The State of Jed River Water Quality

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Topics

- Background
- Issues for the Jed River
- Monitoring
- Water Quality State
- Conclusions
- What can be done?

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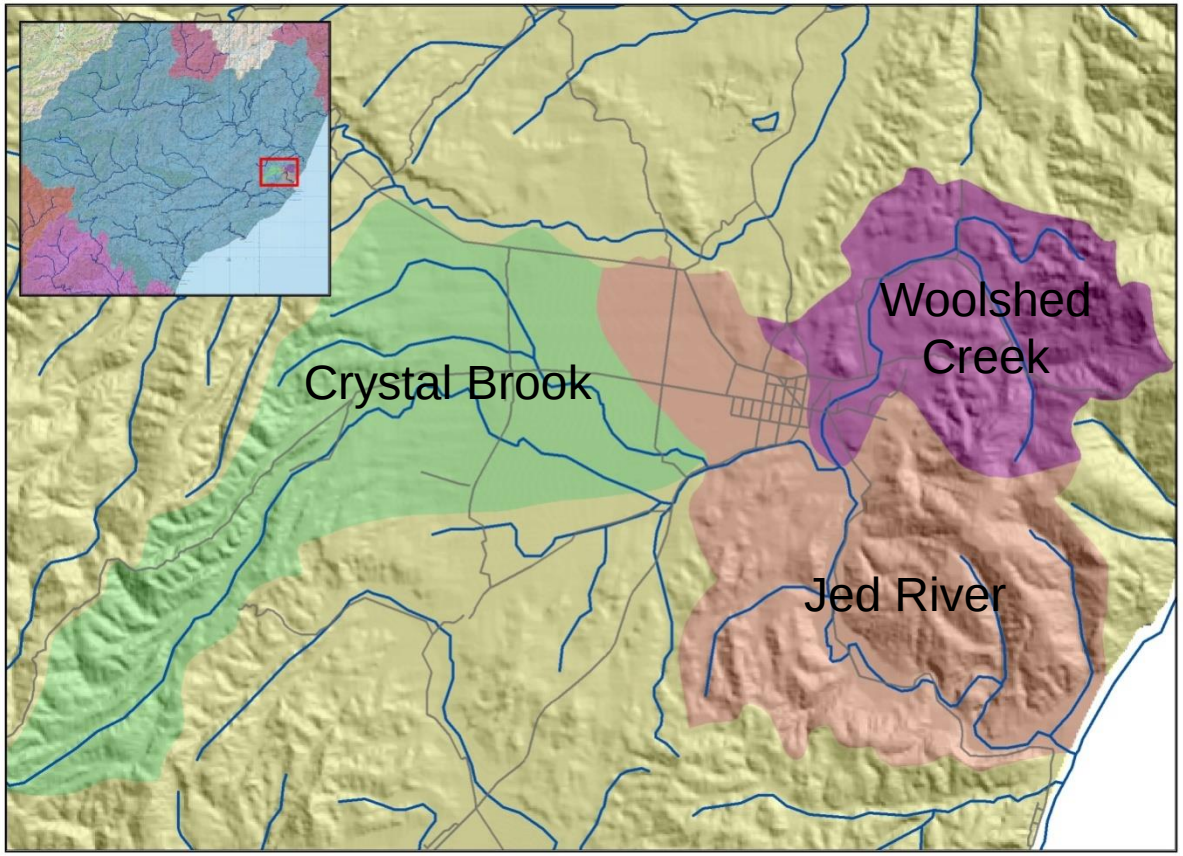
Background

- Two main tributaries to Jed River



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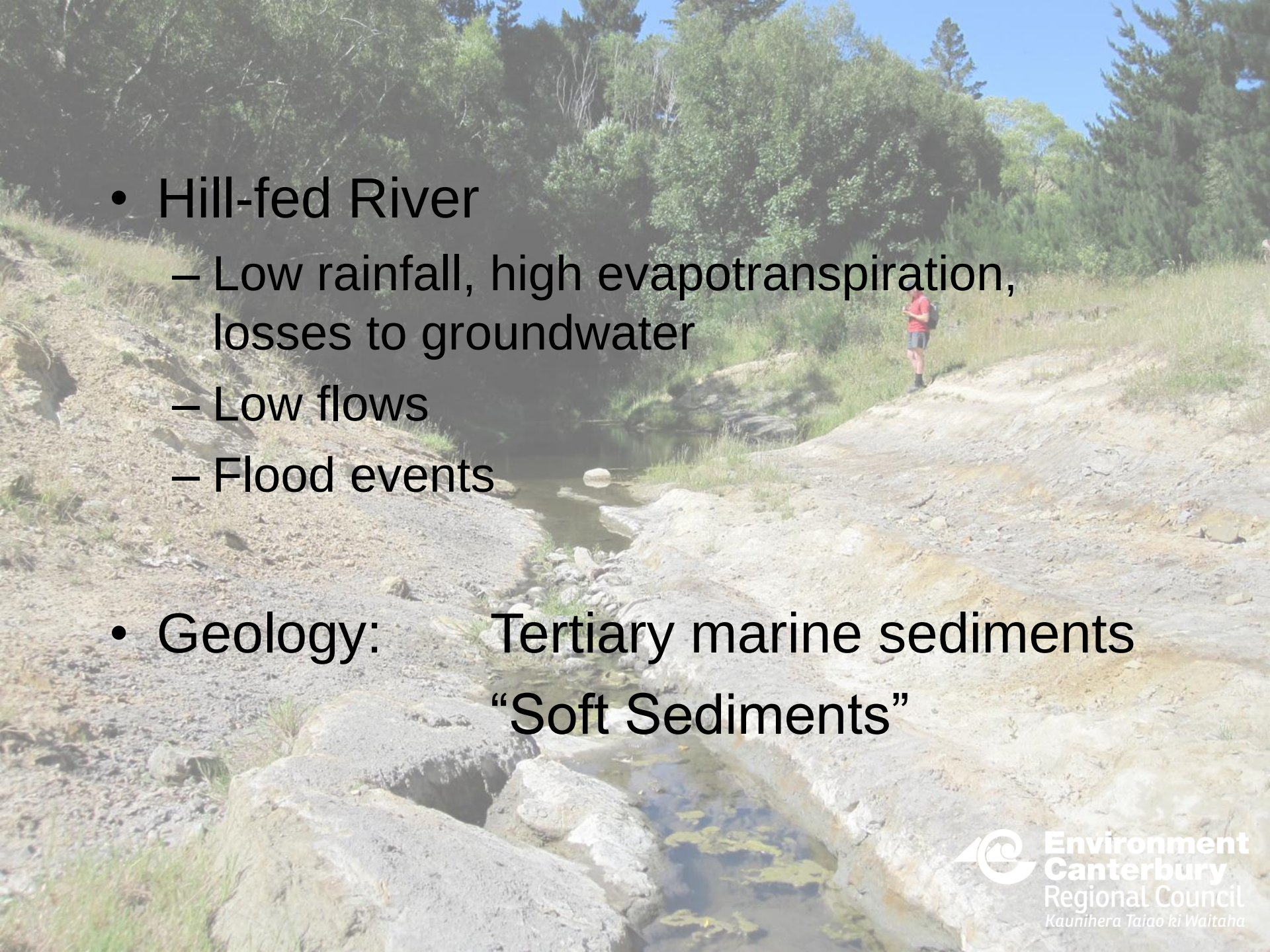

