

# IMPACTS OF SEDIMENT ON GIANT KŌKOPU



Sediment can affect māhinga kai by influencing habitat, behaviour, feeding, growth and survival.

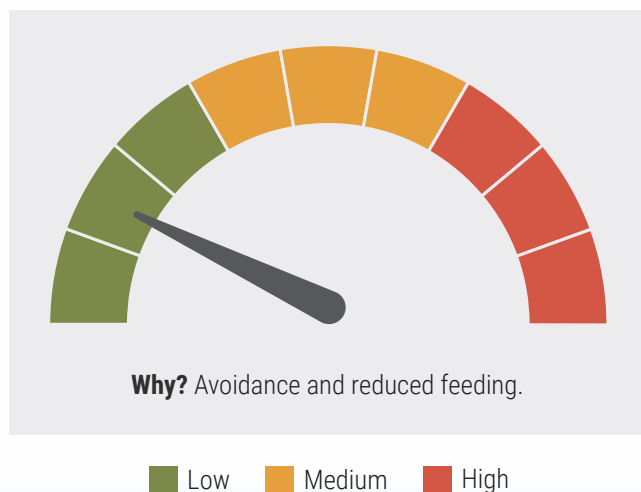
## Background on giant kōkopu (*Galaxias argenteus*)

Giant kōkopu are one of six species in Aotearoa New Zealand's whitebait catch. They are endemic and diadromous – they spend about 4½ months in the ocean as larvae before entering rivers<sup>1</sup>. Giant kōkopu make up less than 0.5% of the whitebait caught in rivers around the whole country, but they are slightly more common in whitebait catches in South Westland<sup>2</sup>. Giant kōkopu are found in very variable habitats, often in wetlands and forested creeks, but also in lakes and gravelly streams. They do not penetrate very far inland. Giant kōkopu are found all around the country but are absent from large areas of the East Coast of both islands<sup>3</sup>. Giant kōkopu probably take two to three years to reach maturity. They are generalist feeders<sup>4</sup>, slow growing and are estimated to live for up to 30 years<sup>5</sup>.

## Giant kōkopu (*Galaxias argenteus*)



## Giant kōkopu sensitivity to elevated sediment



Prepared by Mike Hickford, Michele Melchior and Melanie Mayall-Nahi from NIWA for Our Land and Water National Science Challenge, March 2023. Image of giant kōkopu by Dave Allen, NIWA.

For references and further information see [niwa.co.nz/sediment-impacts](https://niwa.co.nz/sediment-impacts)

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## Effects of suspended sediment on giant kōkopu

<b>Habitat</b>	Experimental restoration of giant kōkopu populations has shown that stocked juvenile fish are retained better at clear water sites than at turbid sites <sup>6</sup> . However, these results may be misleading because predatory shortfin eels were more abundant at the turbid sites.
<b>Behaviour</b>	Direct effects unknown. The very low abundance of giant kōkopu in whitebait catches, even in South Westland, has prevented any analysis of the effect of turbidity on upstream migrations <sup>7</sup> .
<b>Feeding</b>	Giant kōkopu are generalist feeders that eat a wide range of food with aquatic and terrestrial origins <sup>4</sup> . They have been described as a "skulking predator" <sup>3</sup> that use their powerful body shape and fin arrangement to ambush prey on the water surface <sup>5, 8, 9</sup> and lower in the water column. Small fish (e.g., īnanga and bullies) are also a common component of their diet <sup>4</sup> . As with the other kōkopu species, they are typically nocturnal and probably do not rely heavily on sight for feeding <sup>10</sup> . Instead, they use special pressure sensors along the side of their body to detect the movement of their prey <sup>11</sup> . Given this, it is unlikely that the feeding of giant kōkopu will be affected by an increase in suspended sediments.
<b>Growth</b>	Direct effects unknown.
<b>Survival</b>	Direct effects unknown.

## Effects of deposited sediment on giant kōkopu

<b>Habitat</b>	It appears that giant kōkopu may prefer areas with finer substrates, although the association with smaller substrate size may simply reflect their strong preference for low water velocity <sup>12</sup> – this is where smaller substrate is likely to occur.
<b>Behaviour</b>	Direct effects unknown.
<b>Feeding</b>	Direct effects unknown. However, giant kōkopu are generalist feeders so may be capable of switching their diet entirely to terrestrial invertebrates or fishes if aquatic invertebrate abundance decreases because of deposited sediments.
<b>Growth</b>	Direct effects unknown.
<b>Survival</b>	Direct effects unknown.

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## Further information:

1. McClintock, G.J. (2018). Early life history dynamics of the New Zealand whitebait species. M.Sc. thesis. University of Canterbury: Christchurch. 106p.
2. Yungnickel, M.R., M.J.H. Hickford, and D.R. Schiel (2020). Spatio-temporal variation in species composition of New Zealand's whitebait fishery. *New Zealand Journal of Marine and Freshwater Research* 54(4): 679-694.
3. McDowall, R.M. (1990). *New Zealand freshwater fishes: a natural history and guide*. Auckland: Heinemann Reed. 553p.
4. Bonnett, M.L. and P.W. Lambert (2002). Diet of giant kokopu, *Galaxias argenteus*. *New Zealand Journal of Marine and Freshwater Research* 36(2): 361-369.
5. Jellyman, D.J. (1979). Observations on the biology of the giant kokopu, *Galaxias argenteus* (Gmelin, 1789). *Mauri Ora* 7: 53-61.
6. Aldridge, B.M.T. (2008). Restoring giant kokopu (*Galaxias argenteus*) populations in Hamilton's urban streams. M.Sc. thesis. University of Waikato: Hamilton. 90p.
7. McDowall, R.M. and G.A. Eldon (1980). The ecology of whitebait migrations (*Galaxiidae: Galaxias* spp.). *New Zealand Ministry of Agriculture and Fisheries, Fisheries Research Bulletin* 20: 1-172.
8. Eldon, G.A. (1969). Observations on growth and behaviour of *Galaxiidae* in aquariums. *Tuatara* 17(1): 34-46.
9. Main, M.R. (1988). Factors influencing the distribution of kokopu and koaro (*Pisces: Galaxiidae*). M.Sc. thesis. University of Canterbury: Christchurch. 127p.
10. Rowe, D.K. and T.L. Dean (1998). Effects of turbidity on the feeding ability of the juvenile migrant stage of six New Zealand freshwater fish species. *New Zealand Journal of Marine and Freshwater Research* 32(1): 21-29.
11. McDowall, R.M. (1997). An accessory lateral line in some New Zealand and Australian galaxiids (*Teleostei: Galaxiidae*). *Ecology of Freshwater Fish* 6(4): 217-224.
12. Bonnett, M.L., R.M. McDowall, and J.R.E. Sykes (2002). Critical habitats for the conservation of giant kokopu, *Galaxias argenteus* (Gmelin, 1789). *Science for Conservation* 206: 1-50.

*Prepared by Mike Hickford, Michele Melchior and Melanie Mayall-Nahi from NIWA for Our Land and Water National Science Challenge, March 2023. Image of giant kōkopu by Dave Allen, NIWA.*