

**BIOLOGICAL RESERVES IN THE WEST COAST AND SOUTHLAND BEECH FOREST MANAGEMENT REGIONS**

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**SUMMARY:** The main purposes of biological reserves in the northern West Coast and western Southland beech forest management regions and some factors affecting their selection are described. Their total area is about 30,000 ha in the West Coast region and about 5,000 ha in western Southland (excluding Waitutu State Forest).

## INTRODUCTION

There are various scientific reasons for reserving areas of land and strictly protecting the plants and animals sustained by them.

The main reason for biological reserves in the regions under review is to secure undisturbed examples of the main forest ecosystems for research. The reserves thus become control areas for monitoring the changes occurring in formerly comparable areas. The reserves proposed by the New Zealand Forest Service within the West Coast and Southland "beech utilisation schemes" are seen as the equivalent of what are usually known overseas as "natural areas" or "scientific reference areas". The basic principles have been reviewed by Moir (1972).

In practice, the selection of reserve areas presents many problems. The ecologist must exercise sound and informed judgment in choosing adequate, viable and representative areas, and he usually has to defend his selection against other claims for the land or against existing legal rights which may conflict with the proposed reserve. For a comprehensive account of the difficulties of selecting and establishing biological reserves see Franklin and Trappe (1968). Although based on United States experience it applies equally well to New Zealand conditions.

Until a year ago, most of the biological reserves established by the New Zealand Forest Service were in the North Island, because our knowledge

of the composition of the North Island indigenous forests is better than of those in the South Island. However, the completion of preliminary plans for the South Island beech utilisation scheme caused a reassessment of priorities, and attention is now being given to reserving some areas in these regions for scientific purposes (Thomson and Nicholls 1973).

## SELECTING THE RESERVES

In this account, "West Coast" means all the land between the Buller and Hokitika rivers west of the Brunner and Victoria ranges and the main divide south of Lewis Pass; "western Southland" includes the Longwood Range, the Waiau Valley below Lake Monowai, and the terrace and hill country further west as far as Lake Hauroko. (At the present time, the delineation of biological reserves between Murchison and Lewis Pass, and in the far western portion of the Southland beech scheme, is still under review.)

Biological reserves in these two regions are fully justified, even without the beech schemes. Firstly, although some features are repeated elsewhere in New Zealand, each region is ecologically unique. Secondly, both regions have already been drastically changed in many areas by several kinds of use or by outright exploitation.

The main reserves should be large and ecologically comprehensive areas undisturbed by logging. But reserves are also needed in

disturbed areas, either because the "virgin" communities have been too greatly reduced or because interference has resulted in types of vegetation which are themselves of particular value for scientific comparisons (e.g., beech pole stands on mined ground or regenerating burnt pakihi vegetation).

During the selection of the reserves which are now proposed and which are enumerated below, the forest types defined by the National Forestry Survey of 20 to 25 years ago were generally relied upon. There has been no time for a special closer study of forest community patterns; but recent local research by Herbert (1972) and Wardle (1972), the discussion of forest patterns and succession by Holloway (1954), and the general knowledge of Forest Service officers in the Nelson, Westland, and Southland conservancies have all provided valuable supplementary information. The allegation sometimes heard that the Forest Survey types are based solely on timber volumes needs to be refuted. On the contrary, the very broad Forest Survey typing of most of the northern West Coast forests was ecologically based, and the types were accepted, without further subdivision, as sufficiently accurate indicators of timber volumes for an estimate of regional resources (Naylor 1955, Rawson 1954). In western Southland, typing was more detailed, but again the first broad stratification was ecological (Holloway 1952).

Ecosystems were first recognised on geological, physiographic, and climatic grounds. Large areas of the more common Forest Survey types have thus been set aside in several places, and probably include most of the local variations in plant and animal distribution, soil types and so on. A special attempt was made to cover the seemingly anomalous occurrences of some types, which is especially a feature of the West Coast region.

