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THE 1993 FIRE AT HAYNE'S LEASE ECOLOGICAL RESERVE

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A documentation of damage and beginning regeneration of vegetation

H. Roemer

The following observations and illustrations are based on a brief visit to the ecological reserve on August 20, 1993, together with Bob Scheer. The visit occurred six weeks after a severe fire that had burnt all but the southernmost 1/5 of the reserve. Most of the steep, rocky slopes and all of the wetland portion were excluded from the visit. The brevity of the visit precluded an exhaustive search for surviving or reappearing plant species. Further, accurate identification had to rely on vegetative characters for species where re-sprouting was only just beginning. The present documentation will therefore be only an overview of the more obvious vegetation damage and a status of the regeneration stage six weeks after the fire.

In general, both the devastation by the fire and the degree of greenup only six weeks later were impressive. The bulk of new growth was on account of very few species, however. Fire intensity appears to have been lower and greenup was more advanced in portions burnt in a 1989 fire and dominated by a single grass species, Sporobolus cryptandrus (Sand dropseed). About half of all Ponderosa pines, despite their widely scattered occurrence appeared to have been killed by the fire.

Native vascular plants showing signs of regeneration (in order of decreasing cover, irrespective of pre-fire coverage):

Sporobulus cryptandrus (sand dropseed)	large number of individuals, high biomass, some with signs that they will flower
Rhus glabra (sumac)	very vigorous shoots from root suckers, high biomass, no mortality
Stipa comata (needlegrass)	scattered individuals re-sprouting; % mortality difficult to determine as burnt specimens are rarely distingishable from other bunchgrasses
Aristida longiseta (red three-awn)	as above
Agropyron spicatum (bluebunch wheatgrass)	scattered; on severely burnt portions, only an estimated 1/2 of individuals of this grass survived

Opuntia fragilis (prickly pear cactus)	scattered; in severely burnt portions only about 1/3 of the plants show re-sprouting from the root crown
Chrysopsis villosa (goldaster)	scattered survival; re-growth 6 - 8 cm tall
Achillea millefolium (yarrow)	scattered survival
Euphorbia cf. serpyllifolia (thyme-leaved spurge)	numerous, freshly seeded plantlets, but no large biomass
Eriogonum niveum (snow buckwheat)	few; probably scarce pre-fire
Artemisia frigida (pasture sage)	scattered; small re-sprouts only in less severely burnt portions
Purshia tridentata (antelope brush)	few survivors and only in less severely burnt areas. 95% or more of these shrubs were lost; survivors were of two kinds, large bushes resprouting from unburnt terminal twigs, and small bushes with 5 -15 cm long new shoots from the root crown
Balsamorhiza sagittata (balsam root)	few pre-fire specimens, most of which may have survived in a lightly burnt area
Phlox longifolia (long-leaved phlox)	one survivor noted; few pre-fire plants, some of them in pine needle accumulations which burned very hot
<u>only among rocks:</u>	
Rhus toxicodendron (poison ivy)	some survival and re-sprouting in heavily burnt area at foot of slope (higher rocky sites not examined)
Rosa cf. pisocarpa (clustered wild rose)	specimens re-sprouting where base protected by large rocks
[Artemisia tridentata (big sagebrush)	No living plants encountered; charred stems would be virtually indistinguishable from those of medium-size antelope brush; however, this species was present and locally abundant; 100 % mortality ?]

Fresh growth of non-native weeds (approximate order of decreasing abundance):

Linaria dalmatica (Dalmatian toadflax)	several large colonies, vigorously resprouting from fleshy rhizomes
Centaurea diffusa (diffuse knapweed)	re-growth of basal rosettes from root crowns, extensive survival
Cirsium arvense (Canada thistle)	small colonies, vigorous re-growth from rhizomes
Setaria viridis (green bristlegrass)	scattered individuals, annual, from seed
Amaranthus retroflexus (rough pigweed)	as above
Chenopodium album (lamb's quarter)	as above
Tragopogon dubius (yellow salsify)	fresh rosettes, from root
Convolvulus sepium (hedge bindweed)	new growth from fleshy rhizomes

The rest of the remaining 80 to 100 (mostly native) vascular species which occurred in the burnt parts of the reserve are not accounted for at this point, although some of them may be expected to have survived in the sparsely vegetated rocky portions and some others will come up from underground organs after the dormant period.

A more thorough baseline study to determine a complete list of vascular plant survival is therefore recommended for May 1994. This study should include also the rocky slopes.

A reliable list for comparative purposes of vascular plants in the reserve as of early summer 1993 does not exist. However, a composite checklist of species recorded up to 1988 has been compiled and is appended. This list pre-dates both major fires that occurred since establishment of the reserve and should be used as comparative baseline. (It will be important not to combine the post-fire checklist with the old checklist for the reserve.)

