions. This may have historically influenced the distribution of marmots, since all recent and extant records fall within the Leeward area (Bryant and Janz, 1996).

There is evidence of historical wildfire in the MH Zone in general (Brooke *et al.*, 1970) and within the range of Vancouver Island marmots (Milko, 1984). Milko *op cit* noted a charcoal layer near the surface, and remnant meadow vegetation in surrounding forest, at a colony site which was not on steep enough terrain to be maintained in a suitable state by snow creep or avalanching. Evidence for recent fires in the MH zone suggests that wildfire is still an important factor for maintenance of marmot habitat. However, recent reviews of the status of the species continue to stress that the marmots depend on meadow environments "... kept clear of trees by avalanches or snowcreep" and do not mention the possible role of fire (Bryant, 1996; Bryant and Janz, 1996).

The hypothesis that wildfire has been historically important for creating and maintaining marmot habitat also suggests that 1). fire control programs over the past 50 years will have been detrimental to marmot preservation, and 2). fire could be used to enhance marmot habitat and thereby increase marmot abundance. The sites most conducive to habitat enhancement for marmots presently support krummholz or other non-commercial tree stands, therefore it should be possible to institute a burning program which does not threaten valuable timber. Those sites tend to be at slightly higher elevation than commercial stands in the MH zone. Some logged sites in the lower MH

zone have been colonized (at least temporarily) by marmots (Bryant, 1996), therefore it is expected that some suitable habitats created or improved by fire would also be used.

In view of the perilous status of the Vancouver Island marmot, the subject of habitat enhancement by means of fire warrants immediate attention. Environmental conditions conducive to the spread of fire in high elevation sites may occur very infrequently, so that considerable research and monitoring may be needed to determine appropriate timing and locations. If those factors can be determined, then experimental burns should initially involve non-used or formerly used marmot habitats, with the intention of determining the extent to which site suitability is actually improved by fire.

4.0 MAINTENANCE OF GARRY OAK MEADOWS

The objectives of fire in this case would not be directed toward a particular wildlife species, but would involve the maintenance of certain herbaceous plant communities. Burning would reduce or eliminate dense stands of largely introduced shrubs and could have adverse impacts of some wildlife species currently associated with Garry oak environments. Most Garry oak stands now occur in close proximity to housing or other developments where burning would result in fire risks, adverse air quality, etc. There may now be no opportunities to reinstate burning programs in Garry oak habitats, however a thorough survey needs to be done to determine if any such sites exist.

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Appendix 1.



*Donald A. Blood
& Associates Ltd.*

WILDLIFE RESOURCE AND ENVIRONMENTAL CONSULTANTS

September 1, 2000

Mr. Jason Laird, Assistant Engineer,
Western Forest Products Ltd.,
Gold River Operation, P.O. Box 220,
Gold River, B. C. V0P 1G0
Fax: (250) 283 - 7222

phone (250) 283 - 2221

→ Zeballos 761 - 2200

Dear Mr. Laird;

Subject: Wildlife benefits of broadcast burns on Vancouver Island

Our firm is conducting a brief assessment of the potential of broadcast burns to enhance wildlife habitat on Vancouver Island. This project is under the direction of Mr. Kim Brunt, MELP, Nanaimo.

I note from your October 15, 1999 memo to Liz Stanlake of the HCTF, Victoria, that you support this initiative and that you are aware of some specific sites in the WFP Gold River Operation where both silvicultural and wildlife benefits could be achieved by means of burning. At this time I would very much appreciate learning the location of those blocks having potential for burning, and something about their characteristics (e.g. subzone; elevation; aspect) so that we will have a fair idea of their wildlife capability. PHSP's or similar documentation would probably be helpful.

Unfortunately, our contract with MELP does not involve field inspections.

We have also been asked to develop a budget for at least two burn sites and to review responsibilities of the key organizations which would be involved (MELP; MoF; Licensees), so if you have any comments on those items we would like them too.

I would appreciate it very much if you could contact me with respect to the above matters.

Yours sincerely,

Don

D. A. Blood, M.Sc., R.P.Bio.

DAB/sao
cc: K. Brunt
file



*Donald A. Blood
& Associates Ltd.*

WILDLIFE RESOURCE AND ENVIRONMENTAL CONSULTANTS

September 1, 2000

Mr. John A. Deal, R.P. Bio.
Habitat Forester, Canadian Forest Products Ltd.
Eaglewood Logging Division
Woss, B. C., V0N 3P0
Fax: (250) 281 - 2485

Dear Mr. Deal;

Subject: Wildlife benefits of broadcast burns on Vancouver Island

Our firm is conducting a brief assessment of the potential of broadcast burns to enhance wildlife habitat on Vancouver Island. This project is under the direction of Mr. Kim Brunt, MELP, Nanaimo.

I note from your October 26, 1999 memo to Liz Stanlake, HCTF, Victoria., that you support this initiative. At this time I wish to find out if you could identify two or more sites in the CANFOR tenure where broadcast burning is likely to have benefits for wildlife as well as silviculture, and could provide any background information on them (e.g. PHSP) so that we could generally assess their wildlife capability. Unfortunately, our contract with MELP does not provide for field inspections. Any such information you could provide would be very helpful.

We have also been asked to develop a budget for at least two burn sites and to review responsibilities of the key organizations which would be involved (MoF; MELP; Licensees) so if you have any comments on those items I would like them as well.

I would appreciate it very much if you could contact me with respect to the above matters.

Yours sincerely,

Don
D. A. Blood, M.Sc., R.P.Bio.

DAB/sao
cc: Kim Brunt
file