Ecological impacts of gravel extraction

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Common issues raised by river users

- Where has all this fine sediment come from?
- Water clarity used to be much better than this in the past
- The pools aren’t as deep as they used to be
- Why have fish numbers declined?
- Is gravel extraction linked with any of these?
Ecological effects of gravel extraction

- A subject that has received limited attention in New Zealand
- Preliminary studies indicate that impacts depend on river type and nature of extraction activities

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

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

- Any changes may disrupt the balance
Morphological effects

Over-extraction can cause:

- Degradation of the channel
- Wider shallower channels
- Bank erosion
- Changes in sediment transport
- Reduction in channel complexity
- Coastal erosion

Implications for habitat
Habitat effects

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

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

- What is over-extraction?
  - Imbalance between gravel load and amount of extraction?

- How do you separate natural variability from impacts of gravel extraction?

- Can aerial photos be used to assess changes to channel morphology?

- Can a detailed study of ecological effects be justified?