

IMPACTS OF SEDIMENT ON TUNA LONGFIN EEL

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

Background on tuna longfin eel (*Anguilla dieffenbachii*)

Longfin eels are endemic to Aotearoa New Zealand. They are found throughout the country including the Chatham Islands. They move much further inland than New Zealand's other common eel species, the shortfin eel (*Anguilla australis*), often occurring in alpine waterways^{1,2}. Longfin eels are generalists, living in a broad range of habitats³. Larger longfin eels like fast-flowing water and are more abundant in areas with plenty of cover (e.g. macrophytes, undercut banks, overhanging vegetation and logs)³. Longfin eels are catadromous – mature adults migrate out of rivers to the sub-tropical Pacific Ocean to spawn and die⁴. Eel larvae drift on ocean currents back to New Zealand and transition to colourless glass eels before entering waterways⁵. Once in freshwater, the glass eels turn brown and begin to head upstream as elvers⁶. Longfin eels grow slowly (1-2 cm per year) and are very long-lived with some large females living for over 100 years¹.

Tuna longfin eel (*Anguilla dieffenbachii*)



Tuna longfin eel sensitivity to elevated sediment



Low Medium High

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Effects of suspended sediment on tuna longfin eel

Habitat	There is no relationship between the duration of turbid conditions in rivers and the occurrence of longfin eels ⁷ . Longfin eels are probably insensitive to increases in suspended sediment loadings in rivers ⁷ .
Behaviour	Longfin glass eels migrate into very turbid waters during flood events ⁸ . In fact, high turbidity can allow glass eels to migrate during daylight hours rather than just at night ⁸ . Turbid waters are unlikely to impede the migration of elvers from coastal areas into adult habitat because elvers do not avoid even extremely high turbidities in experiments ⁹ . In some situations, migrating elvers appear to be attracted towards turbid tributaries ¹⁰ .
Feeding	Longfin eels mainly feed at night ¹¹ using their sense of smell for general detection of food and a combination of smell, touch, taste and sight for determining the specific location of prey ¹² . Their feeding is not greatly dependent on sight and they can feed actively in turbid flood conditions ¹³ .
Growth	Small longfin eels (<400 mm) mainly eat crustaceans and insect larvae, but larger eels mainly eat fish ¹³ . Sustained periods (21 days) of very high turbidity do not reduce the length or weight of juvenile longfin eels ¹⁴ . This is probably not surprising given that longfin eels are opportunistic feeders that are capable of energy conservation between feeding events ¹³ .
Survival	The survival of juvenile longfin eels is not affected by long-term (21 days) exposure to very high turbidity ¹⁴ . It appears that fine suspended sediments do not abrade or clog the gills of longfin eels ¹⁴ .

Effects of deposited sediment on tuna longfin eel

Habitat	Small and medium-large longfin eels are more common in areas with stony substrates or with in-stream debris (e.g., logs) that provide cover ^{3,15} . The density of juvenile and adult longfin eels does not change with long-term (60 day) increases in deposited sediments ^{16,17} . However, when deposited sediments are decreased longfin eel densities increase substantially ^{16,17} .
Behaviour	Direct effects unknown.
Feeding	Direct effects unknown. However, the small amphipod <i>Paracalliope fluviatilis</i> is a common prey item of small longfin eels (<400 mm) ¹³ , whereas larger eels feed almost exclusively on small fishes ^{13,18} . When deposited sediment levels are reduced, there is an associated increase in the abundance of <i>Paracalliope fluviatilis</i> , bullies and other small native fishes ¹⁶ . Therefore, reducing the levels of deposited sediments may indirectly increase the feeding rate of longfin eels.
Growth	Direct effects unknown. However, as with feeding, the growth of longfin eels may be reduced by an increase in deposited sediments because their common prey items are less common. Although, while longfin eels have relatively small home ranges they are capable of more extensive movements to occupy more beneficial habitat ¹¹ .
Survival	Direct effects unknown.

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Further information:

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