Each proposal is, of course, still open to review. No doubt the mooted Scientific Advisory Committee will closely examine them. Some amendments are also likely if scope is found for biological reserves within the scenic reserves administered by the Department of Lands and Survey.

#### PROPOSED NORTHERN WEST COAST BIOLOGICAL RESERVES

##### 1. *Tiropahi* (ca. 7,000 ha)

This contains the complete sequence of forest types on the western side of the Paparoa Range: coastal podocarp-hardwood forest, beech-podocarp forest types on limestone terrain, riparian flats, the lower flanks of the range, and flights of gravel terraces; pure montane beech forest to the tree line and shrubland beyond this.

##### 2. *Tailings Creek* (ca. 650 ha)

Mainly regenerating logged lowland beech-podocarp forest, to be compared with the undisturbed associations in the Tiropahi reserve.

##### 3. *Blackwater* (ca. 8,500 ha)

This covers the full range of types on the northern quarter of the Paparoa Range: types of beech-podocarp forest in the lower valleys, including a local red beech-kaikawaka type; montane forest variously composed of silver or mountain beech, or bog dactyldiums and shrub hardwoods, with marked local differences in the altitude of the tree line.

##### 4. *Fletcher's Creek* (ca. 2500 ha)

A representative portion of the altitudinal sequence of forest types on the west side of the Inangahua Valley: beech-podocarp forest on flood plains and gravel terraces, very steep limestone terrain and higher, dissected gravels; mountain beech forest at higher altitudes on very infertile sandstone country.

##### 5. *Coal Creek* (ca. 3,000 ha)

A representative portion of the altitudinal sequence of forest types on the east side of the Inangahua Valley, with certain other vegetation types: manuka and regenerating beech forest on the lower country; beech-podocarp types on the mid-slopes of the Brunner Range; a wide belt of montane podocarp-hardwood forest above this, grading into montane shrubland on the crest of the range.

