

"A community is more sustainable when all the threads pull together as one."

The Health of Waterways in the Waimea Catchment

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Outline

1. Good news stories

2. Widespread issues:

- Stream habitat
- Fish passage
- Stream temperature

3. Waimea River:

- fine sediment & toxic algae
- vehicles and fish

4. Spring-fed streams:

- nitrate toxicity
- Fine sediment



Wairoa River 5km upstream Pig Valley

1. Good news stories

- Bathing water sites on Lee, Roding and Waimea all grade as “good”
- Rivers generally very clear in base flows eg Wairoa >5m visibility 85% of the time.
- Waimea - nutrient concentrations low-mod



"A community is more sustainable when a

2. Stream habitat, fish passage, stream temperature and wetlands



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Stream Habitat Keyword = **Variety!**

Meander



Bed Material



Depth & Width



Bank Shape

**Streamside
trees**

all the trees are all together as one."



Residual Pools – Very important in the Moutere Terrain



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Grading the bed



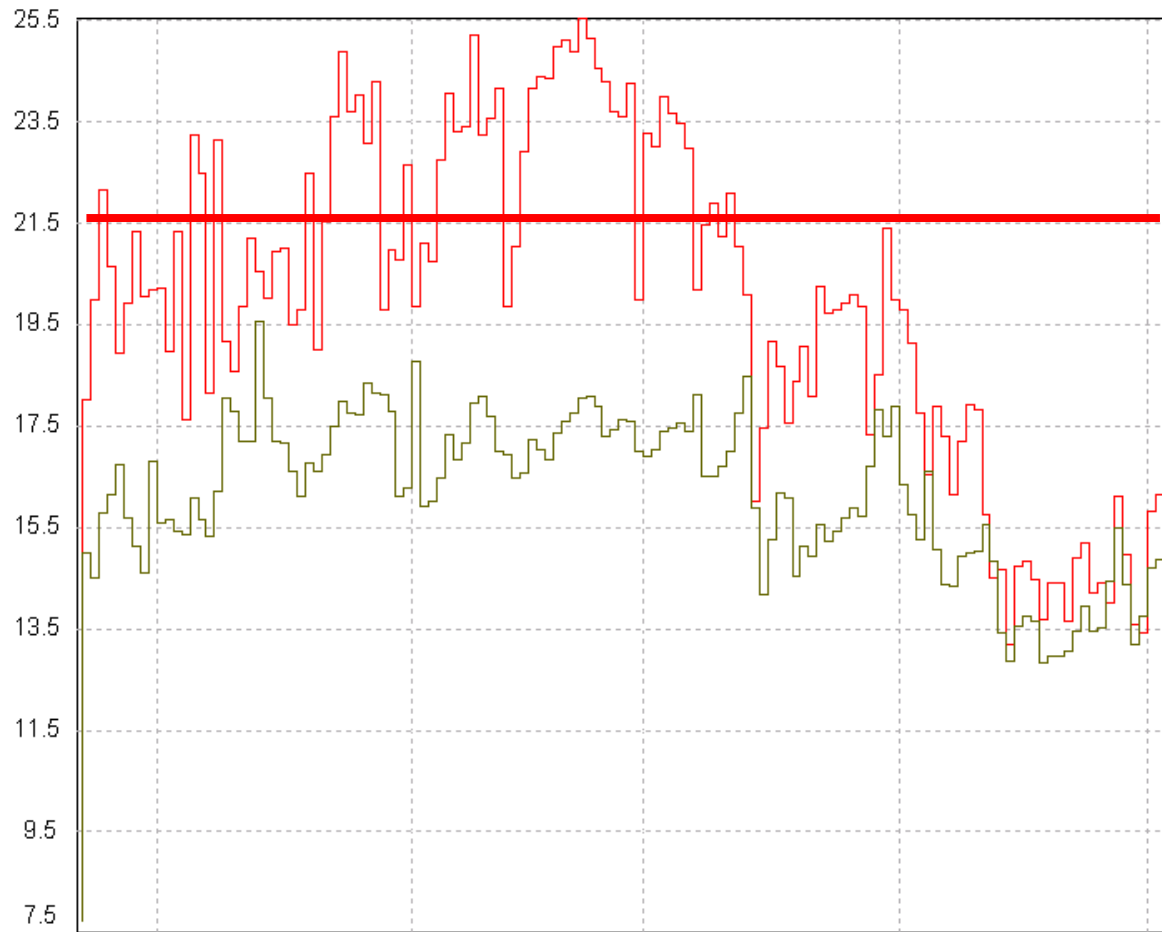
the threat
Redwood Valley Stream
April 2007

