IMPACTS OF SEDIMENT ON AUA YELLOW-EYED MULLET

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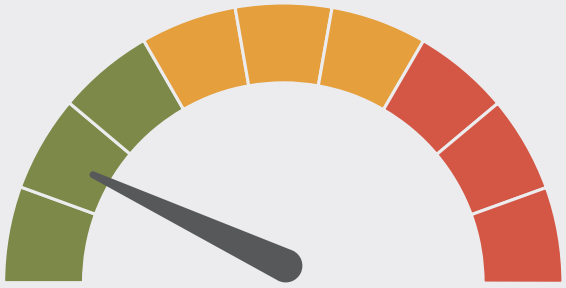
Sediment can affect mahinga kai by influencing habitat, behaviour, feeding, growth and survival.

Background on aua yellow-eyed mullet (*Aldrichetta forsteri*)

Aua yellow-eyed mullet occur around Aotearoa New Zealand as well as being found at Norfolk Island and in southern Australia[1]. They are often found in schools in sandy or muddy bays, estuaries and harbours, as well as in coastal waters[2, 3]. They are more common towards the upper end of estuaries (probably to avoid predators in lower open areas)[4], particularly in summer[5, 6] but do not commonly enter freshwater[6]. Yellow-eyed mullet are omnivores and feed on a wide range of food types including algae, small invertebrates, fish, fish eggs and detritus gulped up with sand or mud from the seafloor[2, 7, 8]. Individual fish may live for up to seven years[9] and they mature after two to four years[10, 11]. They can reach a maximum size of more than 400 mm[9].

Aua yellow-eyed mullet (*Aldrichetta forsteri*)

Aua sensitivity to elevated sediment



Why? Mobile, pelagic predators.

Low Medium High

Prepared by Mike Hickford, Michele Melchior and Melanie Mayall-Nahi from NIWA for Our Land and Water National Science Challenge, February 2023. Image of aua yellow-eyed mullet by NIWA.

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Effects of suspended sediment on aua yellow-eyed mullet	
Habitat	Yellow-eyed mullet are transient visitors to estuarine areas[9]. They are mobile predators that move in schools because this reduces predation risk and improves foraging success[12] . Yellow-eyed mullet use their lateral line system rather than visual cues for navigation and to maintain schooling in turbid water[13]. Consequently, water clarity has very little effect on their occurrence at individual sites within estuaries[4].
Behaviour	Yellow-eyed mullet are well adapted for schooling and feeding successfully in the changeable and often turbid water of upper estuarine areas[12]. It is unlikely that their behaviour will be altered by moderate changes in the level of suspended sediments[7].
Feeding	Yellow-eyed mullet have adapted to schooling and feeding successfully in the changeable and often turbid water of upper estuarine areas[12]. It is unlikely that their feeding will be altered by moderate changes in the level of suspended sediments[7].
Growth	Yellow-eyed mullet are normally only transient visitors to estuarine areas[9] and are well adapted to feeding in the often turbid water of upper estuarine areas[13], so it is unlikely that increased suspended levels will alter their growth. There is evidence that yellow-eyed mullet in a turbid coastal lake have greater growth rates than fish in nearby estuaries and harbours with less turbid water[14].
Survival	Most populations of yellow-eyed mullet are only exposed to turbid conditions while visiting estuaries[15], so it is unlikely that increased levels of suspended sediments will alter their growth. However, there are populations of yellow-eyed mullet that are permanently present in freshwater habitats[6] and these populations are stable enough to support a long-term commercial fishery in a highly turbid coastal lake[14, 16]. However, the population in the coastal lake is dependent on recruitment from marine sources because yellow-eyed mullet do not spawn in the lake.

Effects of deposited sediment on aua yellow-eyed mullet	
Habitat	Land-use intensification in catchments (e.g., urbanisation or pastoral development) usually results in increased sedimentation lower in the catchment[17] and this can harm critical habitat of some species. However, yellow-eyed mullet are one of the few estuarine fishes that are more abundant in estuaries that have a greater percentage of urban or pastoral development in their catchment[4].
Behaviour	Direct effects unknown.
Feeding	Yellow-eyed mullet have specialised mouth structures[18] that allow fish to suck sediment from the seafloor which they filter for small invertebrates[19]. It is unlikely that increases in deposited sediments would affect their ability to feed in this manner.
Growth	It appears that deposited sediments do not decrease the growth rate of yellow-eyed mullet. Instead, there is evidence that yellow-eyed mullet in a turbid and heavily sedimented coastal lake have greater growth rates than fish in nearby estuaries and harbours[14].
Survival	The population of yellow-eyed mullet in a heavily sedimented coastal lake is stable enough to support a long-term commercial fishery[14, 16].

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Prepared by Mike Hickford, Michele Melchior and Melanie Mayall-Nahi from NIWA for Our Land and Water National Science Challenge, February 2023. Image of aua yellow-eyed mullet by NIWA.

ISSN 2230-5548
NIWA Information Series 117

June 2023