

there being only 9 ft. of fall from low-river level at the Balclutha traffic-bridge to ordinary high-water mark.

The tidal influence is felt for nearly eleven miles up the Matau Branch and about seven miles up the Koau Branch. Evidence was given that deep-draught schooners had navigated the Koau Branch up almost to the top of the tidal influence. At the present day a flat-bottomed shallow-draught steamer has great difficulty in traversing the same reach. This will show to what extent the shoaling-up has occurred.

The following table gives approximately the area of the various subdivisions, and also the total watershed of the river:—

	Square Miles.		Square Miles.
Lake Wakatipu	1,179	Waitabuna River	147
Lake Hawea	560	Waiwera River	94
Lake Wanaka	1,010	Puerua River	77
Clutha River above Clyde ..	4,680	Tuakitoto Lake	80
Manuherikia River above Ophir ..	802	Clutha River to Balclutha ..	7,821
Manuherikia River above Alexandra ..	1,164	Clutha River to mouth (total watershed) ..	8,091
Lindis River	405	Lake Wanaka (area of lake) ..	70
Ponahaka River	800	Lake Wakatipu (area of lake) ..	93
Tuapeka River	84	Lake Hawea (area of lake) ..	41

The watershed of the Clutha River below the lakes, before settlement took place, was covered with natural vegetation, principally tussocks, with scrub in the gullies. Owing to a variety of causes, chief among which were burning-off by the settlers and eating-off by rabbits and other animals, large areas are now bare; the gullies have not the help of the roots of the scrub and vegetation to retain the loose material, and consequently whenever thunderstorms—which are somewhat prevalent in parts of the watershed—occur immense quantities of material are torn from the hillsides and carried towards or into the main stream.

Your Commissioners consider that the effect of interfering with the original physical character of the watershed by agricultural and pastoral operations, including burrowing by rabbits and burning-off, has decreased the stability of the surface soil, and thereby enabled the natural denuding agencies to carry increased quantities of detritus into the river and its tributaries. This increase over the natural denudation that occurred before any settlement took place, and which the river was able to transport safely to the sea, would, in their opinion, be as much as the increase due to mining operations; and therefore the settlers and the miners are equally responsible for the shoaling that has taken place in the vicinity of Balclutha, as far as that shoaling is due to the increase of detritus poured into the upper reaches of the river and its tributaries.

The burning of the tussocks was done to a much greater extent in the past than is now done by the runholders, with the idea of improving the grass. Limited burning under strict supervision, and at the proper time of the year, may not do much harm, and possibly does improve the grass; but your Commissioners are so strongly of opinion as to the immense amount of harm which can be done, and frequently is done, by the burning getting out of hand that they consider the stopping of the practice of burning the tussock should be under strict regulation, if not forbidden by law. That there is now not so much burning as heretofore is largely due to the fact that there is nothing left to burn, and consequently nothing left for the stock to eat; or, what is more important so far as river-control is concerned, there is nothing to protect the face of the country against the elements.

Although within the watershed below the lakes there was never very much large timber, what there was has been almost entirely cut out, especially for mining-timber.

Whatever the cause of the disappearance of the native vegetation, there is no gainsaying the fact that the denudation from natural causes henceforth will be very much worse than in the past, and will be a very serious factor for consideration in connection with the safeguarding of lands lower down. At St. Bathans, where there is a large number of water-races, your Commissioners received the direct evidence of those engaged in their upkeep that very much more work was now involved than in the past.