Barriers to fish passage

- 15-20% of in-stream structures are likely to be barriers to, or impede, fish migration
- 70% are perched culverts
- Wai-iti weirs



Streams get a bit hot in small un-shaded streams



22-Dec-2006 10:00:00 to 4-May-2007 15:00:00

— Daily Max-Mean Midpoint (degC) at HY Reservoir at Templemore Dr

— Daily Max-Mean Midpoint (degC) at HY Reservoir at Hill St



Wetlands

1% left in the Waimea Ecological District

- Rough Island
- Challies Island



3. Waimea River



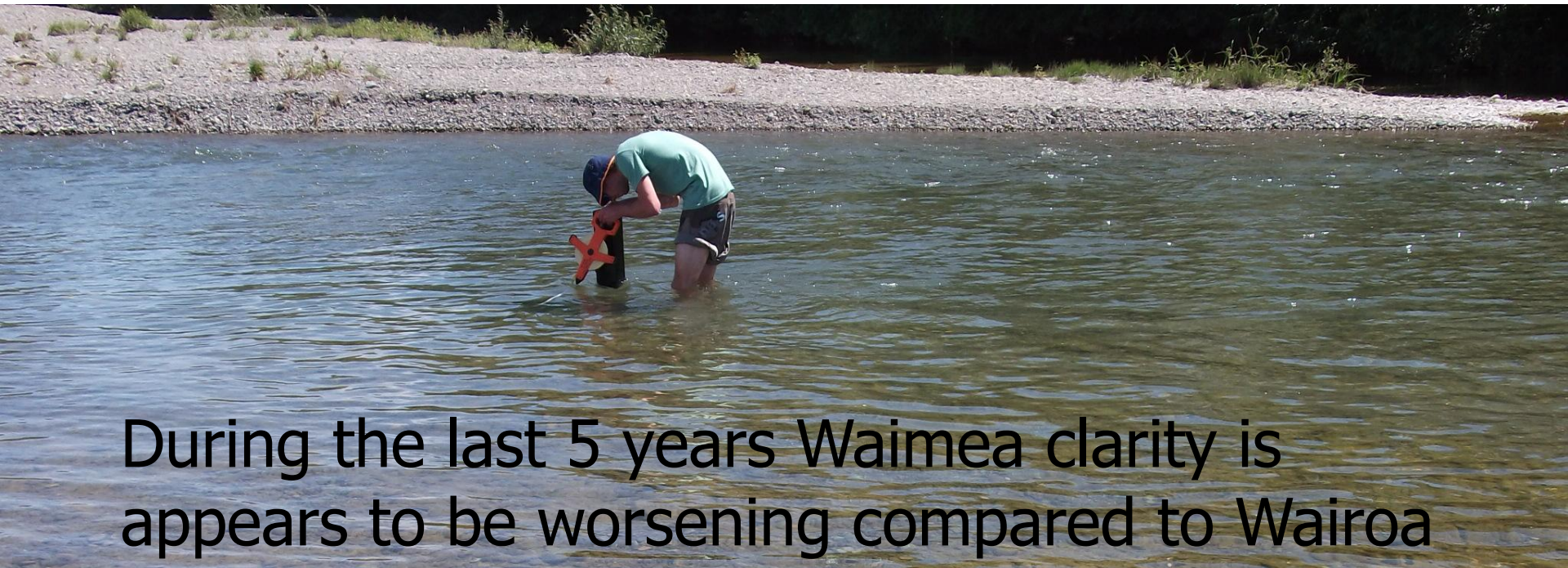
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Water Clarity in the Waimea Catchment

In base flows ...