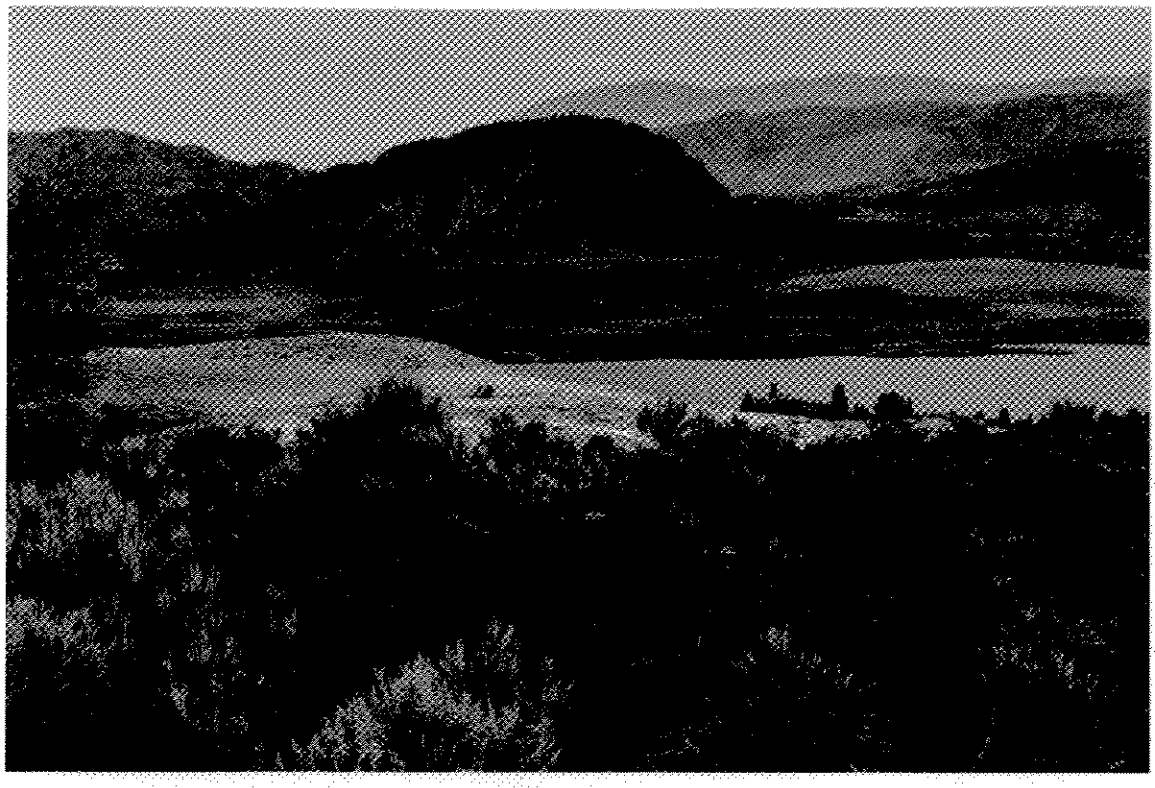
CHECKLIST OF VASCULAR PLANTS OF HAYNE'S LEASE ECOLOGICAL RESERVE, PRE-DATING 1989 FIRE

After records by C.Brayshaw and K.Wade, 1971, J.Pojar, 1976, H.Janszen, 1982, and L.Pavlik, 1988; compiled and edited[1] by H.Roemer (NOTE: The boundaries of the original proposal inventoried by the first three surveyors were wider than those of the present reserve.)

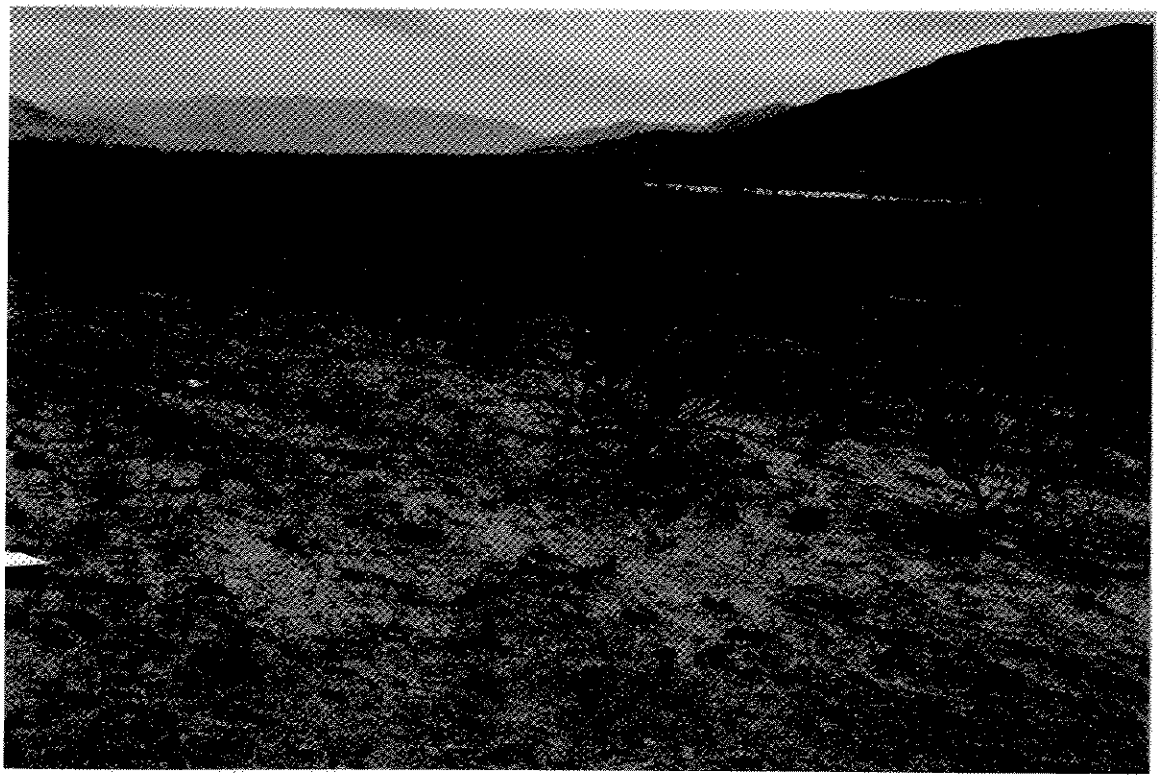
Achillea millefolium
Agropyron spicatum
Alnus incana
Amelanchier alnifolia
Antennaria dimorpha
Antennaria microphylla
Antennaria umbrinella
Apocynum cannabinum
Arabis holboellii
Arabis puberula
Aristida longiseta
Artemisia campestris
Artemisia frigida
Artemisia michauxiana
Artemisia tridentata
Astragalus miser
Astragalus purshii
Balsamorhiza sagittata
Betula occidentalis
Bromus tectorum
Calochortus macrocarpus
Camelina microcarpa
Carex aperta
Carex lanuginosa
Castilleja lutescens
Ceanothus velutinus
Centaurea diffusa
Chaenactis douglasii
Chenopodium fremontii
Chrysopsis villosa
Chrysothamnus nauseosus
Clematis ligusticifolia
Comandra umbellata
Cornus stolonifera
Crepis atrabarba
Crataegus douglasii
Cynoglossum officinale
Cystopteris fragilis
Delphinium nuttallianum
Descurainia pinnata
Draba verna
Elaeagnus angustifolia
Eleocharis palustris
Elymus cinereus
Elymus glaucus
Equisetum laevigatum
Erigeron filifolius
Erigeron linearis
Erigeron pumilus
Eriogonum heracleoides
Eriogonum niveum
Erodium cicutarium
Festuca idahoensis
Festuca occidentalis
Festuca octoflora
Fritillaria pudica
Galium aparine
Gaillardia aristata
Geum triflorum
Gilia aggregata
Heuchera cylindrica
Hippuris vulgaris
Holodiscus discolor
Koeleria macrantha

