

## Accessory Publication

**Table S1.** Summary of tests for sedimentation effects on selected traits. Overall significance for the sediment addition term ('Sed', in bold) as well as significant interactions between sediment addition and site (S) and/or time (T), as determined from within–subjects contrasts or between–subjects effects using MANOVA, are shown for each trait modality across all sites and times. NS indicates that none of the terms containing sediment addition were significant for the particular trait modality. Univariate Wilcoxon signed–rank tests were conducted for each trait modality within each site and time, arrows indicate where sediment addition caused either an increase ( $\uparrow P < 0.05$ ,  $\uparrow 0.05 \leq P < 0.10$ ), or decrease ( $\downarrow P < 0.05$ ,  $\downarrow 0.05 \leq P < 0.10$ ), in the proportion of animals with the particular trait modality

Streams		Day 7			Day 14			Estuary	Day 7			Day 16			
Traits	Overall	Opitonui (upstream)	Opitonui (downstream)	Awaroa	Opitonui (upstream)	Opitonui (downstream)	Awaroa	Traits	Overall	Inner	Middle	Outer	Inner	Middle	Outer
<b>Relative size</b>								<b>Relative size</b>							
Small	NS	–	–	↓	–	–	–	Small	Sed*S	–	↓	↑	–	↓	↑
Medium	NS	–	–	–	↓	–	–	Medium	NS	–	–	–	–	↑	–
Large	NS	–	–	–	↑	–	–	Large	Sed*S	↑	↑	↓	–	↑	↓
<b>Body form</b>								<b>Body form</b>							
Cylindrical	NS	–	–	–	–	–	–	Cylindrical	Sed*S, Sed*S*T	–	–	↑	↓	–	↑
Spherical	NS	–	–	–	–	–	–	Spherical	Sed*S*T	↓	↑	↑	–	↑	↓
Streamlined	NS	–	–	–	–	–	–	CaCO <sub>3</sub> covered	Sed*S	–	↓	↓	–	–	↓
Flattened	NS	–	–	–	–	–	–								
<b>Habitat</b>								<b>Habitat</b>							
Epibenthic	NS	–	↑	–	–	↑	–	Epibenthic	Sed*S, Sed*S*T	–	–	–	–	–	↑
Attached	NS	–	↓	–	–	↓	–	Attached	NS	–	↑	–	–	↑	–
Infauna	NS	–	–	–	–	–	–	Infauna (upper layers)	Sed, Sed*S, Sed*T, Sed*S*T	–	↓	–	↑	–	↓
Water column	<b>Sed</b>	↓	↓	↓	–	–	–	Infauna (deep)	Sed*S, Sed*S*T	–	–	↑	↓	↓	↑
<b>Feeding habits</b>								<b>Feeding habits</b>							
Predators	Sed*S*T	–	–	–	↑	–	–	Predators	Sed, Sed*S	↑	–	↑	↑	–	–
Grazers	NS	–	–	–	↓	–	–	Grazers	Sed, Sed*S, Sed*T, Sed*S*T	↓	–	–	↓	↑	–
Deposit feeders	NS	–	–	–	↑	–	–	Deposit feeders	<b>Sed</b>	–	–	↓	↓	↓	–
Filter feeders	NS	–	–	–	↑	–	–	Filter feeders	NS	–	↑	–	–	↑	–
Shredders	<b>Sed</b>	–	–	–	–	↓	–	Scavengers	<b>Sed</b>	↑	–	↑	↑	↑	–
Algal piercers	NS	–	–	↓	–	–	–								
<b>Dietary specificity</b>								<b>Dietary specificity</b>							
Strong (specialist)	NS	–	–	↓	↑	–	–	Strong (specialist)	<b>Sed</b>	–	–	–	↓	↓	–
Moderate	<b>Sed</b>	–	↓	–	–	↓	–	Moderate	Sed, Sed*S	↑	↑	–	↑	–	–
Weak (generalist)	<b>Sed</b>	–	↑	↑	–	↑	–	Weak (generalist)	Sed*S, Sed*T, Sed*S*T	↓	–	–	↓	↑	–
<b>Mobility</b>								<b>Mobility</b>							
High	<b>Sed</b>	–	↓	↓	–	–	–	High	NS	–	↑	–	–	↑	–
Medium	<b>Sed</b>	–	↑	–	–	↑	–	Medium	Sed, Sed*S	–	↓	–	–	↓	–
Low	NS	–	↓	–	–	↓	–	Low	NS	–	–	–	–	↑	–