- Waimea
- “good” 90% of the time
 - “excellent” 35% of the time
- Wairoa
- “good” ~100% of the time
 - “excellent” 85% of the time



During the last 5 years Waimea clarity is appears to be worsening compared to Wairoa



31/01/2012



13/01/2012



27/09/2012 13:58



27/09/2012 13:57

Toxic algae



Fish in the Waimea River

- Diverse community of native fish
- Trout fishery has improved significantly in last 6 years (Fish and Game Data)
- Likely impacts from vehicles
- Spawning sites



4. Spring-fed streams: Waimea plains

- Nitrate concentrations are high
- Very low dissolved oxygen
- Macro-invertebrate condition is very poor
- Very high growth rates of aquatic plants and algae
- No longer seem to contain giant kokopu



Nitrate

Neimann Creek

2.5-8.5g/m³ at 600m us Landsdowne Rd

14-16 g/m³ at Landsdowne Rd

Pearl Creek

2.9-3.9 g/m³ at 200m upstream tidegate

Waimea River

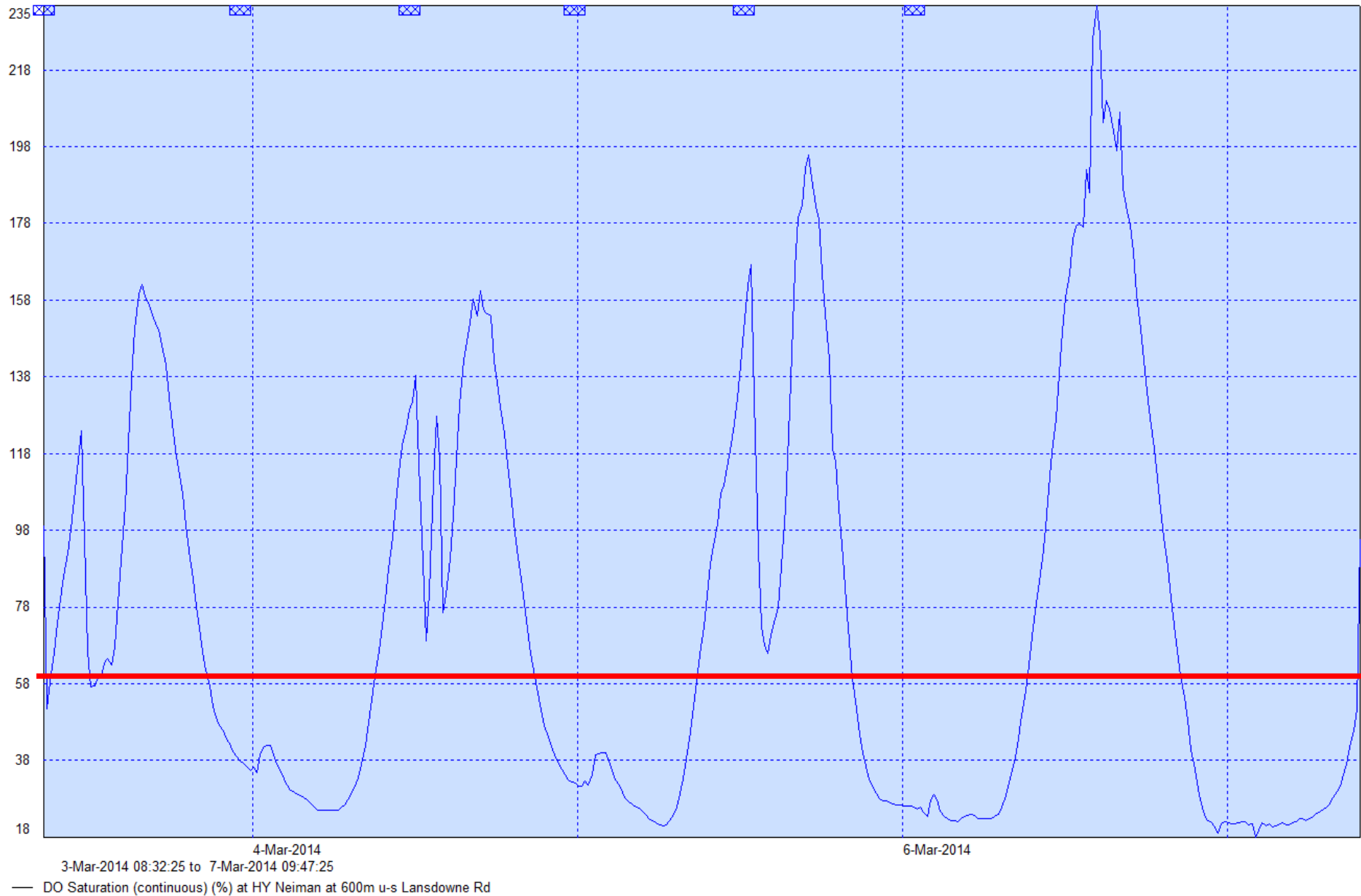
Median for non-winter 0.28 g/m³ (range 0.035-0.87)