[1] Only obvious mistakes and synonyms were corrected while compiling this list in September 1993

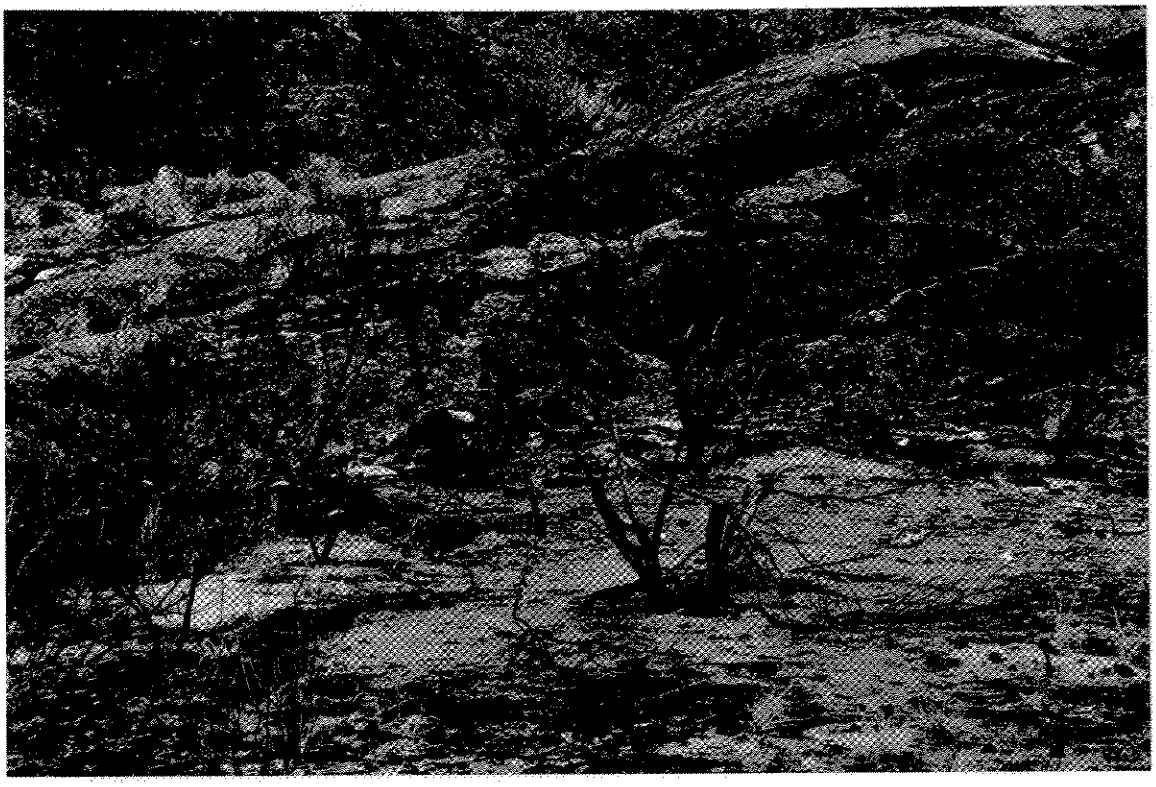
Lappula redowskii
Lemna minor
Lepidium densiflorum
Lepidium perfoliatum
Lepidium virginicum var. pubescens
Leptodactylon pungens
Lesquerella douglasii
Lewisia rediviva
Lithophragma bulbifera
Lithophragma parviflora
Lithospermum incisum
Lithospermum ruderale
Lomatium geyeri
Lomatium macrocarpum
Lomatium triternatum
Medicago sativa
Mentzelia albicaulis
Mentzelia laevicaulis
Microseris troximoides
Microsteris gracilis
Oenothera pallida
Opuntia fragilis
Orobanche californica
Oryzopsis hymenoides
Panicum scribnerianum
Penstemon confertus
Penstemon fruticosus var. scouleri
Penstemon richardsonii
Phacelia hastata var. leucophylla
Phacelia linearis
Philadelphus lewisii
Phlox longifolia
Phragmites communis
Pinus ponderosa
Plantago patagonica
Poa compressa
Poa cusickii
Poa juncifolia
Poa sandbergii
Polemonium micranthum
Polygonum douglasii
Polygonum majus
Potentilla anserina
Prunus virginiana var. melanocarpa
Pseudotsuga menziesii
Purshia tridentata
Ranunculus cymbalaria
Ranunculus glaberrimus
Rhus glabra
Rhus radicans
Ribes cereum
Rosa nutkana
Rosa pisocarpa
Rumex acetosella
Salix exigua
Salix rigida var. mackenzieana
Salsola kali
Sambucus caerulea
Saxifraga integrifolia
Scirpus acutus
Selaginella densa
Selaginella wallacei
Sisymbrium altissimum
Sisymbrium incisum
Sporobolus cryptandrus
Stellaria umbellata
Stephanomeria tenuifolia
Stipa comata
Stipa occidentalis
Symphoricarpos mollis
Taraxacum officinale
Tragopogon dubius
Triglochin maritimum
Tiodanis perfoliata
Typha latifolia
Verbascum thapsus
Verbena bracteata
Woodsia scopulina
Zygadenus venenosus var. venenosus
Zygadenus venenosus var. gramineus