- Hill-fed River
  - Low rainfall, high evapotranspiration, losses to groundwater
  - Low flows
  - Flood events

- Geology: Tertiary marine sediments
  "Soft Sediments"

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Cheviot Sewage Treatment Plant

- Past discharges into Crystal Brook
- 1980's: discharge to land – Border Dyke irrigation
- Present: discharge to land – spray irrigation

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Jed River Issues

- Poor aesthetic appearance
- Public Health Warnings
- Water Quality and wildlife

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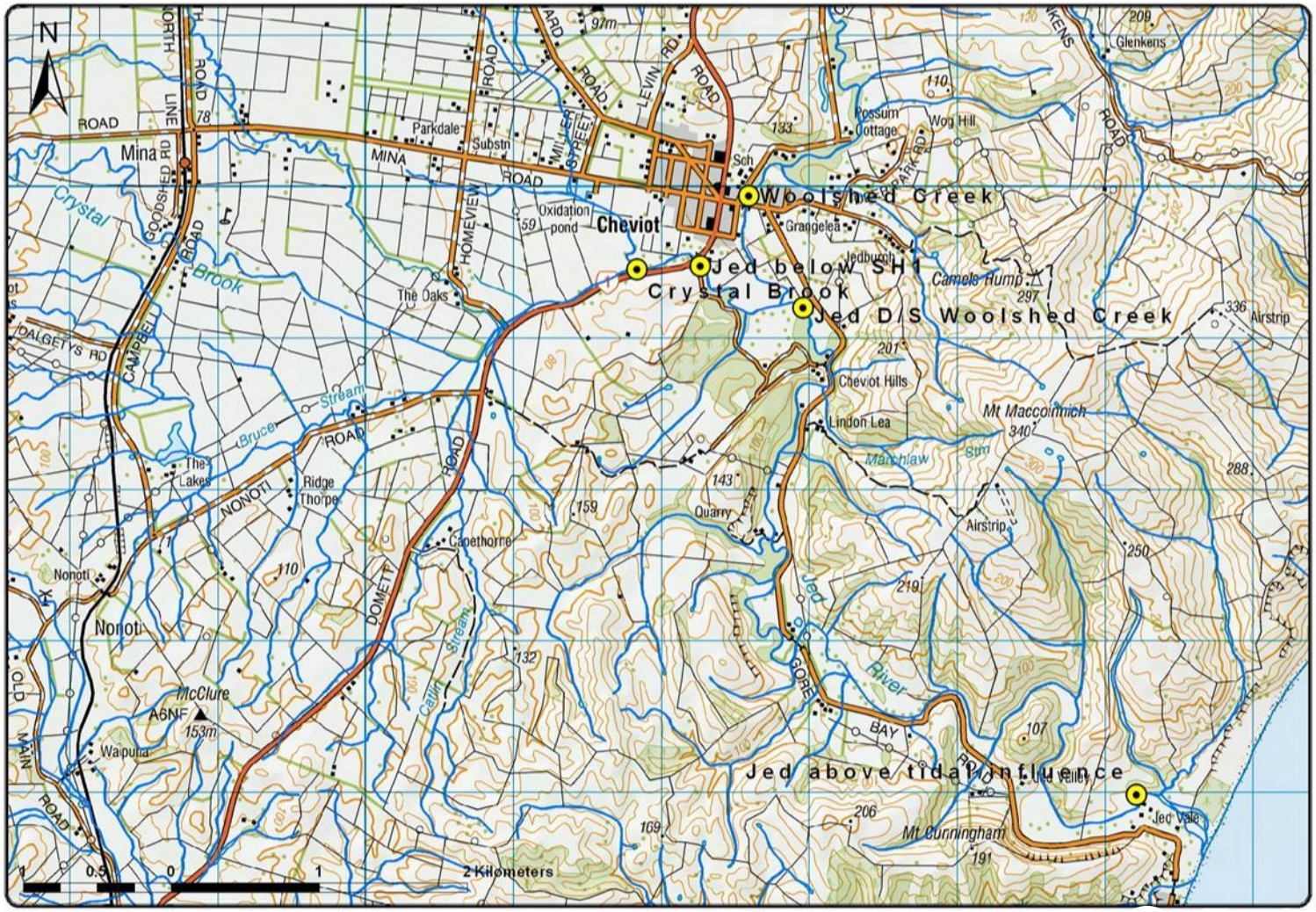
Monitoring