Median for winter 0.72 g/m³ (range 0.54-1.1)

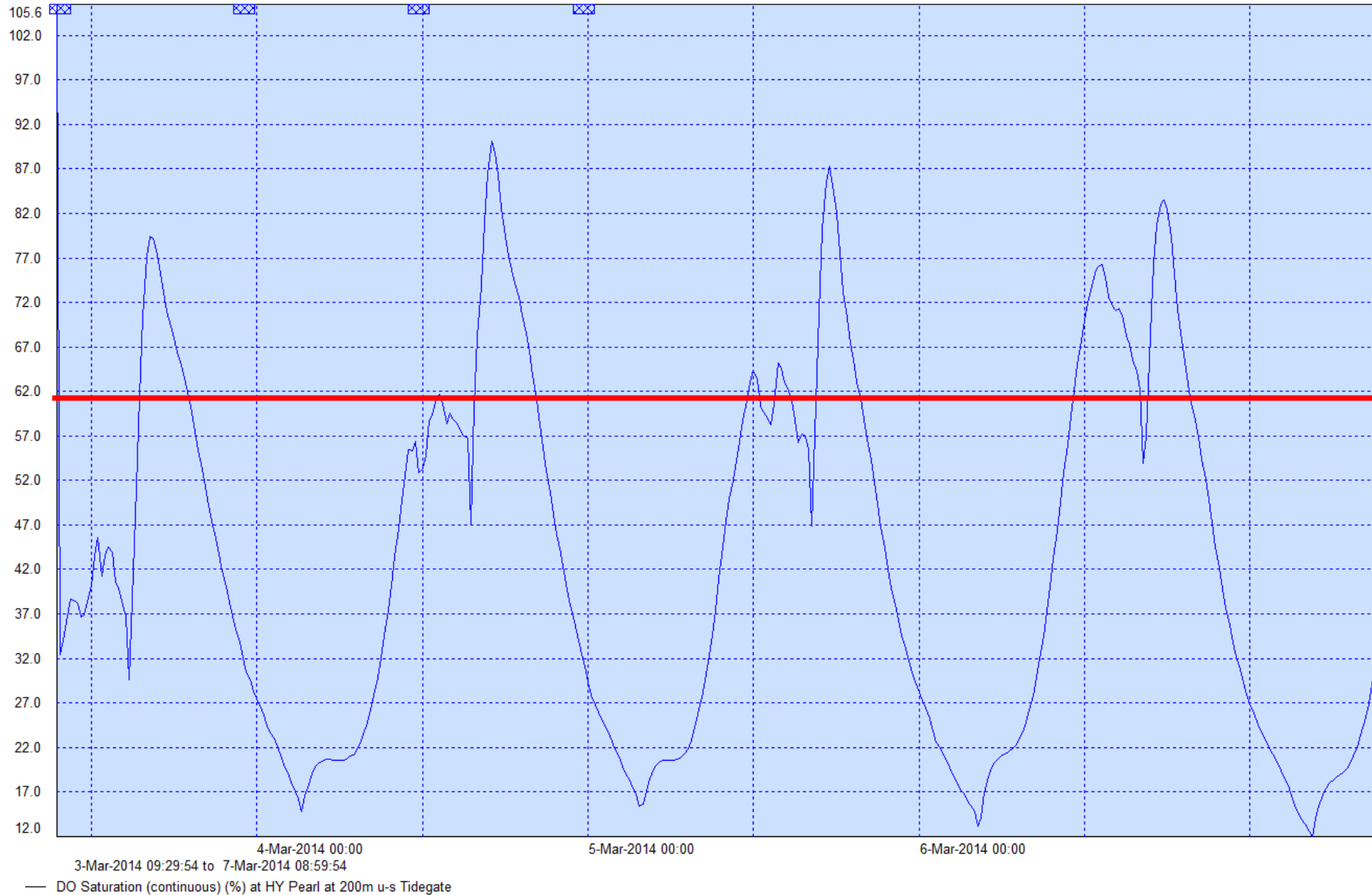


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Neimann Creek 600m upstream Landsdowne Rd



