



# Central Plains Water – lowlands streams and Lake Ellesmere/Te Waihora

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# Issues covered

Impacts on lowland streams and Lake Ellesmere/Te Waihora

- increased groundwater levels
- increased loadings/concentrations of nitrates

# Evidence reviewed

## For the applicant

- Dr Greg Burrell – aquatic ecosystems
- Mr Paul Kennedy – water quality

## For submitters

- Professor David Hamilton – Lake Ellesmere/Te Waihora
- Dr Scott Larned – water quality

## Ecan officers reports

- Mr Carl Hanson – nitrates in groundwater
- Dr Howard Williams – groundwater levels

# Increased groundwater levels - lowland streams

- Uncertainty of predictions
- Increased stream flows beneficial for habitat – some exceptions
- Negative impact overall on aquatic ecosystem health of increased drainage requirements

# Increased groundwater levels - Lake Ellesmere/Te Waihora

- Increased lake openings
- Increased migratory opportunities for fish
- May result in increased salinity gradients
  - Effects uncertain
    - Potential negative impacts on invertebrates (e.g. chironomids - significant component of food web)
    - Potential increased risk of Nodularia blooms

# Lake Ellesmere/Te Waihora opening



9 NOV 2004

# Nitrates

## Three issues to consider

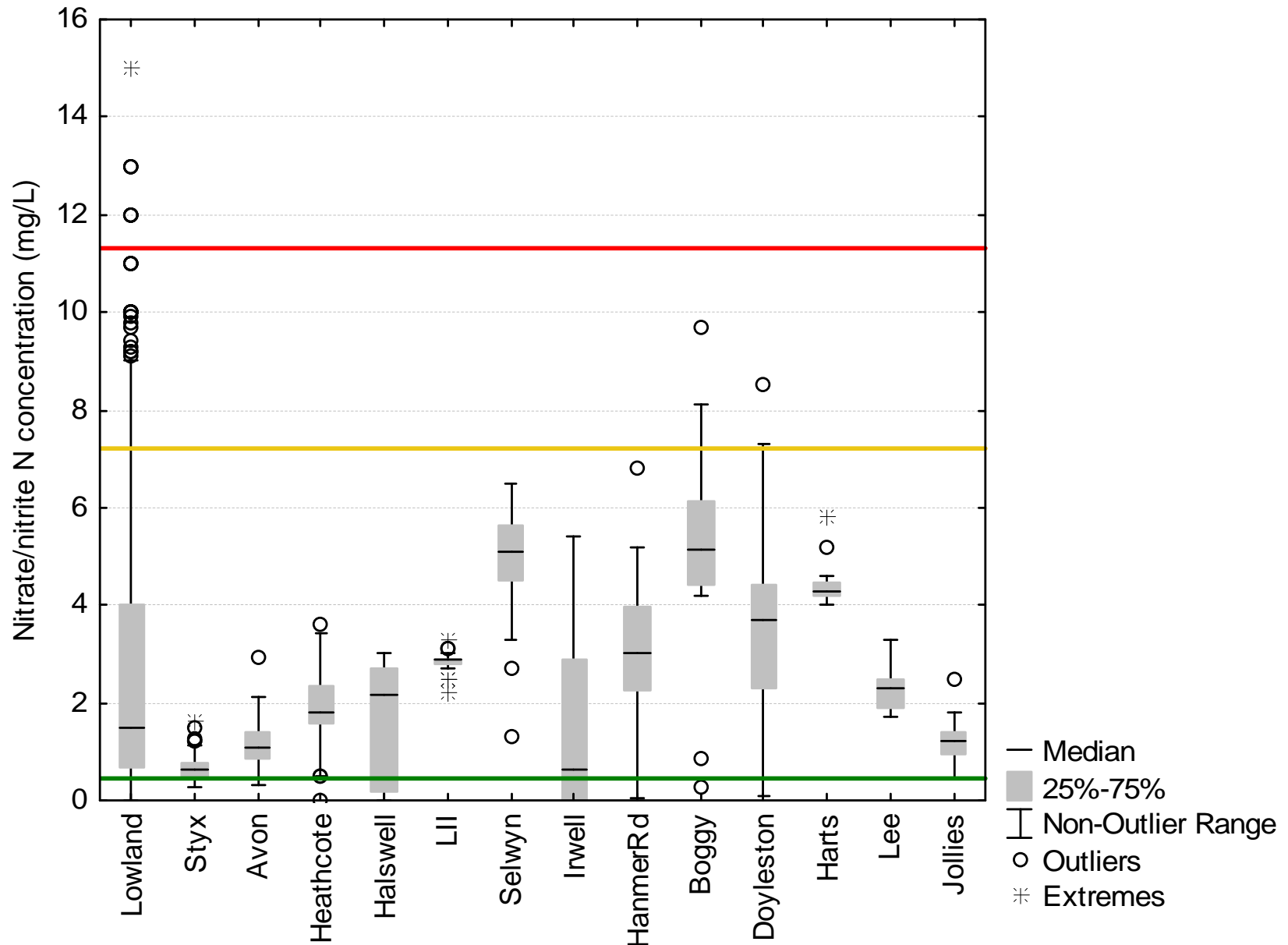
- Nutrient enrichment – plant growth
- Aquatic toxicity to fish and invertebrates
- Human toxicity risks from drinking-water supplies