Jed River and Tributaries Monitoring Sites



Water Quality State

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Jed River

- Conductivity and pH
- Biochemical Oxygen Demand (BOD_5)
- Water Clarity
- Nutrients
  - Nitrogen
  - Phosphorus
- Microbiological Contamination

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Conductivity and pH

- Conductivity: ability of water to conduct electrical current
  - Recommended guideline value

    17.5 mS/m
  - Canterbury hill-fed rivers median

    11 mS/m

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Conductivity and pH

- Conductivity: ability of water to conduct electrical current
  - Recommended guideline value

    17.5 mS/m
  - Canterbury hill-fed rivers median

    11 mS/m
  - Minimum conductivity at each of the 5 sites:
    - 29 - 49 mS/m

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Conductivity and pH

- pH: essential conditon for aquatic life
- Influences toxicity
  - pH guideline: 7.2 - 7.8 (NZ) or 6.5 - 8.5 (Canterbury)
  - Hill-fed median: 7.6

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Conductivity and pH

- pH: essisential conditon for aquatic life
- Influences toxicity
  - pH guideline: 7.2 - 7.8 (NZ) or 6.5 - 8.5 (Canterbury)
  - Hill-fed median: 7.6
  - Median pH at each of the 5 sites
    - 7.85 - 8.2

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Conductivity and pH

- Elevated conductivity and pH????
- Catchment geology
  - Leaching of soluble ions from rocks and soils of tertiary marine sediments

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Biochemical Oxygen Demand (BOD_5)

- Measure of amount of oxygen consumed by micro-organisms during the breakdown of organic material
- Organic Sources: In-river production or inputs of organic matter
- Physiological stressor to aquatic organisms

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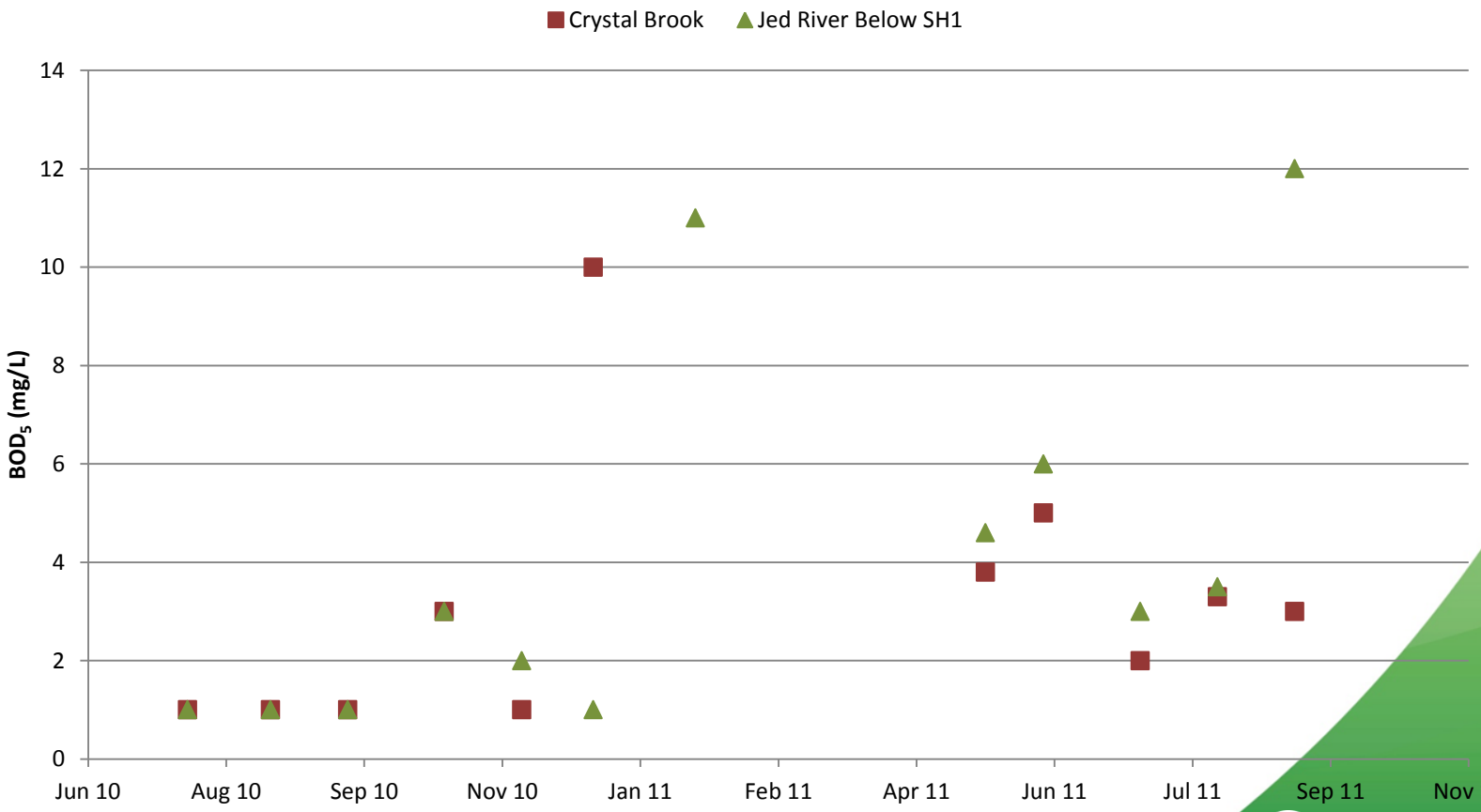
Biochemical Oxygen Demand (BOD_5)



