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**IMPACT OF GRAZING ON MEYER SWAMP LICENCE AREA,
COOK RIVER FLATS; A FIELD
INSPECTION REPORT**

by

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INTRODUCTION

In 1970, the Cook River changed course, destroying large areas of forest, but also creating potential new sites for forest regeneration. Several scientists suggested that an area of the Cook River flat be protected from agricultural or forestry development and from grazing so that it could be studied long term to record the redevelopment of natural vegetation on newly formed silt flats. Part of Meyer Swamp, defined by the Cook Lagoon, the foot of the moraine, and the new course of the Cook River where it swings away from the moraine, was mooted as a possible study area (labelled "licence area" on map; note that the licence area, tutu area and the lower part of the present Cook River have replaced Meyer Swamp). This suggestion was not followed through and subsequently a 5 year grazing licence over that area was issued to John and Mark Shaw in July 1983. This licence is now up for renewal.

We were asked, by West Coast Regional Office of DOC, to survey the licence area to assess the impact of grazing on regeneration of native vegetation.

METHODS

On 16 June 1988 we spent 6 hours in the licence area in wet, northerly conditions. We entered from Gillespies Beach Road along an old logging access track. We made several traverses through the swamp: from the centre toward the coast, across a tributary of the Cook River to an 'island' at the southern end of the lagoon, back along the edge of the swamp to the distal end and finally returned along the forest edge at the foot of the moraine (route shown on map). We made notes on community composition, depth of silt and gravel layers, and browse sign.

VEGETATION PATTERN AND LANDSCAPE FEATURES

History

The lower Cook River occupies a broad, low lying river plain located between glacial lateral moraines. Like many West Coast rivers the Cook River has changed its course several times in the past. In 1970, precipitated by floods, the main course of the Cook River changed to flow down the channel of the smaller Clearwater River. Water overflowed the new channel and spread through a substantial portion of Meyer Swamp depositing large quantities of river silt and debris. Meyer Swamp had carried stands of rimu and kahikatea forest together with silver pines and interspersed with open scrub and herbaceous species. Most of this cover was subsequently killed by the flooding and build-up of silt. A few areas of forest survived on the southern fringe of the Meyer Swamp adjacent to the former channel and a few live trees remained near the coastal lagoon on the northern side of the new river mouth (A.D. Reid, unpublished Forest Service report).

Vegetation Pattern

Four vegetation/landscape units were identified: upper licence area, central licence area, lower licence area i.e. nearest the coast, and 'island'.

These units reflect differential impact of past flooding, varying water table and different base material. The major vegetation components are described.

1. Upper licence area

The eastern end of the licence area appears to have suffered the worst impact of the 1970 flood, as well as several subsequent silt and gravel deposits. Standing dead kahikatea stems are sparsely scattered across the area and many decaying logs lie on the ground. The area is characterised by a very short, grazed turf of predominately exotic pasture grasses and herbs: Yorkshire fog, lotus, brown top, sweet vernal, selfheal, Jersey cudweed. The pasture species, and white clover, are apparently absent (one specimen only of each species was found in the whole survey area).

Some native species are establishing on otherwise bare mounds of gravel eg small leaved pohuehue, the mat daisy *Raoulia tenuicaulis* and a moss *Polytrichum*. Occasional plants of *Carex comans*, gahnia, and flax, and small coprosma shrubs showing signs of browse, are present.

2. Central licence area

The middle section of the licence area, about half the total area, would have been a dense stand of kahikatea. Now only the dead boles remain, killed by the deposition of a 25 cm layer of silt and a much deeper layer (at least 1 m) of gravel. The boles have weathered through time and lost their tops leaving them about 8-10 m tall (cf probably 30 m when alive). Many boles have been removed for timber and others lie on the ground covered by vegetation. Occasional wheki and broadleaf which would have survived the 1970 flood are present. They support epiphytic broadleaf, kamahi, *Coprosma foetidissima*, *Metrosideros fulaens* and abundant *M. perforata*. The shrub layer is dominated by flax and with occasional individuals of *Coprosma propinqua*, *C. taylorae*, lancewood, rohutu and gahnia.

The dominant cover (70%) is a sedge and grass turf. In drier areas it comprises pasture grasses (as above) as-well as *Carex comans*, catsear and *Gunnera monoica* and introduced herbs such as foxglove, selfheal, and Scotch thistle. In wetter areas *Carex comans* dominates with streaks of *Carex disita*, *Isolepis cernua*, *J. gregiflorus*, the exotic rushes *J. effusus* and jointed rush, and bryophytes. At the base of many trunks, ferns such prickly shield fern, *Blechnum fluviatile*, *B. minus* and *B. penna-marina* grow. Based on our observations regeneration of woody species is almost non-existent. What plants that have regenerated show abundant evidence of browse.