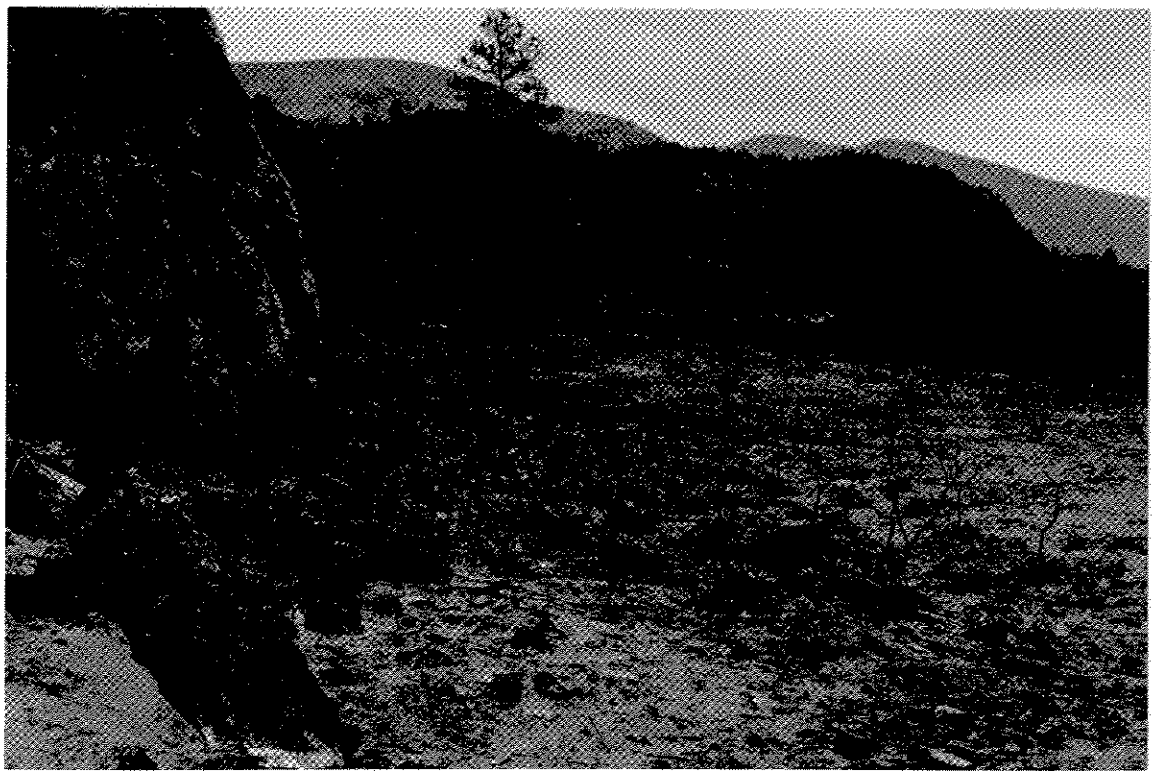
1. Distant view of Hayne's Lease Ecological Reserve as seen from Richter Pass Road. The heavily charred rectangular area (including the bright green patch) at the foot of the mountain is the ecological reserve. Most of the E.R. burned hotter than the surrounding grazed area due to the greater amount of dry dead grass on the ground. The green patch is explained in photographs # 9 and 10.



2. One of the most heavily burnt portions of the reserve, looking southeast. Dead, charred bushes were antelope brush (Purshia tridentata), a significant feature of the reserve and a plant with very narrow distribution in British Columbia.



3. The fire burned hottest near the foot of the rocky slopes. However, a lack of fuel in the rocky portions allowed some shrubs, such as wild roses (Rosa pisocarpa) and poison ivy (Rhus toxicodendron), which were rooted in deeper crevices to survive.