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Water Clarity

- Issues
  - Aesthetic appearance
  - Recreation
  - Aquatic ecology

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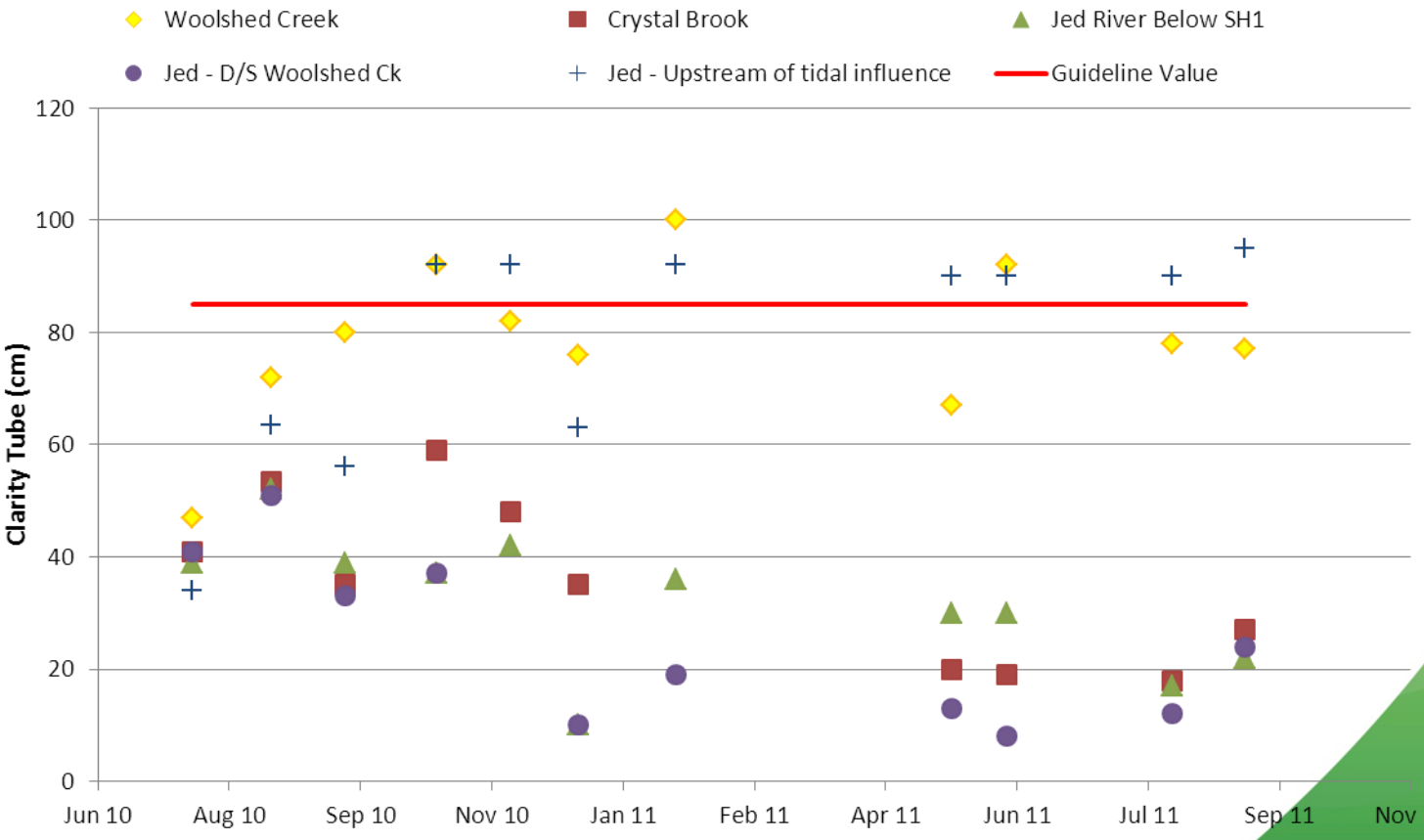
Water Clarity

- Influences:
  - Soil erosion/eroding banks
  - Wastewater discharge – high organic load
  - Stormwater run-off
  - Re-suspended bed sediments
  - Excessive algal growth

Water Clarity



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Causes of poor clarity in the Jed

- Soft sediment geology
- Stock access and bank erosion
- Flood events
- High organic content?

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Nutrients

- Dissolved Inorganic Nitrogen (DIN)
  - Sum of plant available nitrogen
- Ammonia Nitrogen

  (NH4N)
- Dissolved Reactive Phosphorus (DRP)

