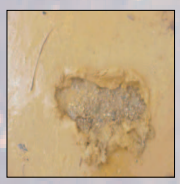
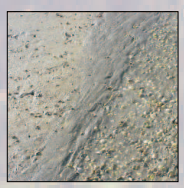
Catastrophic dumps degrade habitat biodiversity

Broad-scale or repeated dumps of sediment can have significant effects on ecological function

Key Dump Signs



- Difference in the colour of sediments e.g.brown clay over the original grey marine sediments



- Gravel in areas of fine muds or sediments with mixed grain sizes

- Rock flats covered in layers of mud
- Mud in larva flow-type slugs over hard packed sand

- Obvious signs of die-off
- Low numbers of cockles and of suspension feeders
- Lower overall diversity

Ecological changes

- Elevated suspended sediment concentrations
- Depressed primary production and suspension feeder populations
- Changes to fringing mangroves, salt marshes and sea grass beds
- Changes in estuarine morpology and sediment type
- Changes to diversity, abundance and size of resident animals

What we have learnt so far...

- The deposition of **2-3cm** of clay has significant consequences.
- Catastrophic sediment dumps **kill** most of the resident animals.
- Only large burrowing crustaceans, e.g. crabs, seem able to cope.
- Clay remains stuck for a long time and does not provide a good substrate for colonising animals, hence **recovery is slow**.
- Depending on location in the estuary clay is either blown off by storms, covered by sand ripples or mixed, modified and transported by crabs and other large crustaceans.

so given the seriousness of these problems how do we prioritise risk?

The Effects of Sediment on Estuarine and Coastal Ecosystems (ESECE) programme is funded by the Foundation for Research Science and Technology C01X0024

Prioritising areas of the greatest risk

Making a risk map

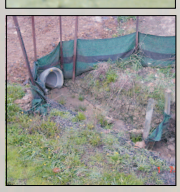
NIWA is mapping the risk of catastrophic sediment dumps, predicting trends, recommending solutions*

Tools for prioritising risk

Understanding biological and physical processes in estuaries and defining the sensitivity of ecosystems helps prioritise estuaries for management. Combining this with human values, allows us to determine estuaries and habitats at greater risk and those beyond repair.

Common Values

- Beaches used for swimming and recreation
- Areas of historical and cultural importance e.g. shellfish gathering areas
- Areas of economic importance and habitats of endangered or protected species



Loading the dice

- High and sporadic rainfall
- Young volcanic soils
- Steep terrestrial topography
- History of slips or land slides
- Catchment use

Threat indicators

- Estuary shape and flushing
- Wave and wind exposure
- Artificial structures that obstruct water flow e.g. oyster racks, causeways, wharves
- Animals like crabs and shrimp that break up sediment deposits.

Reducing risks

- Predicting sediment loads under various land use scenarios
- Identification and management of high risk factors e.g. urbanisation, roading, forestry, farming etc.
- Using estuarine sediment retention zones
- Restricting within estuary structures

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