Annex C: Key results of the sediment legacy project

The Te Mana o te Wai work programme included a project to complete a sediment legacy project to inform the restoration programme. The project was a collaboration between the Lake Trust, Horizons, Massey University and Niwa. The report was completed by NIWA. The sediment legacy project reported that:

- In 1922 the sediment came from the southern inflows (Arawhata Stream and Sand Road drain) and the Queen Street drain;
- In 1942 the sediment originated from the Arawhata Stream and Patiki Stream Catchments;
- In 1962 the sediment originated from the Arawhata Stream and Mangaroa Stream Catchments.
- During the period that sewage effluent was being discharged into the lake, this may have been the source of some of the additional sediment, but it is unlikely to have been the major source. The CSSI isotopic proportions indicate that, in 1972, the sediment originated from the Mangaroa Stream at the northern end of the lake and the Sand Road drain at the southern end of the lake.
- In 1980 the sediment was coming from the Queen Street Drain which is consistent with observations by Gibbs and White (1991; 1994) of very high flows of turbid water in the Queen Street drain and the Arawhata Stream. At that time, the Queen Street drain flow was augmented with water from the Ohau River and also received water from hydroponics (M. Gibbs, NIWA, personal observations).
- Over the last 5 years the sediment results show the Arawhata Stream catchment has been contributing between 48% and 75% of the sediment, and the Mangaroa Stream catchment has been contributing between 20% and 45% over the same period (Figure A). In addition the sediment accumulation rates have increased in recent times as shown in the table below (Table A).

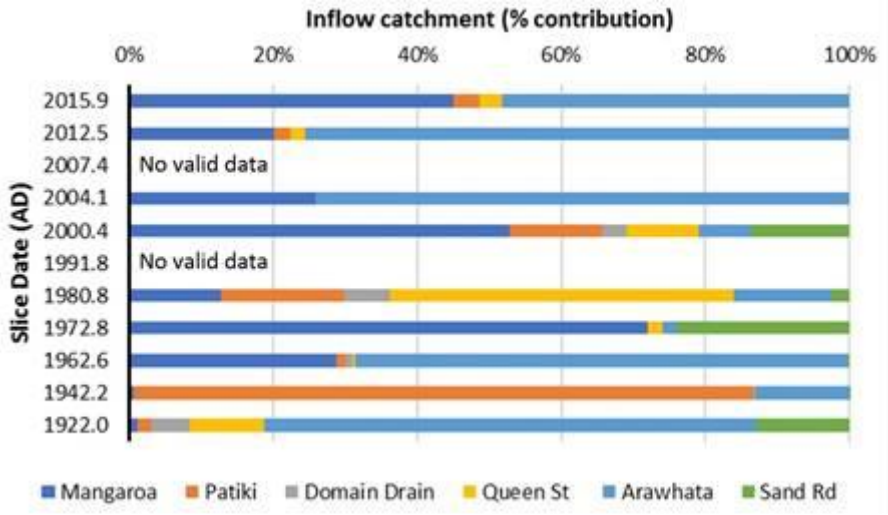

Figure 1 Bar graph of soil proportions showing the relative proportion changes in soil sources contributing to the sediment at site 1. Data from 2007 and 1991 have been omitted as they were not interpretable.

Table 1 Sediment accumulation rates in Lake Horowhenua as determined by the sediment legacy study.

Sediment accumulation rates (SAR) for selected depth / date ranges in the sediment core from Site 1.

Depth range (cm)	Time range (year)	SAR (mm y^{-1})
0-1.5	2015-2018	6.2
1.5-3.5	2012-2015	5.9
3.5-10	2000-2012	5.8
10-15	1991-2000	5.2
15-30	1962-1991	5.0
30-40	1942-1962	4.9