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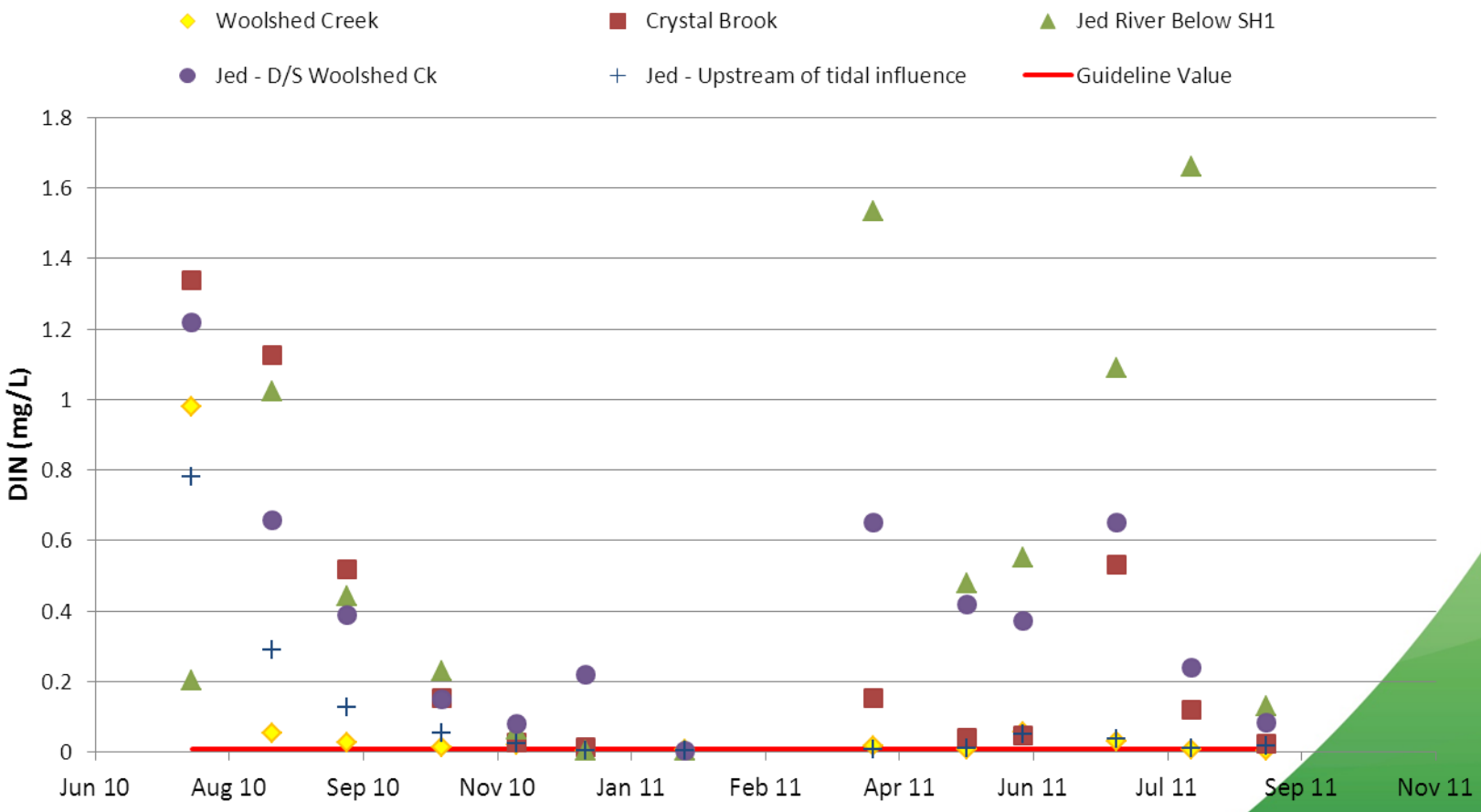
Dissolved Inorganic Nitrogen



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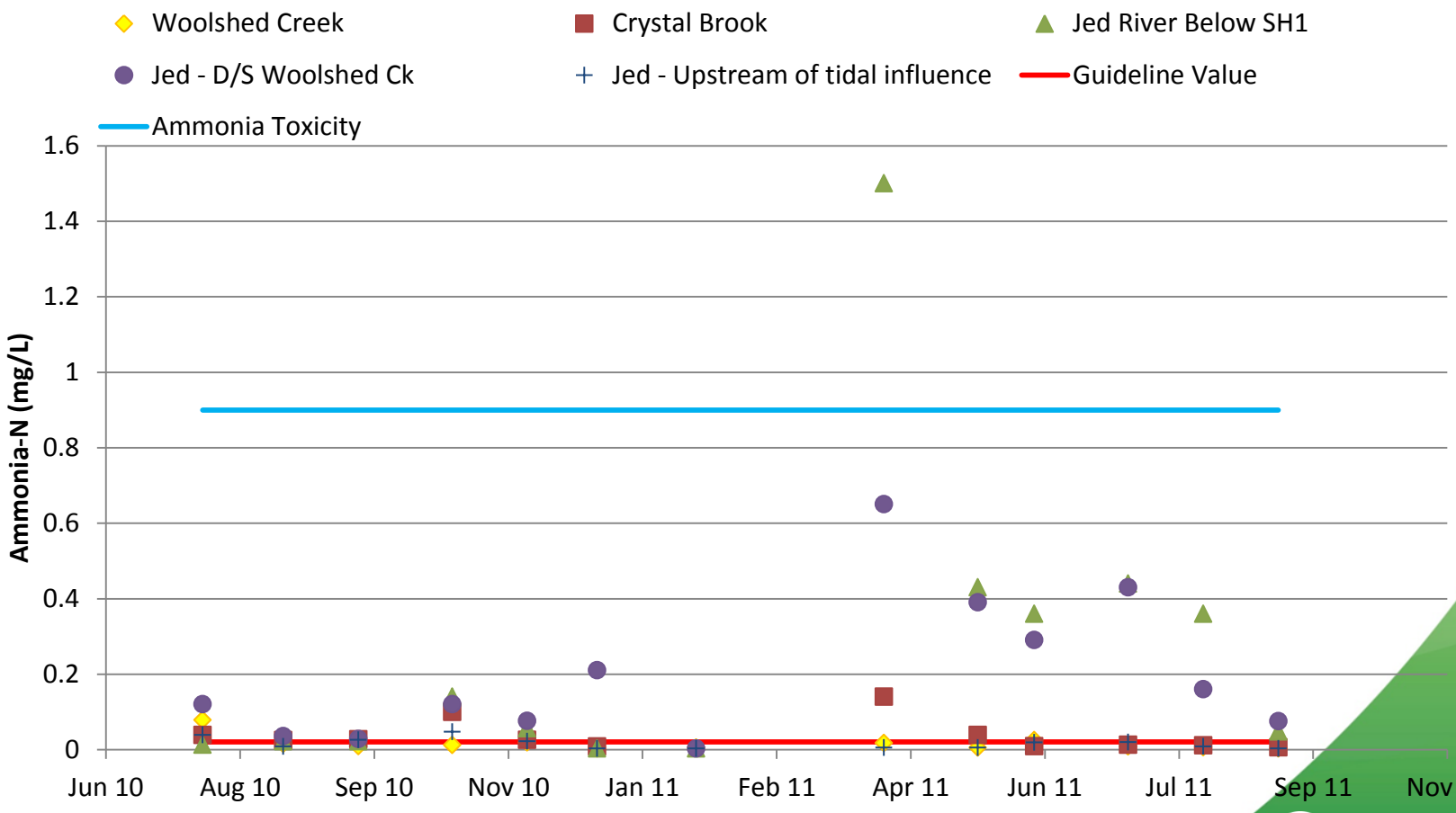
Ammonia Nitrogen



