

Small reserves are a common feature of the more intensively developed parts of New Zealand. The following table is based on the "Biological Survey of Reserves Series" and presents the mean area and size distribution of scenic reserves in nine regions of New Zealand. Historical reserves and domains have not been included in the analysis, unless they have high biological values. Some reserves which consist of two or more discrete units have been split for analysis. In several areas (eg. north Westland) the analysis did not include new reserves created since the survey data was published.

Table 1

These data show that the mean size of scenic reserves varies considerably, primarily with respect to development. The two areas with the smallest mean reserve sizes, north Auckland and west Taranaki, are major urban/farming and farming areas respectively, while the two areas with the largest mean reserve sizes, south Westland and Marlborough Sounds, have only limited urban and rural development. The size distribution of reserves also follows this pattern with 60 percent of the west Taranaki reserves less than 10 ha compared with only 6 percent in south Westland. For the 439 reserves analysed, 27 percent (119) are less than 10 ha and 54 percent (240) less than 50 ha. Clearly small reserves are a common feature of the New Zealand protected natural area system.

Some of the data presented above conceal the extent of small reserves in the more intensively developed parts of New Zealand as some of the geographical districts analysed are very diverse (eg. Canterbury and Otago).

Table 2

The relationship between development and reserve size (and number) is very dramatically shown with only three reserves (2.3, 2.6, 11.4 ha) present on the intensively farmed Canterbury Plains (500,000 ha). Banks Peninsula, an area that has experienced considerable human impact since the first European settlers, has 43 percent of reserves less than 10 ha and 90 percent less than 50 ha. The remainder of Canterbury (high country and north Canterbury) has on average much larger reserves; only 7 percent of the reserves are less than 10 ha. When early botanists such as Laing and Cockayne visited Banks Peninsula at the turn of the century the forests were already severely fragmented as a result of fire and logging over the previous 50 years. At this time kaikawaka was a distinctive and common tree in the uppermost forest remnants, usually growing in association with thin-barked totara. However, by the time Kelly surveyed the scenic reserves of Banks Peninsula in the late 1960s, kaikawaka was all but extinct. Widespread mortality appears to have occurred amongst adult trees in the 1940s and 1950s with only one adult and a few small areas of regenerating saplings present. This mortality has occurred irrespective of the size of the forest remnants and irrespective of whether or not they were protected. Research is presently underway to establish the cause of the mortality.

TABLE 1: RESERVE SIZES FOR NINE REGIONS OF NEW ZEALAND

	mean reserve area (all reserves)		mean reserve area (reserves <1000ha)		% reserves in different size classes (ha)				
	N	ha	n	ha	<10	10-50	50-100	100-1000	>1000
S. Westland	32	548	29	264	6	16	13	56	9
Marlborough Sounds	85	509	77	182	21	11	14	45	9
S. Marlborough	23	321	20	47	21	41	8	13	17
N. Westland	27	306	26	174	26	22	15	33	4
Canterbury	72	196	71	50	31	47	7	14	1
Otago	53	167	52	145	17	25	13	43	2
E. Taranaki	73	166	71	116	21	30	15	31	3
N. Auckland	33	33	33	33	50	30	12	6	0
W. Taranaki	40	30	40	30	60	30	5	5	0
TOTAL	439	260	419	116	27	27	12	28	5

TABLE 2: RESERVE SIZES FOR THE CANTERBURY LAND DISTRICT

	mean reserve area (all reserves)		mean reserve area (reserves <1000ha)		% reserves in different size classes (ha)				
	N	ha	n	ha	<10	10-50	50-100	100-1000	>1000
Plains	3	5	3	5	66	33	0	0	0
Banks Peninsula	42	28	42	28	43	48	2	7	0
Rest of Canterbury	27	479	26	90	7	48	15	26	4

A further set-back for kaikawaka occurred in June 1984 when a gorse fire on the Akaroa side of Flag Peak was swept out of control by gusty northwest winds over the top of Flag Peak and down into Armstrong Scenic Reserve. About 400 kaikawaka saplings were killed by the fire representing a 75 percent reduction in the total kaikawaka population on Banks Peninsula. This area had until then been considered as offering the best chance for the long-term survival of this species on Banks Peninsula. Today there are about 145 kaikawaka distributed between seven sites of which 75 percent occur at just two sites; about 30 percent of all kaikawaka are in poor health.

On Banks Peninsula kaikawaka has come close to extinction as a result of both natu-

ral and human-induced disturbance over the last 50 years. This has occurred despite many of the best kaikawaka sites being in scenic reserves. The fate of this species clearly illustrates the vulnerability of small reserves. Without some form of management there is a strong likelihood that kaikawaka could become extinct on Banks Peninsula as have other species (eg. hinau and rimu. Two male rimu exist but no female trees are known). It is also worth noting that with the death of the adult kaikawaka, we have also lost the very distinctive filmy fern *Hymenophyllum malin-gii*, which usually occurs abundantly as an epiphyte on mature kaikawaka. This fern has not been seen on Banks Peninsula since the early part of this century. 🦋



Dead adult kaikawaka in thin-barked totara forest, Purau Valley, Banks Peninsula. All photos David Norton.