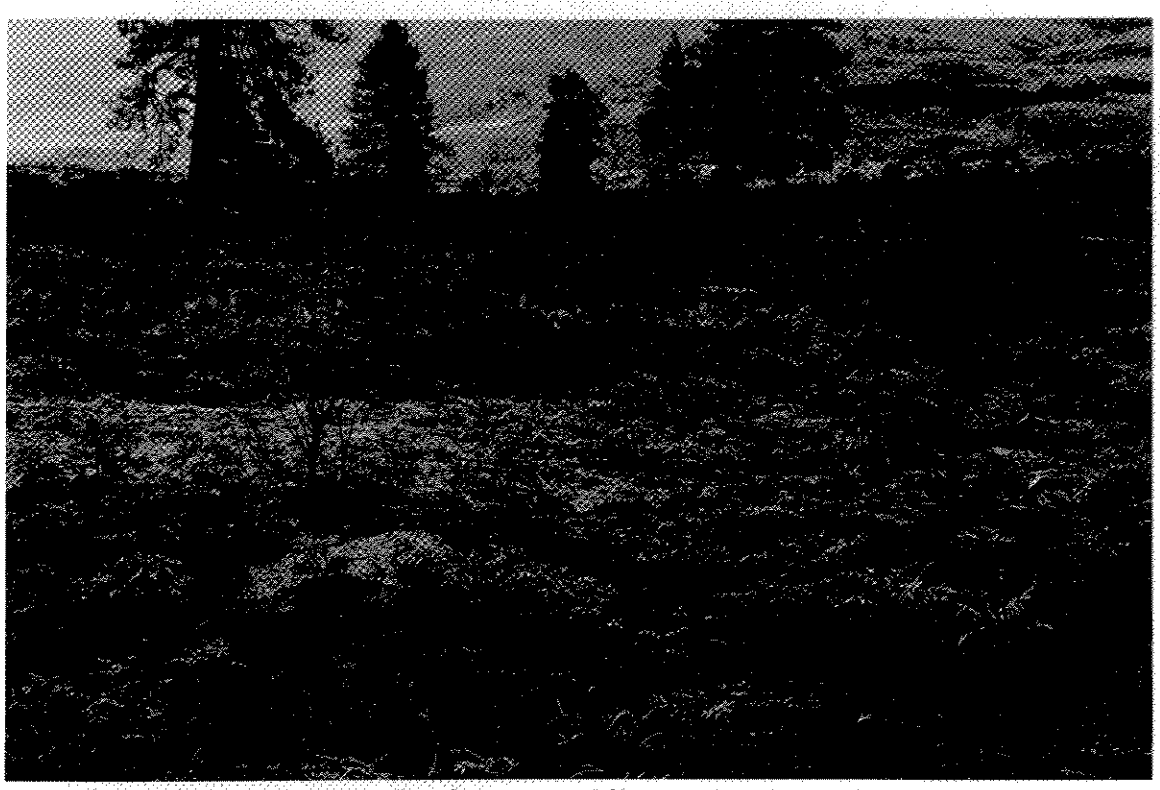


4. Regrowth of sumac (Rhus glabra) from root suckers was phenomenal. The fresh foliage is about one foot tall six weeks after the fire.

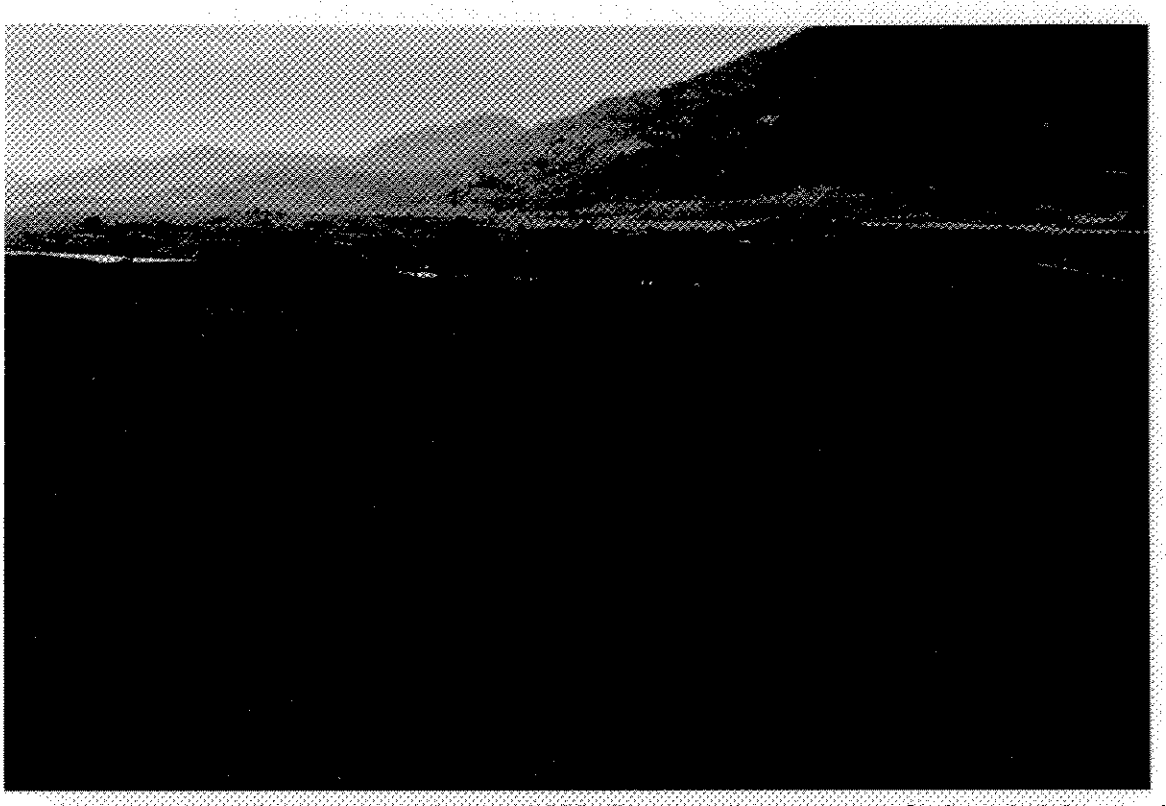
5. The largest of the antelope brush specimens were also the most severely burnt. The green foliage in the background is of diffuse knapweed (Centaurea diffusa). These plants apparently established themselves after the 1989 fire.