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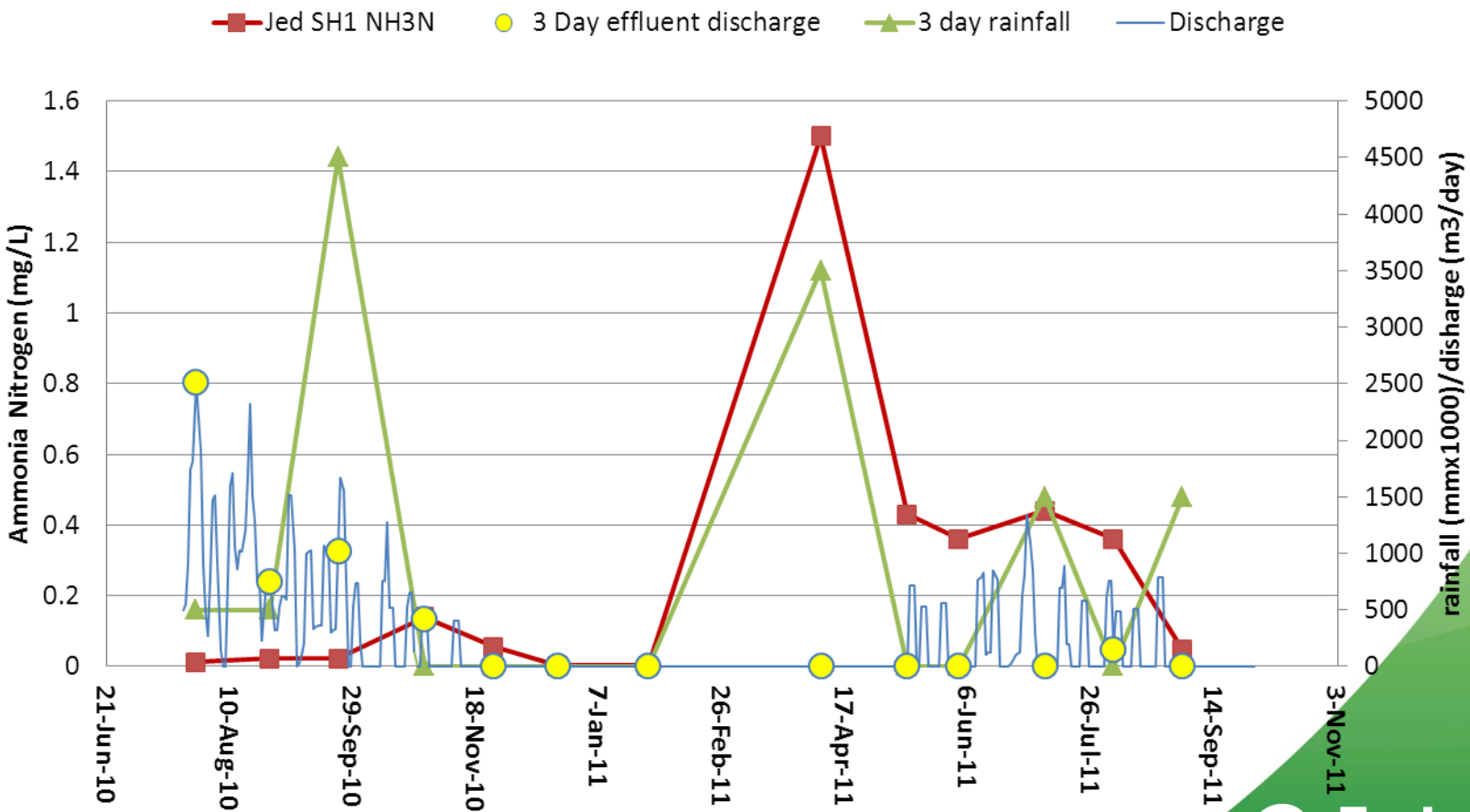
Ammonia Nitrogen and Wastewater



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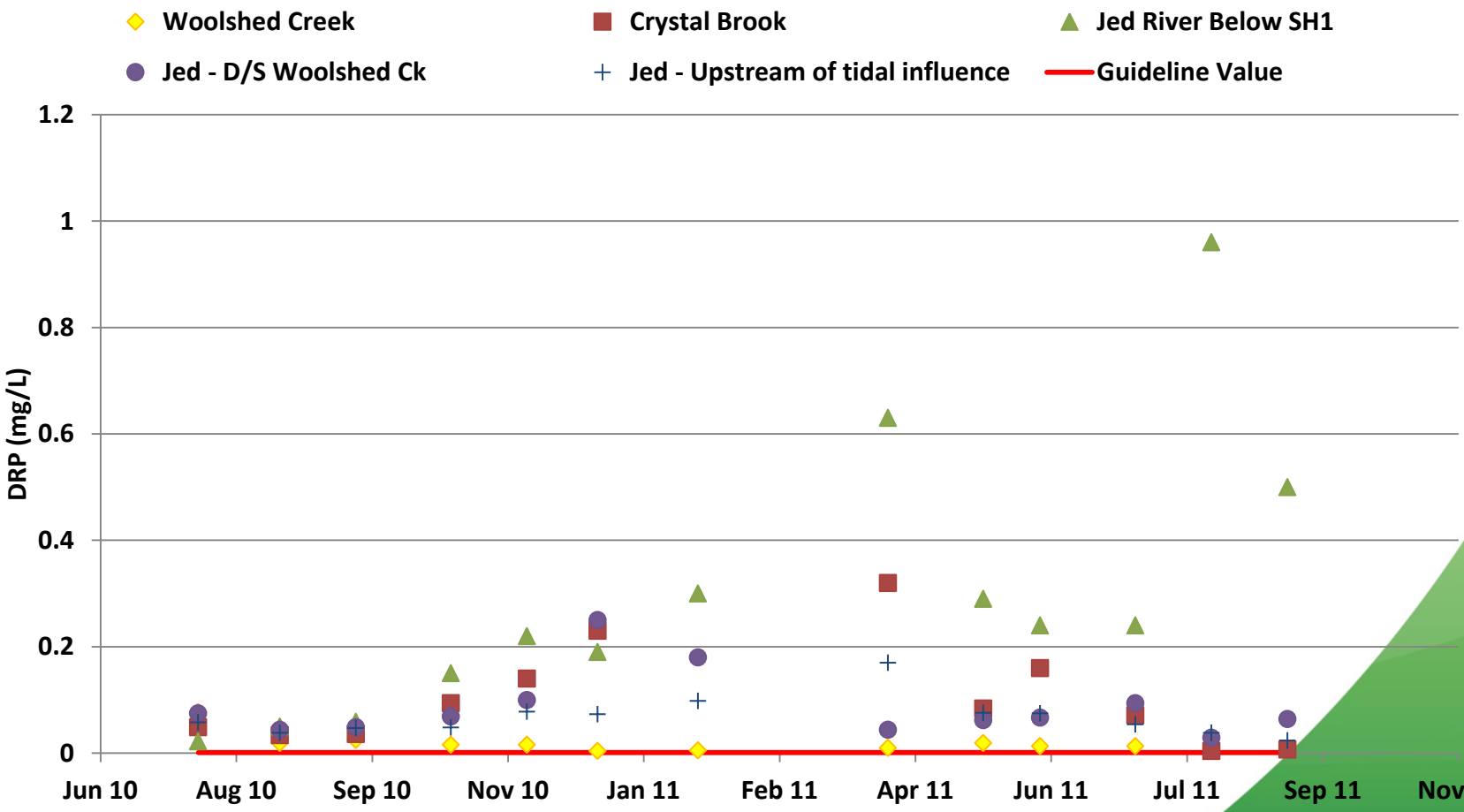
Dissolved Reactive Phosphorus