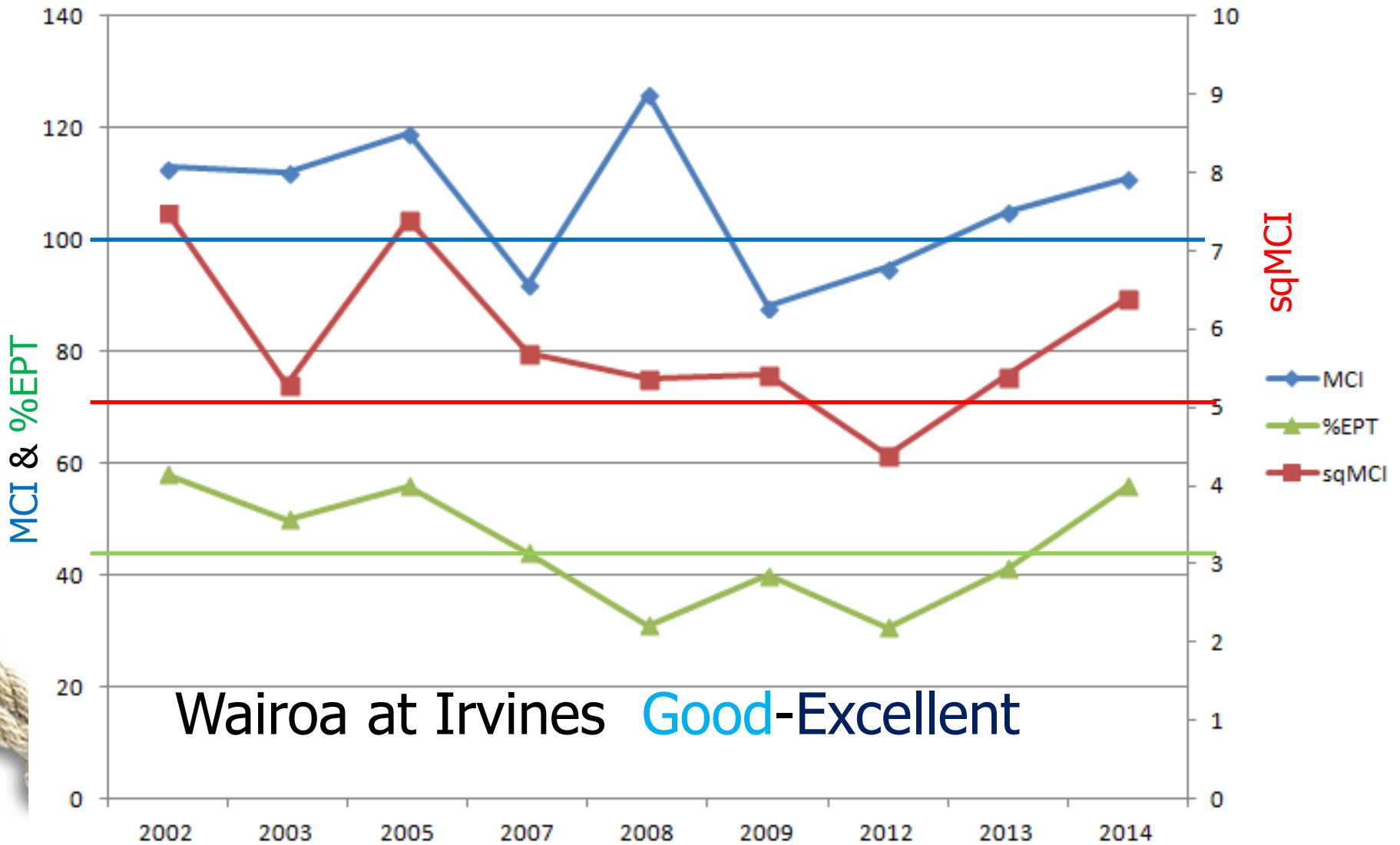
Pearl Creek 200m upstream tidegate



Things to watch:

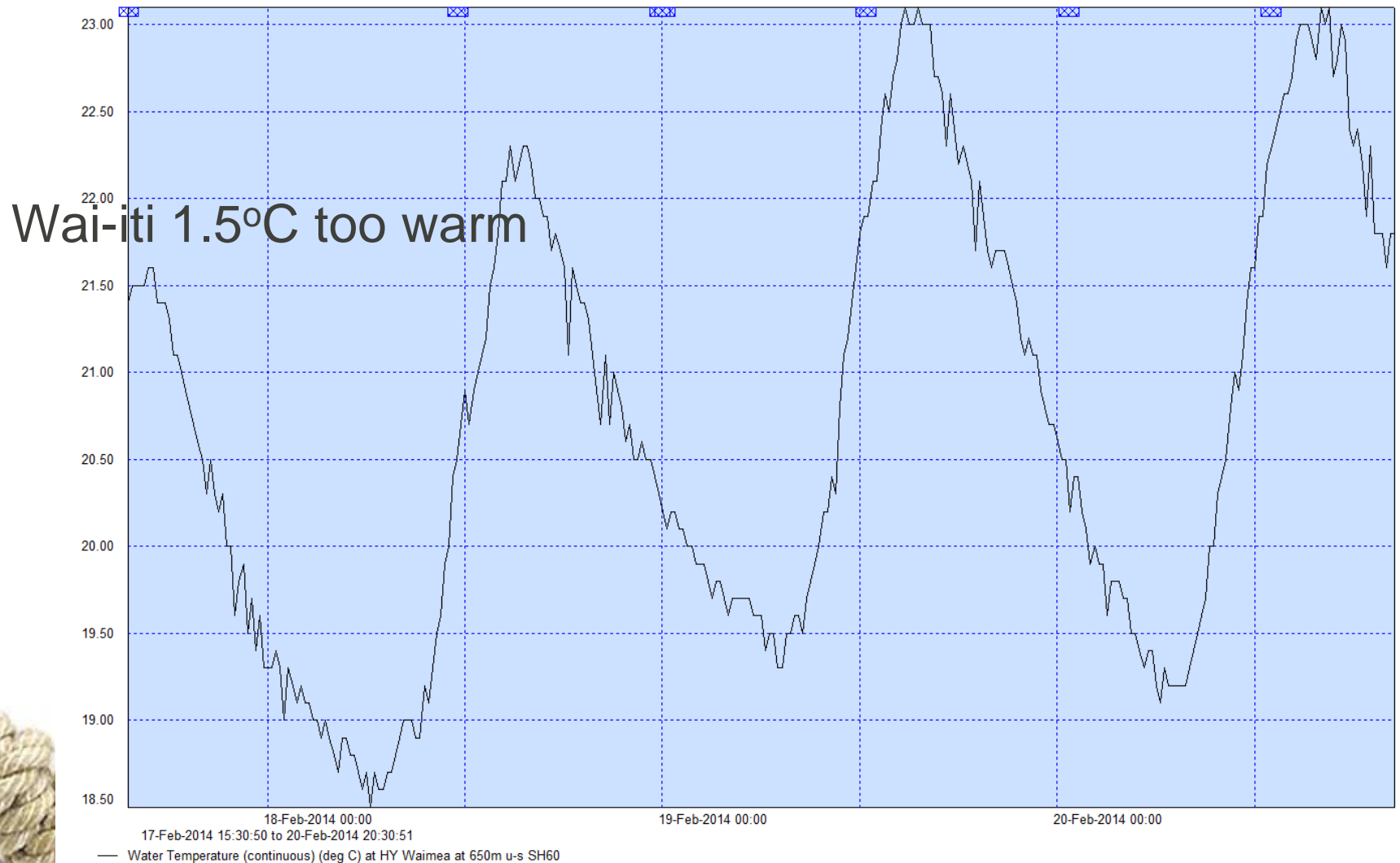
Macro-Invertebrate Metrics – Waimea at SH60