##### 6. *Capleston* (ca. 150 ha)

The best remaining example of undisturbed

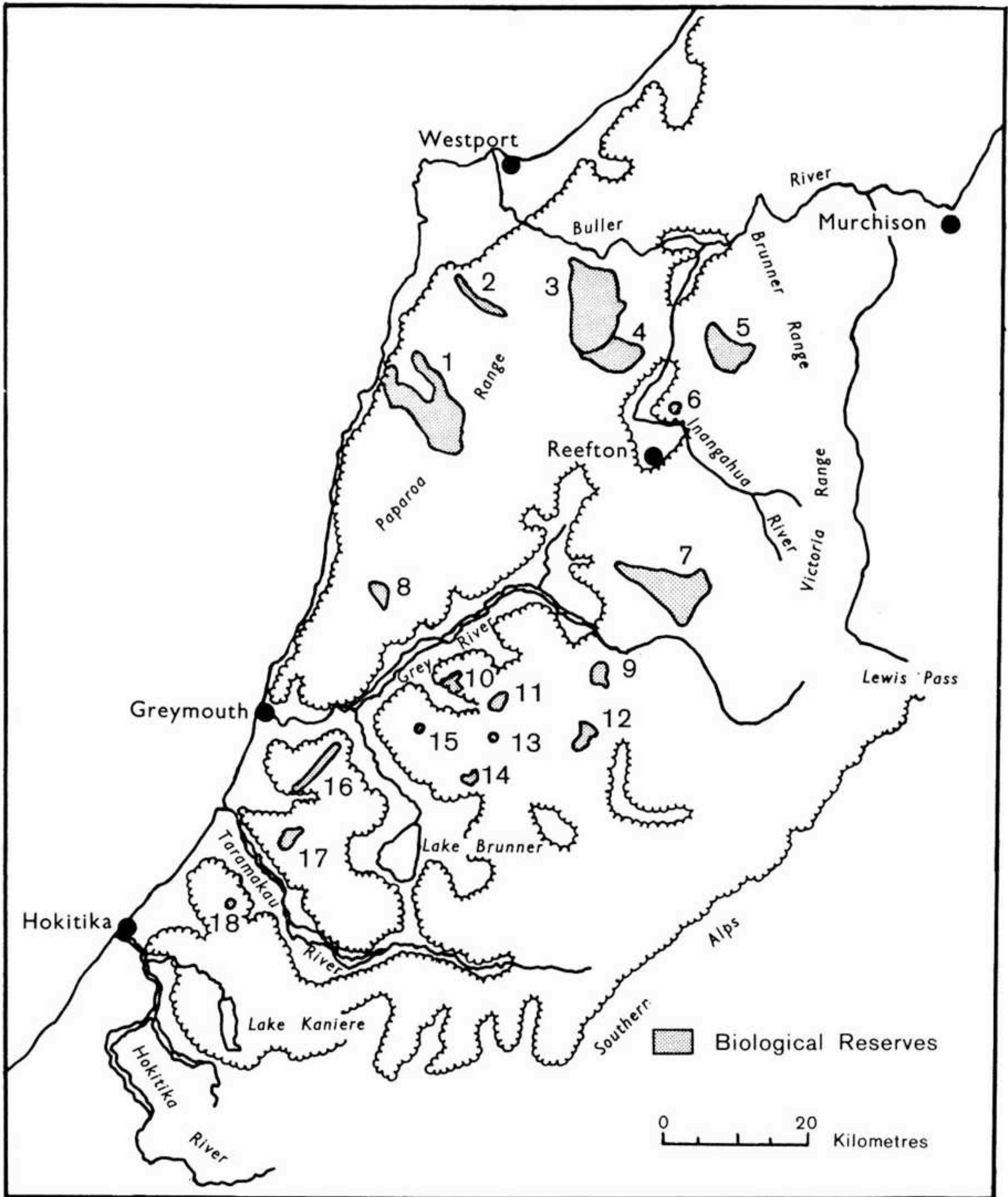


FIGURE 1: Northern West Coast area showing the locations of the proposed biological reserves (numbered as in text).

rimu-hard beech-red beech forest on the oldest gravel formation in the Inangahua Valley.

7. *Big River – Snowy River* (ca. 5,000 ha)

This contains the complete sequence of forest types of the Reefton hill country and the upper Inangahua-Grey divide: the hard beech-podocarp forests of the Big River Valley contrasting with the red and silver beech-podocarp forests of Snowy River Valley; mountain beech-pink pine forest on elevated morainic gravels and silver beech forest on the upper slopes of Bald Hill granitic mountain; also beech pole stands of apparent natural origin.

8. *Roaring Meg* (ca. 1,000 ha)

This covers the upper half of the catchment of Roaring Meg Creek on the south-east side of the Paparoa Range; on this side of the Grey Valley, it is the only undisturbed example of the beech-podocarp/podocarp-hardwood ecotone, with low altitude and montane podocarp-hardwood forest separated by a belt of beech forest; the reserve also includes montane shrubland.

9. *Waipuna* (ca. 700 ha)

A partly-exploited but still classic example of the post-Glacial mosaic of forest communities on the intricate soil pattern of the Waimea gravel formation between the upper Grey and Ahaura rivers.

10. (ca. 200 ha)

Mainly undisturbed forest just north of Nelson Creek: an example of beech-podocarp forest in valleys and remnants of podocarp-hardwood forest on undissected Cockeye gravels above; also contains beech pole stands.

11. *Kelly's Creek* (ca. 300 ha)

This reserves beech-podocarp forest on broken country, podocarp forest with varying amounts of beech on the Waimea gravel formation and pure podocarp hardwood forest on the higher Cockeye gravels, a pattern typical of the Lake Hochstetter area between the Ahaura River and Nelson Creek.

12. *Flagstaff* (ca. 500 ha)

This covers the great variety of podocarp,

podocarp-beech and pure beech stands on the wide range of sites on the Loopline and Moana gravel formations south-east of Lake Hochstetter; it also includes beech pole stands developed after catastrophic gales.

