

Ecological impacts of gravel extraction

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Common issues raised by river users



- o Where has all this fine sediment come from?
- o Water clarity used to be much better than this in the past
- o The pools aren't as deep as they used to be
- o Why have fish numbers declined?

- o Is gravel extraction linked with any of these?

Ecological effects of gravel extraction



- o A subject that has received limited attention in New Zealand
- o Preliminary studies indicate that impacts depend on river type and nature of extraction activities
- o Some perceptions (mine)
 - If extraction occurs outside the wetted channel then no problems
 - Gravel supply is naturally variable – river ecosystem adapted to coping with this variability

River Morphology



- o A balance between
 - Flows
 - Amount and size distribution of sediment load from upstream
 - Composition of bed and bank sediments
 - Type of bank vegetation

- o Any changes may disrupt the balance

Morphological effects



- o Over-extraction can cause
 - Degradation of the channel
 - Wider shallower channels
 - Bank erosion
 - Changes in sediment transport
 - Reduction in channel complexity
 - Coastal erosion

- o Implications for habitat

Habitat effects



- o Changes to bed stability
- o Changes to substrate composition
- o Loss of habitat structure and variability
- o Loss of hiding spaces
- o Reduction in river-groundwater exchange

Water Quality effects



- o Mobilise fine sediment
 - Directly during extraction and vehicle crossings
 - Indirectly via vegetation clearance, beach raking and bar skimming
- o Clogs up spaces among riverbed gravels
- o Reduces river-groundwater exchange and therefore affects temperature regime
- o Reduces water clarity
- o Affects quality and availability of food for stream invertebrates and fish

Questions



- o What is over-extraction?
 - Imbalance between gravel load and amount of extraction??
- o How do you separate natural variability from impacts of gravel extraction?
- o Can aerial photos be used to assess changes to channel morphology?
- o Can a detailed study of ecological effects be justified?