# Nitrates – lowland streams

Potential toxicity impacts on instream biota is the greatest risk

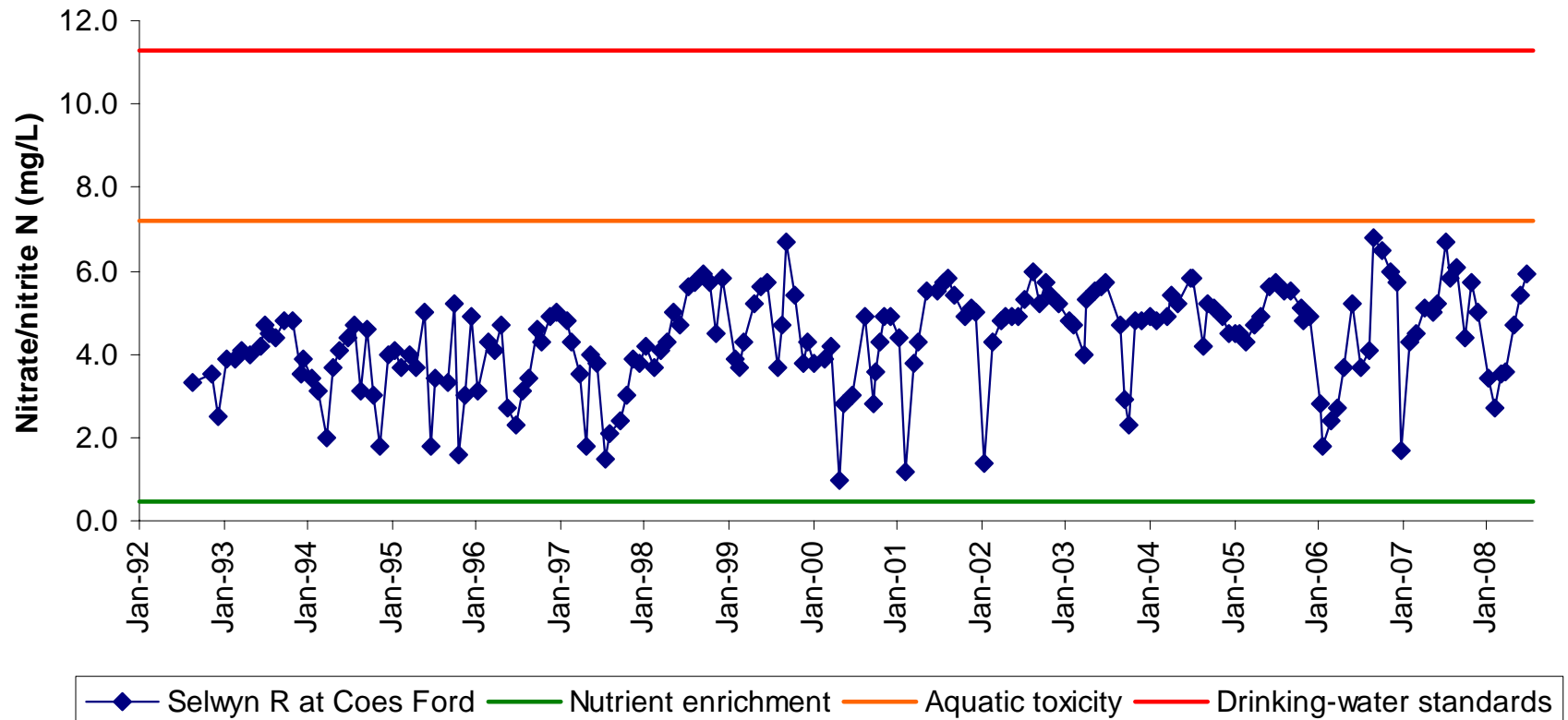
- ANZECC 2000 toxicity thresholds are relevant for considering risks
- Some streams already exceed the toxicity threshold at times

# Range of nitrate concentrations in lowland streams



# Range of nitrate concentrations in Selwyn River

## Selwyn River/Waikirikiri



# Nitrates – Lake Ellesmere/Te Waihora

- Lake Ellesmere/Te Waihora - nutrient enrichment issue
- Total loading important
- Nitrogen limitation at times
- Increased phytoplankton production
- Uncertain of effects on lake ecosystem

# Lake Ellesmere/Te Waihora – high phytoplankton biomass



# Mitigation - Farm plans

May reduce, but not eliminate, the risk of increased nitrate concentrations to lowland streams and increased nitrogen loads to Lake Ellesmere/Te Waihora