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Microbiological Contamination

- *Escherichia coli (E. coli*)
- Health Risks

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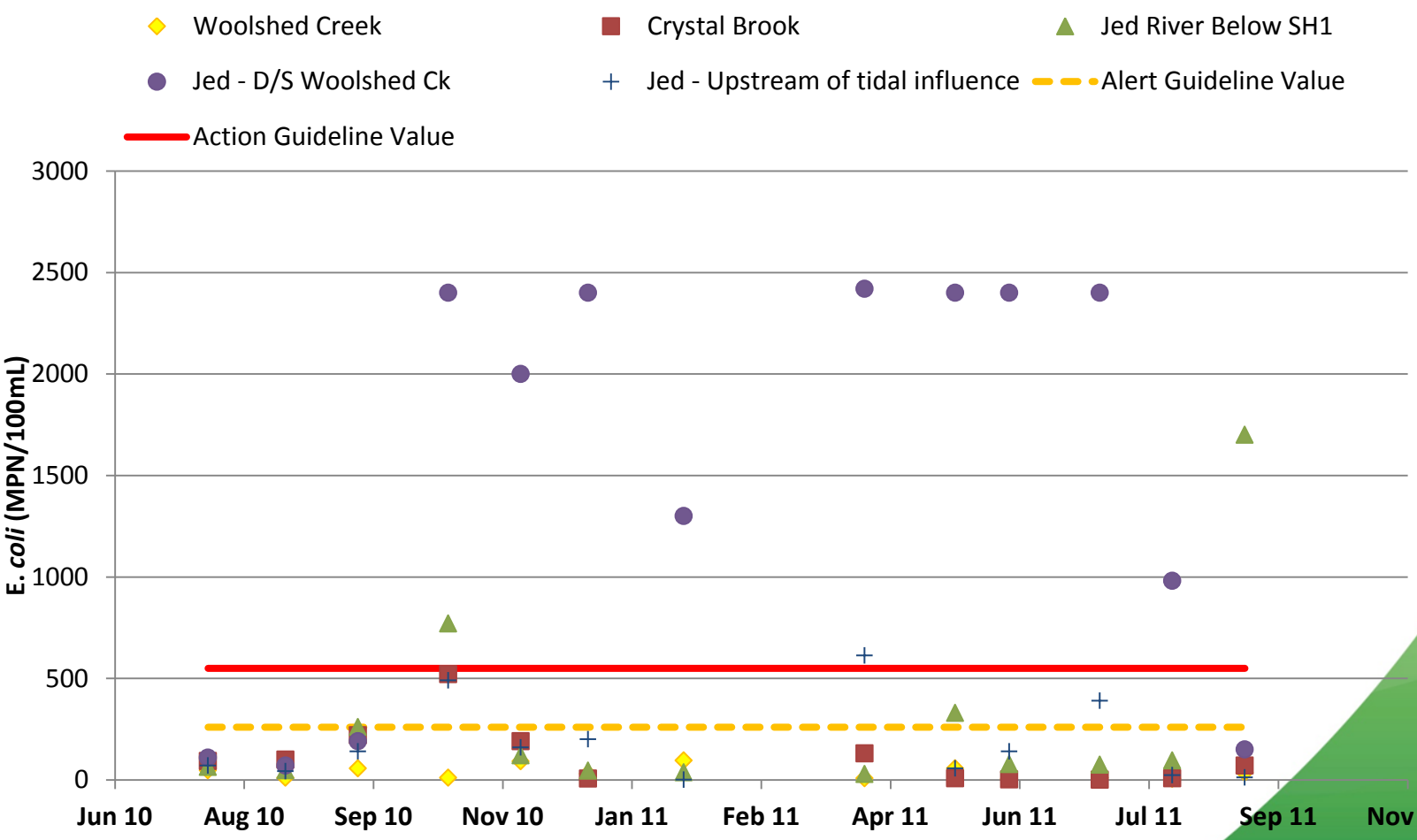
Microbiological Contamination



