

IMPACTS OF SEDIMENT ON AUA YELLOW-EYED MULLET



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

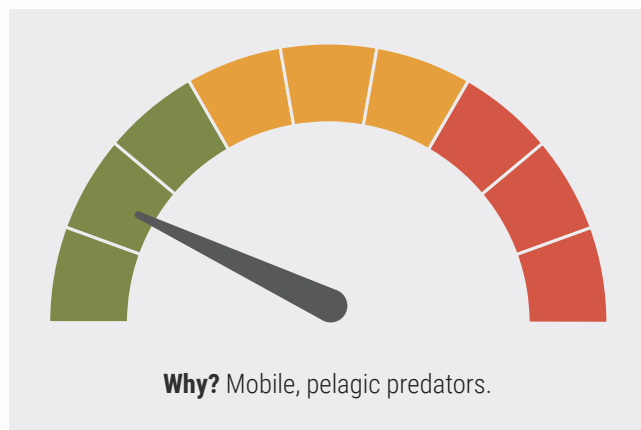
Background on aua yellow-eyed mullet (*Aldrichetta forsteri*)

Aua yellow-eyed mullet occur around Aotearoa New Zealand as well as being found at Norfolk Island and in southern Australia¹. 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 freshwater⁶. 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 years⁹ and they mature after two to four years^{10,11}. They can reach a maximum size of more than 400 mm⁹.

Aua yellow-eyed mullet (*Aldrichetta forsteri*)



Aua sensitivity to elevated sediment



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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