6. Prickly pear cactus (Opuntia fragilis) killed by fire (compare photograph # 7).

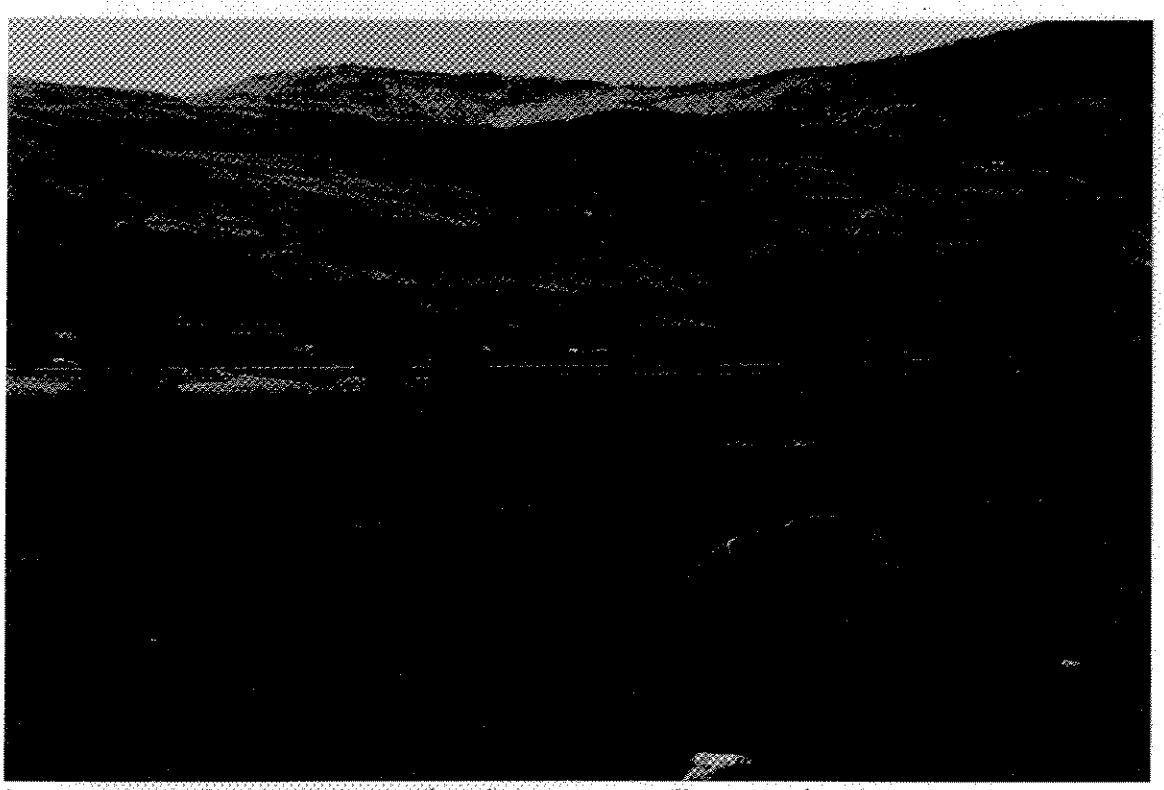
7. Only about one half of the bluebunch wheatgrass (Agropyron spicatum) survived. Some prickly pear cactus were re-sprouting from the root crown where less severely burnt.



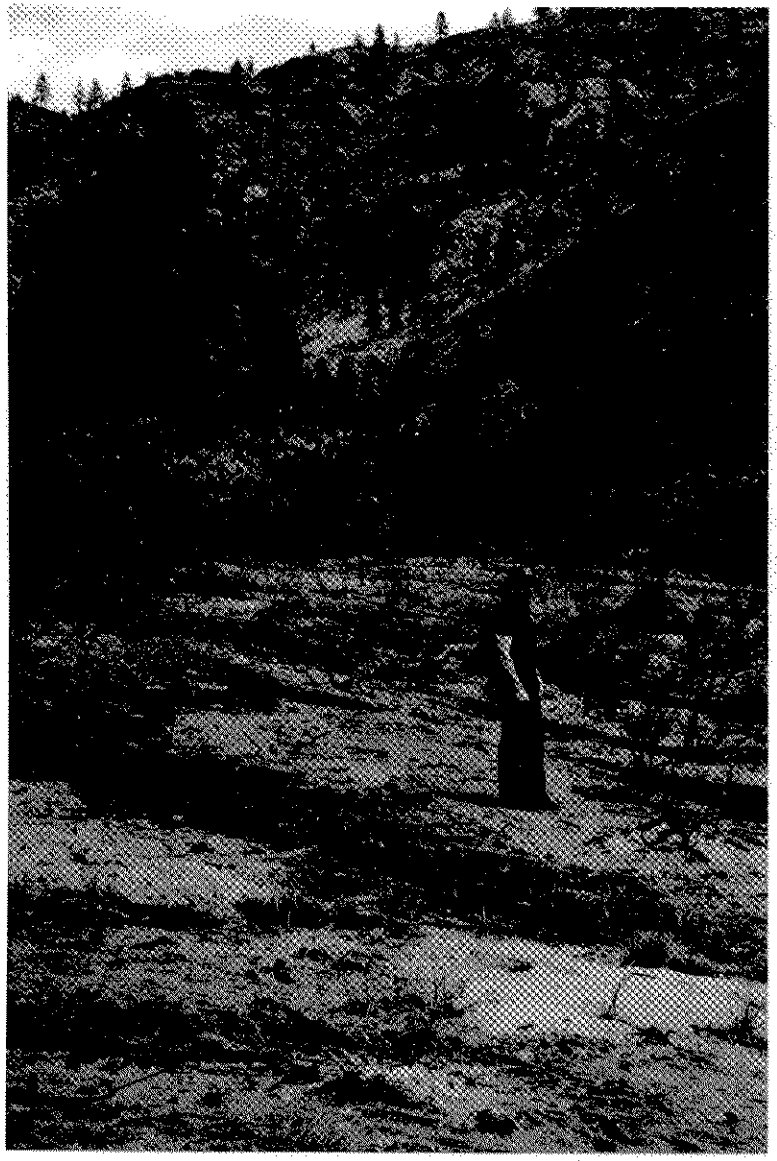
8. Sumac was rejuvenated and extremely vigorous, while nearly all antelope brush and even some large Ponderosa pines were killed.