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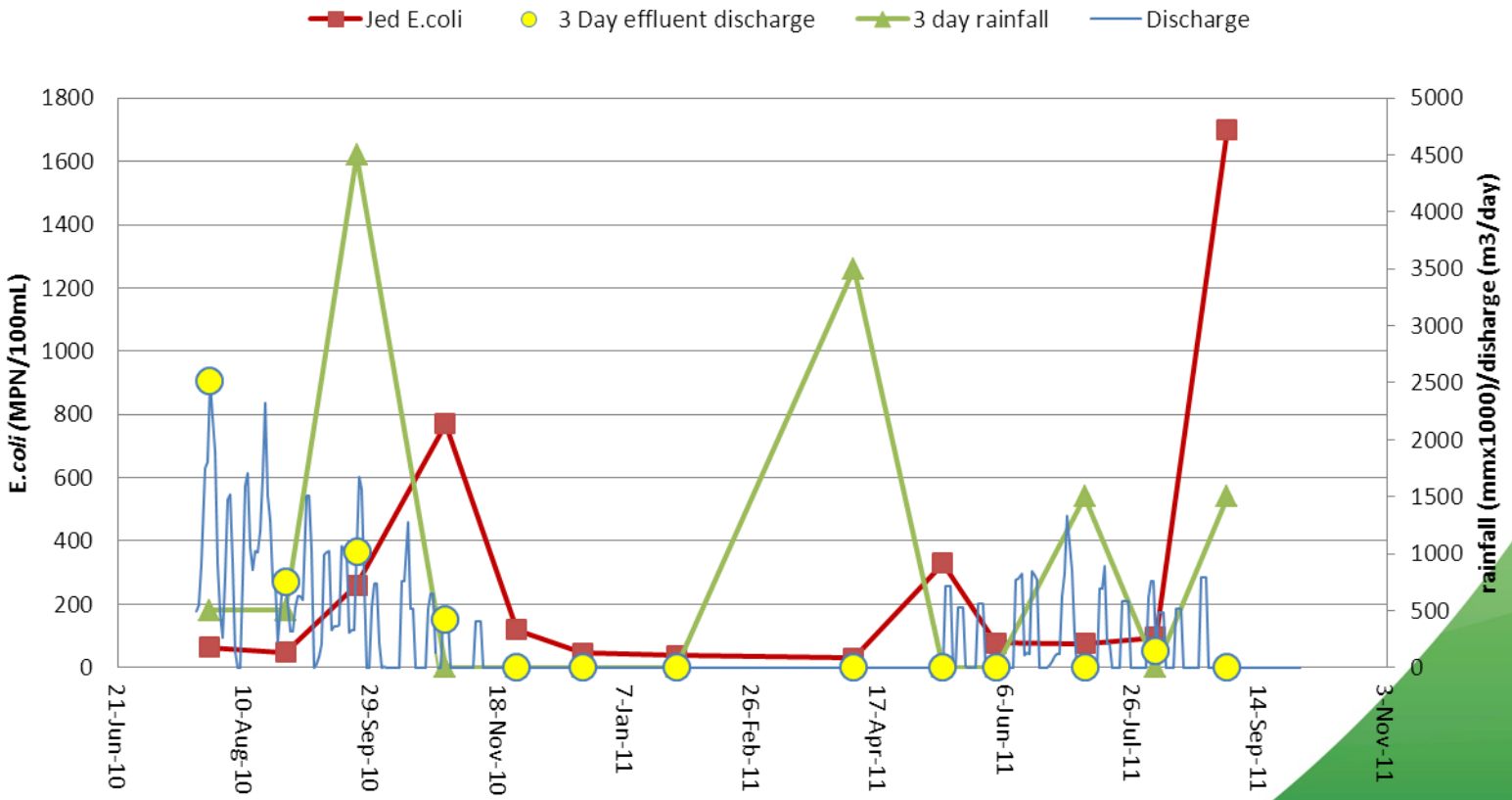
E. Coli and Wastewater discharge



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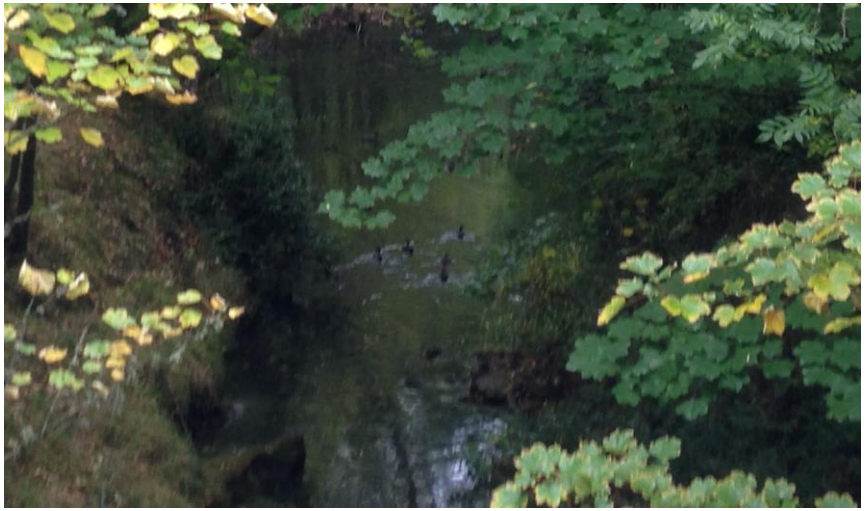
Sources of E. *coli*

- Stock Access??



- Ducks??

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Conclusions

- Catchment Geology
  - Conductivity and pH
  - Water Clarity
  - Nutrients - DRP

- Wastewater
  - BOD_5
  - Nutrients
  - Water Clarity

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Conclusions

- Stock Access and Sediment Inputs
  - Microbiological Contamination
  - Water Clarity
  - Sediment bound Phosphorus

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What can be Done?

- Riparian planting??
- Fencing??
- Stock Crossing??
- Is it that simple??
- What is the “value” of the Jed River??

Thank you

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