13. *Lake Ridge* (ca. 50 ha)

An undisturbed remnant of podocarp-hardwood forest on an elevated outlier of the oldest gravel formation in the region, contrasting with the beech-podocarp forest on this formation in the Inangahua Valley and the Mawheraiti sub-catchment of the Grey River.

14. *Deep Creek* (ca. 350 ha)

A mainly undisturbed example of the pattern of beech distribution in the predominate podocarp-hardwood forest south of Nelson Creek; beeches chiefly on the poorly-drained, undissected Loopline gravel formation, but apparent relics occur on the broken faces of the higher Waimea formation and in poorly-drained pockets on its main elevated surface.

15. *Deadman Creek* (ca. 50 ha)

The only remaining stand of dense rimu on the partly dissected plateau between Nelson Creek and the lower Arnold River; this will be isolated from exotic forest by deep gorges.

16. *Card's Creek – Clear Creek* (ca. 650 ha)

A complex of undisturbed and very old logged areas of podocarp-hardwood forest (with regeneration) on the valley floors and the steep faces of the Kaiata Range exemplifying the very intricate forest type patterns on the "Tertiary" hill country about Greymouth, contains some of the rare kaikawaka stands of the region.

17. *Greenstone* (ca. 750 ha)

This covers a variety of sites typical of the country between Lake Brunner and the coast and includes dense podocarp, podocarp-hardwood and podocarp-beech forest; red, silver and mountain beech are all present in this southernmost outlier of beech forest on the lower country of the region.

18. *Callaghan's* (ca. 100 ha)

