What do we know about the impacts of sediment on trout in the Motueka River?

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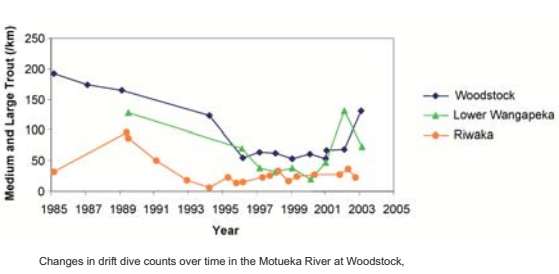
A decline in trout abundance has been observed in some parts of the river.



Changes in drift dive counts over time in the Motueka River at Woodstock, lower Wangapeka River and upper Riwaka River

Could sediment be the cause of this decline?

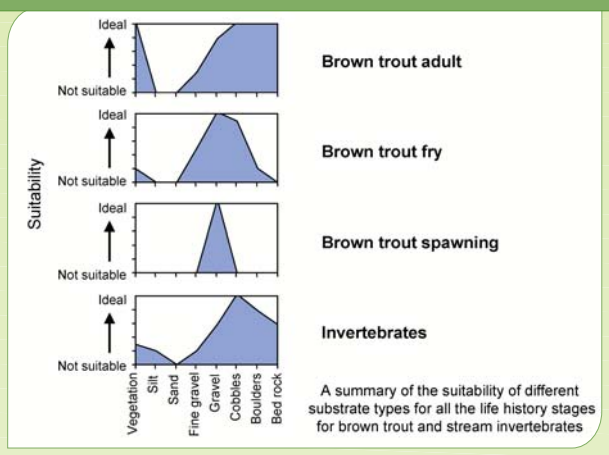
There is a perception among anglers that sediment is the problem and forestry is often blamed.

Other potential causes

Low flows
Over fishing
Floods
Shags

Comments made in a recent NIWA report by long-time anglers suggest there has been a general decline in angling quality in the Motueka River due to:
"increase in fines" *"increased sedimentation/sand"* *"forestry impacts and sediment"*
"poor spawning conditions due to forestry" *"siltation from Separation Point granite"*

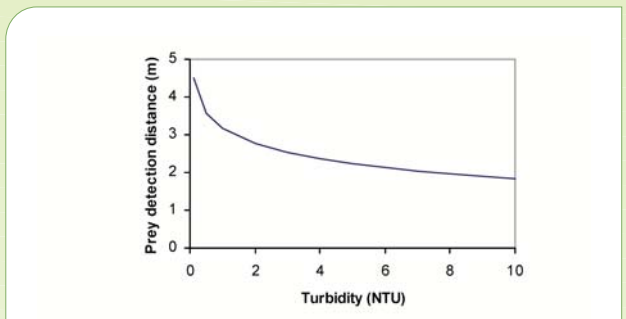
What does sediment influence?



A summary of the suitability of different substrate types for all the life history stages for brown trout and stream invertebrates

- trout spawning habitat
- juvenile trout habitat
- adult trout habitat
- invertebrate habitat
- water clarity/ prey visibility

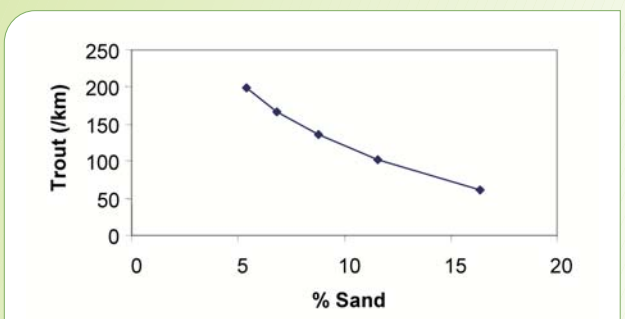
Trout and invertebrate habitat are degraded by sediment because the spaces between larger bed particles are filled with fine sand/mud. This stops oxygen getting to developing trout eggs and fills the spaces where juvenile trout and invertebrates will live/hide. Adult trout habitat is affected if pools and deep runs are filled with fine sediment, reducing their depth. Prey visibility is reduced with reductions in water clarity associated with suspended sediment.



Relationship between invertebrate prey detection distance and turbidity for chinook salmon. Brown trout can be expected to show a similar relationship.

100 Rivers Model

In the early 1990's NIWA developed a nation-wide model that predicts trout abundance using information on various habitat characteristics, including % sand in the river bed.
In this model a small change in the % sand makes a big difference to predictions of trout abundance.



Predicted trout abundance at Woodstock assuming only changes in % sand in the bed and its additional effects on habitat suitability

Does the 100 Rivers model developed from rivers all round New Zealand apply within the Motueka River?

What will we be doing to address this issue?

- relating differences among drift dive counts at sites throughout the river with measurements of habitat features and substrate composition to develop a Motueka River model of trout abundance
- developing a method to characterise riverbed substrate composition trends over time
- relating variation in trout numbers at Woodstock over time with change in substrate composition or other controlling factors
- reviewing literature and carrying out studies on sediment effects on invertebrates
- determining the loads, sources and types of sediment from different parts of the catchment
- determining juvenile trout abundance in spawning streams with contrasting sediment loads

Changes in drift dive counts of trout abundance along the Motueka mainstem from the Stanley Brook confluence downstream

Are these variations related to substrate composition?