3. Lower licence area

The 1970 flood appears to have caused less damage to the area nearest the lagoon. The density of standing boles and of extant shrubs and short trees is greater than in the centre of the swamp. The forest appears to have been a mixture of silver pine, kahikatea and manuka, and was probably less than 15 m tall over much of this area.

The substrate has a deep layer of gleyed silt over gravel reflecting a high water table. Because it is damper, the flax and gahnia are larger and more abundant than in the centre of the swamp; about 40% cover and 1-3 m tall. By contrast, the cover of pasture grasses is less. Instead, *Carex comans* provides about 50% cover in association with *Carex virgata* and *Baumea tenax*. Herbs of damper ground such as bog stitchwort are also present.

Manuka is regenerating well, some plants being 1.5 -3 m tall. Extant shrubs and short trees, up to 2 m tall, many epiphytic, are common and include broadleaf, cabbage tree, southern rata, kamahi, pokaka, putaputaweta, lancewood and mountain fivefinger.

Adjacent to the lagoon some of the dead standing boles are rimu. Some of these, together with a few kahikatea trees, are just surviving with minimal foliage. Here the density and diversity of broad-leaved shrubs is greatest and includes weeping mapou, mapou, kiekie, *Ascarina lucida*, *Coprosma rotundifolia*, *Astelia grandis* and the ferns *Blechnum chambersii*, *B. 'black spot'* and *Pneumatopteris pennigera*. Most of the shrubs would have survived the flood as evidenced by their lack of tops. They also have minimal foliage on the lower trunk as a result of browsing by stock.

Even in this damp area with mostly native cover and where a minimal humic layer has developed, few seedlings were found, none of kahikatea. A few (less than 10) rimu saplings were seen.

4. 'Island'

This 'island' bounded by the Cook River and a minor tributary is outside the licence area but we visited it because it supports a kahikatea forest which has been flooded quite recently. A 15-25 cm thick layer of silt was deposited and earlier silting was also evident. The kahikatea trees while alive appeared to be unhealthy, presumably due to the silt deposit. Tall flax, gahnia and *Carex virgata* were prominent covering perhaps 80% of the area. The few *Coprosma propinqua* shrubs which have either survived or established since the recent inundation are heavily browsed. Areas of bare silt are common and are being colonised mostly by exotic species such as jointed rush, creeping bent, and yarrow.

This area is in an early stage of development after flooding (although almost certainly still subject to regular flooding). It demonstrates the kind of processes which occur/have occurred after flooding on the rest of the licence area.

IMPACT OF GRAZING

While doing the survey we saw about 20-30 sheep and abundant sheep droppings and stock tracks. Throughout the area the turf was closely grazed, most coprosma shrubs showed signs of browse and the lower foliage of shrubs such as broadleaf was absent. Grazing pressure is certainly restricting the establishment of native shrubby plants and may also be promoting the spread of pasture grasses and exotic rushes at the expense of native herb and grass species.

Only minimal regeneration of any native woody species was observed and almost no podocarp seedlings were found. This is in sharp contrast to an adjacent area on the other side of the Cook River. Here tall (c 2-3 m) tutu is abundant. A possible explanation is that this area was inaccessible to stock for the critical few months while the tutu was establishing. (Nitrogen-fixing plants are usually very palatable to stock). If this is the case, it is further evidence that the trampling and grazing of stock in the licence area has severely curtailed the regeneration of native species. It has also prevented spread of gorse which is abundant nearby.

Frost may also have a limited impact on regeneration; much of the ground surface showed evidence of freeze and thaw action. The most significant factor limiting *Podocarp* regeneration is likely to be the lack of shrubs to attract birds into the area, allow them to perch and pass seeds. Until podocarp seed can disperse into the area there will be no regeneration of same.

Except in the damper area where manuka regeneration is well underway, it seems unlikely that broad-leaved species will establish in the licence area under the present grazing regime. Grazing is holding regeneration to native shrubland, and subsequently to forest, in abeyance. The area is such a dynamic one that it would be hard to accurately predict the future of this site, with or without stock. It would appear that since the initial floods there have been continued minor deposits of fresh silt. Further deposits, or another major change in the river course, will have a dramatic influence on the pattern of vegetation change at the site.

Even without stock grazing it is unlikely that this area would have gone through the 'natural' regeneration processes leading back to kahikatea forest as described by Peter Wardle (Proceedings of the New Zealand Ecological Society (1974), 21: 62-71). Since the advent of European settlement of South Westland, large numbers of adventive plant species have been introduced. The distribution of some of these is dependent on human activities (eg ryegrass and white clover) but others appear to have the ability to spread and establish onto any suitable site without human assistance (eg

Yorkshire fog, thistles, and gorse). It is likely that even grazing, these species would have dominated sites such as the recently flooded areas of the Cook riverbed.