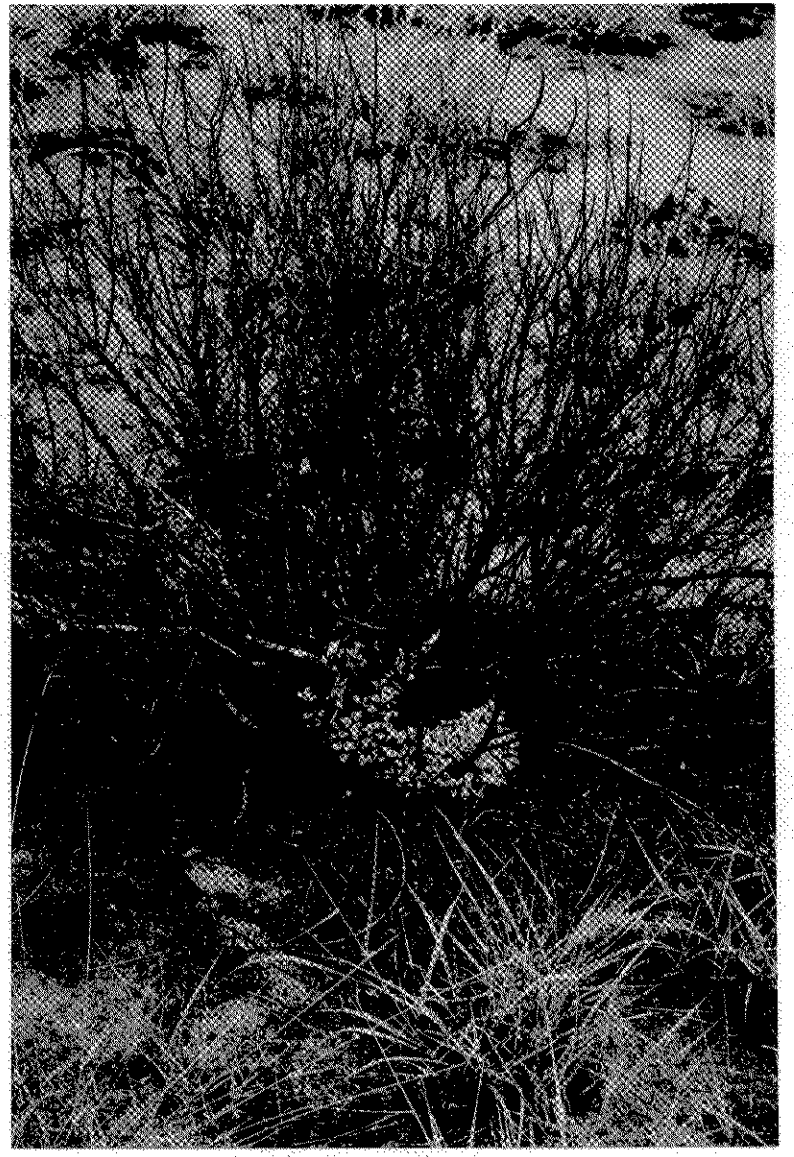
9. The green area on the left was burnt in the 1989 fire and (subsequently?) invaded by sand dropseed (Sporobolus cryptandrus). Due to this fire in 1989 there was less dry grass than elsewhere in the reserve. Antelope brush was also absent from most of this area. As a combined result of the above, the area on the left was less severely burned in the recent fire than the area on the right.



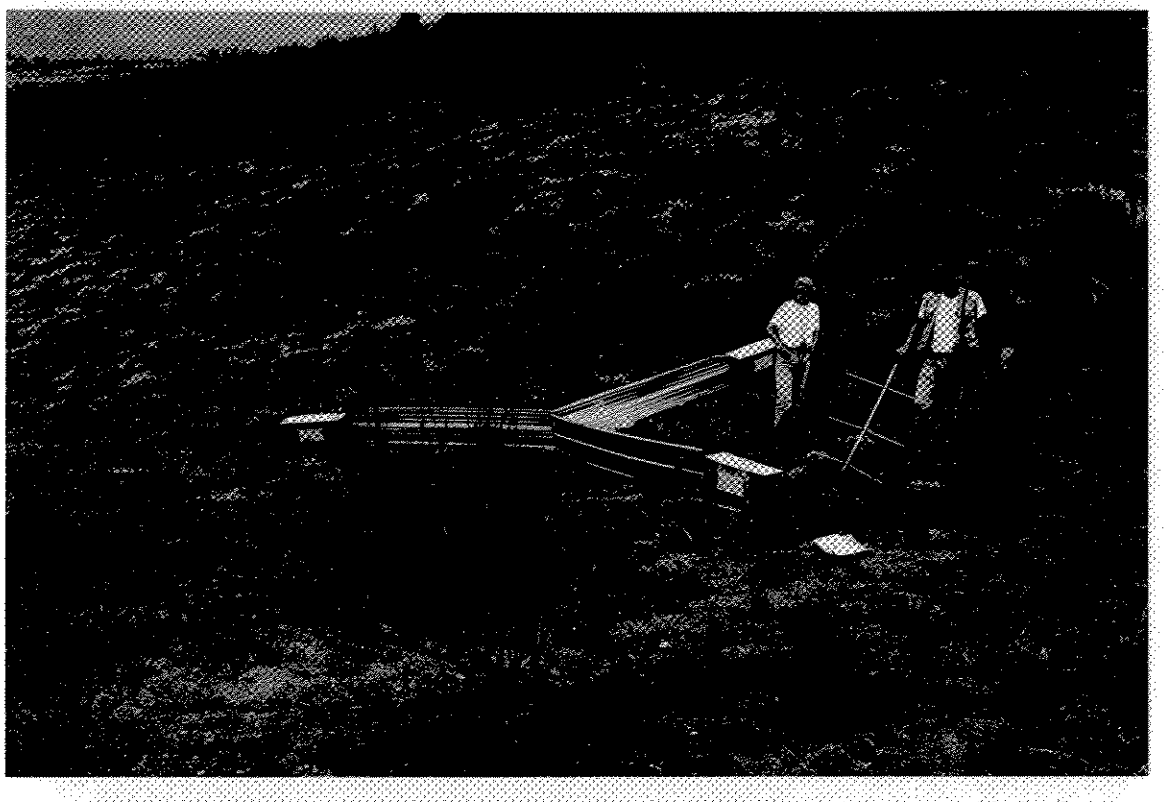
10. A nearly pure stand of drop seed, a native, but not generally appreciated grass, has come back vigorously and quickly after the recent fire. Several dead Ponderosa pines and the heavily burnt stands of antelope brush are seen in the background.