One of the rare remaining stands of podocarp-hardwood forest on hill country

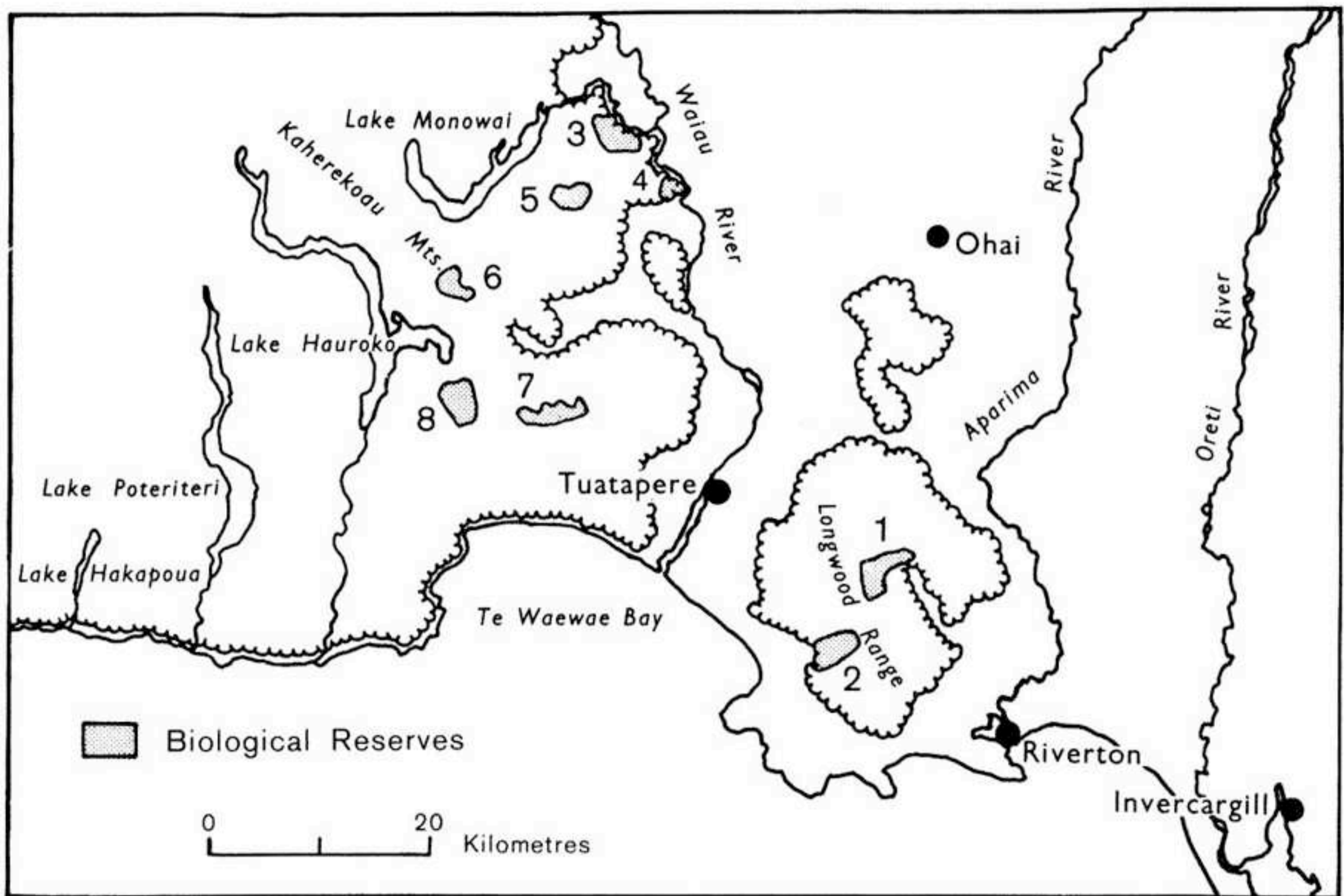


FIGURE 2: Western Southland area showing the locations of the proposed biological reserves (numbered as in text).

between the Taramakau and Kaniere rivers; the southern margin has secondary forest with advanced podocarp regeneration.

PROPOSED WESTERN SOUTHLAND BIOLOGICAL RESERVES

1. *Granity* (ca. 750 ha)

The only remaining complete altitudinal sequence of unlogged beech-podocarp and beech forest types on the eastern side of the Longwood Range; montane shrubland and grassland occur above this to the crest of the range.

2. *Taunoa* (ca. 500 ha)

The only remaining unlogged area on the west flank of the Longwood Range; podocarp-hardwood forest on the lower slopes with an ab-

rupt change to silver beech forest above this; montane shrubland and grassland also included.

3. *Digger's Hill – Digger's Creek* (ca. 750 ha)

A partly logged and burnt but still useful example of podocarp-hardwood and podocarp-beech forest patterns on the varied landscape of the upper Waiau Valley with contrasting regeneration trends in pole beech stands and residual shrub hardwood forest.

4. *Mangapiri* (ca. 250 ha)

The only unexploited, sizable remnant showing the former lowland forest type pattern in the central Waiau Valley; podocarp-hardwood forest on the upper hillsides, similar forest with

admixtures of beech on riparian terraces and local terrace stands of kahikatea.

5. *Dean Hill* (ca. 500 ha)

A representative area of undisturbed beech-podocarp forest in the central Waiau hill country and in particular containing examples of the influence of soils derived from limestone on the distribution of silver and mountain beech.

6. *Lillburn* (ca. 500 ha)

A representative portion of the altitudinal sequence of forest types in the Lillburn catchment: pure beech forest on valley floors, beech-podocarp types on the foothills of the Kaherekoau Range and pure beech above this to the tree line.

7. *Rowallan* (ca. 750 ha)

A coverage of the forest type pattern in the Rowallan Valley: podocarp-hardwood stands on the higher ridges, pure silver beech along the east and west branches of the Rowallan Burn and widely varying degrees of mountain and silver beech admixture elsewhere.

8. *North Waikoau* (ca. 1,000 ha)

This contains a complete representation of the sequence of forest types on the land forms of the Waikoau Valley — Lake Hauroko hill and terrace country: a mosaic of podocarp and beech-podocarp stands on high terraces, silver beech forest on rolling terrain, silver beech with mountain beech on broken country, and beech-bog *dacrydium* stands on poorly-drained valley floors.

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