The influence of these adventive species on the future development of kahikatea forest is uncertain. If stock were removed, a possible scenario is that coarser pasture grasses such as Yorkshire fog would grow tall and rank and nitrogen-fixers such as broom, gorse and tutu would establish. The thick sward would make regeneration of native woody species difficult although they could well establish on higher hummocks or on bare patches. Once a shrubland had developed podocarp regeneration would be more of a possibility. Clearly more information on the interactions between adventive species, grazing and forest establishment is required.

OPTIONS

The three options for this licence area appear to be:

1. Complete protection; ie no further grazing
2. Renew the present licence; review in the future
3. Renew the present licence; allow for grazing in perpetuity.

If stock were removed this would probably provide the maximum opportunity for regeneration of broad-leaved species and subsequently of podocarp species, even given the caution raised in the last section. Ungrazed river flats are uncommon in South Westland therefore such an area would have conservation value.

Option 3 would preclude the use of the area as a site for monitoring regeneration as originally suggested. Its value as a part of the national park would be reduced.

The second option would allow time for action on the proposed package of studies to look at the impact of grazing on South Westland native vegetation. These studies should provide more detailed information than could be gleaned from a 1 day survey eg the likely succession after stock removal and more details on the effects of stock on native vegetation. An informed decision can then be taken on the area. Continued grazing will continue to prevent regeneration of most native woody species, and the spread of adventive shrubs such as gorse. It is not likely, however to alter the success of regeneration of native species after stock removal later.

Other areas of the Cook riverbed are also of potential interest where the scientific study of succession of species could be conducted. Before any decisions are made on the scientific merits of the licence area being considered here, these other areas should be assessed. Of particular interest is the old river channel on the south side of the valley where Dr Gerry McSweeney says there was "extensive kahikatea regeneration in the early 1980's". Although we saw no regeneration during a very brief inspection on 17 June 1988,

the dry nature of this site restricts the growth of adventive grasses and should provide a potential habitat for many native herbaceous species. Subsequent establishment of woody shrub species may, in-time, see the development of totara forest in that area.



Photo: Central licence area showing dense stand of dead kahikatea boles, over predominately adventive grass, herb and sedge turf. Some old logs lie on the ground and re-establishment of flax, wheki, broadleaf and toetoe is limited.

GLOSSARY OF COMMON PLANT NAMES

Common Name	Botanical Name
bog stitchwort	<i>Stellaria alsine</i>
broadleaf	<i>Griselinia littoralis</i>
browntop	<i>Agrostis capillaris</i>
cabbage tree	<i>Cordyline australis</i>
catsear	<i>Hypochaeris radicata</i>
creeping bent	<i>Agrostis stolonifera</i>
epilobium	<i>Epilobium</i> spp
flax	<i>Phormium tenax</i>
foxglove	<i>Digitalis purpurea</i>
gahnia	<i>Gahnia xanthocarpa</i>
Jersey cudweed	<i>Gnaphalium luteo-album</i>
jointed rush	<i>Juncus articulatus</i>
kahikatea	<i>Dacrycarpus dacrydioides</i>
kamahi	<i>Weinmannia racemosa</i>
kiekie	<i>Freycinettia banksii</i>
lancewood	<i>Pseudopanax crassifolius</i>
lotus	<i>Lotus pedunculatus</i>
manuka	<i>Leptospermum scoparium</i>
mapou	<i>Myrsine australis</i>
mountain fivefinger	<i>Pseudopanax colensoi</i>
pokaka	<i>Elaeocarpus hookerianus</i>
quintinia	<i>Quintinia acutifolia</i>
prickly shield fern	<i>Polystichum vestitum</i>
rohutu	<i>Neomyrtus pedunculata</i>
Scotch thistle	<i>Cirsium vulgare</i>
self heal	<i>Prunella vulgaris</i>
silver pine	<i>Lagarostobus colensoi</i>
silver tussock	<i>Poa cita</i>
southern rata	<i>Metrosideros umbellata</i>
sweet vernal	<i>Anthoxanthum odoratum</i>
toetoe	<i>Cortaderia richardii</i>
weeping mapou	<i>Myrsine divaricatus</i>
wheki	<i>Dicksonia squarrosa</i>
yarrow	<i>Achillea millefolium</i>
Yorkshire fog	<i>Holcus lanatus</i>

Meyer Swamp Grazing Licence Area

Cook River Flats