11. On heavily burnt sites such as this, sand dropseed (Sporobolus cryptandrus is nearly the only surviving grass. It may be expected to increase in dominance as most of its competitors are now removed.

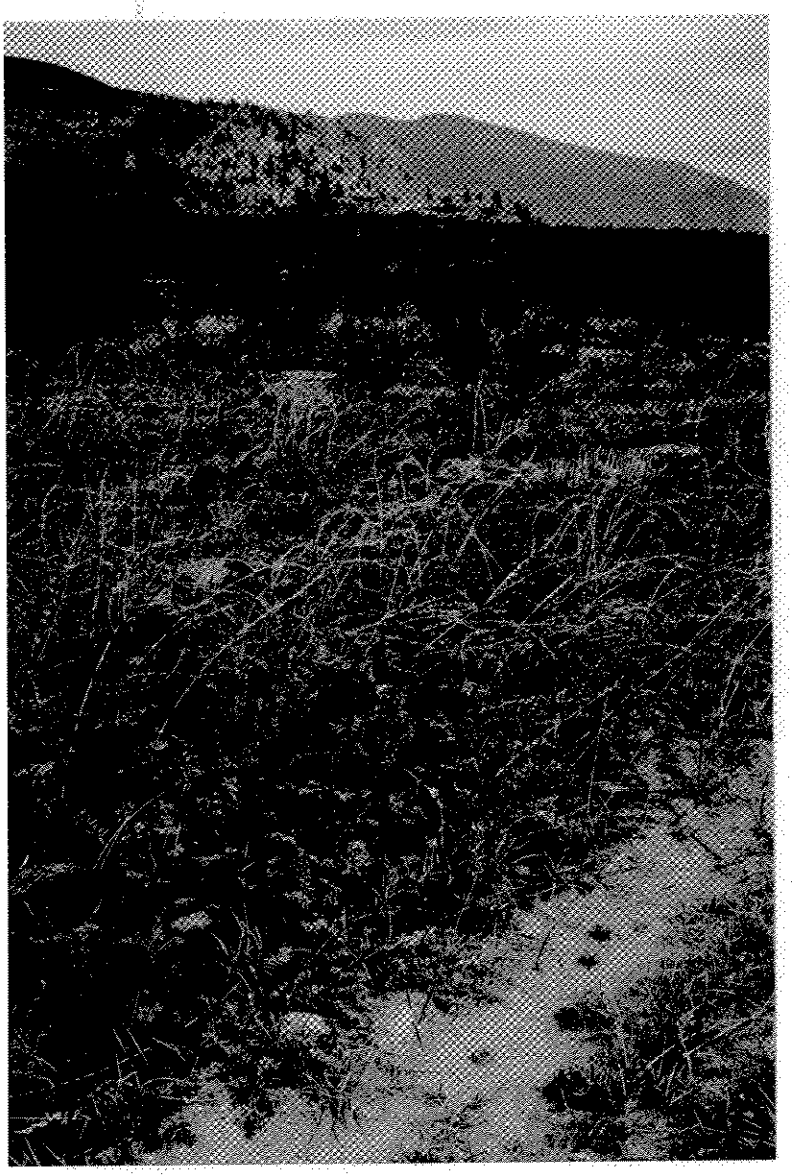


12. Only smaller plants of antelope brush were observed to have re-sprouted from the the base, and this only in less severely burnt areas. (Fore- and background: Sand dropseed)



13. Fence and trap arrangement for gopher snake census and research. About one third of the green grasses are bluebunch wheatgrass, the rest is sand dropseed. This is an area of moderate-intensity fire.

14. White evening primrose (Oenothera pallida), rare in B.C., is found on sandy cutbanks of the road right-of-way bisecting the reserve. This area was spared by the fire.



15. Dalmatian toadflax (Linaria dalmatica), a noxious weed in dry areas, has come back 100%, aided by an extensive network of fleshy underground rhizomes and roots. Heavy weed invasion is expected as a consequence of the 1993 fire.

16. In case anybody wondered what this place looked like before recent fires and weed invasions, here are four duplicate prints which Dave Larkey found for me. What a contrast!

HR.