Fair-poor



Wairoa at Irvines Good-Excellent

Water Temperature in the Waimea gets 1°C too warm at times (midpoint of mean and maximum)



Slime

In summer low-flows cover of filamentous green algae is occasionally >30%



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Limits for Water Quality

| Parameter | | Guideline Value | Purpose of standard or guideline | Reference |
|------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------|
| Dissolved oxygen (DO) | | >80% saturation or >6.5 mg/L | Aquatic ecosystem protection | ANZECC (1992) |
| pH | | 6.5 – 8.5* | Aquatic ecosystem protection Good | Tasman District Council (2009) |
| | | ≥5 – <6.5 or >8.5 – ≤9 | Satisfactory | |
| | | <5 or >9 | Unsatisfactory | ANZECC (2000) Saffran <i>et al.</i> (2001) |
| Ecosystem Metabolism | Ecosystem Respiration (ER) | < 6 gO ₂ /m ² /day | Healthy | Young <i>et al.</i> (2008) |
| | | > 6 – ≤10 gO ₂ /m ² /day | Satisfactory | |
| | Gross Primary Production (GPP) | > 10 gO ₂ /m ² /day | Poor health | |
| | | < 4 gO ₂ /m ² /day > 4 - ≤ 7 gO ₂ /m ² /day >7 gO ₂ /m ² /day | Healthy Satisfactory Poor health | |
| Water Temperature | | 20°C ** | Aquatic ecosystem protection | Cox & Rutherford (2000) |
| Clarity | | >5 m | Excellent | Tasman District Council (2009) |
| | | 3 – 5m | Satisfactory | |
| | | 1.6 – 3m | Contact recreation Fair | ANZECC & ARMCANZ(2000) |
| | | <1.6m | Unsatisfactory | Tasman District Council (2009) |
| Turbidity | | <5.6 NTU for lowland rivers | Contact recreation | ANZECC & ARMCANZ(2000) |
| Ammoniacal nitrogen (NH ₄ -N) | | <0.02 mg/L for lowland rivers | Aquatic ecosystem protection | ANZECC & ARMCANZ(2000) |
| Total nitrogen (TN) | | <0.614 mg/L | Aquatic ecosystem protection | ANZECC & ARMCANZ(2000) |
| Dissolved inorganic nitrogen (DIN) | | <0.444 mg/L | Aquatic ecosystem protection | ANZECC & ARMCANZ(2000) |
| Dissolved reactive phosphorus (DRP) | | <0.01 mg/L | Aquatic ecosystem protection | ANZECC & ARMCANZ(2000) |
| Total phosphorus (TP) | | <0.033 mg/L | Aquatic ecosystem protection | ANZECC & ARMCANZ(2000) |
| E. coli | | 150 cfu/100mL | Contact recreation (Median) | MfE & MoH (2003) |
| | | <260 cfu/100 mL | Contact recreation Acceptable | |
| | | 260-550 cfu/100 mL | Contact recreation Alert | |
| | | >550 cfu/100 mL | Contact recreation Action | |
| | | >1000 cfu/100 mL | Stock drinking water (Median) | |
| Periphyton score | | <8 Low | Recreation and aesthetics | Biggs & Kilroy (2000) |
| | | >8 High | | |
| | | 30% bed cover | | |

*A community i

* NZ natural range.

** Based on the midpoint of the daily maximum and daily mean.

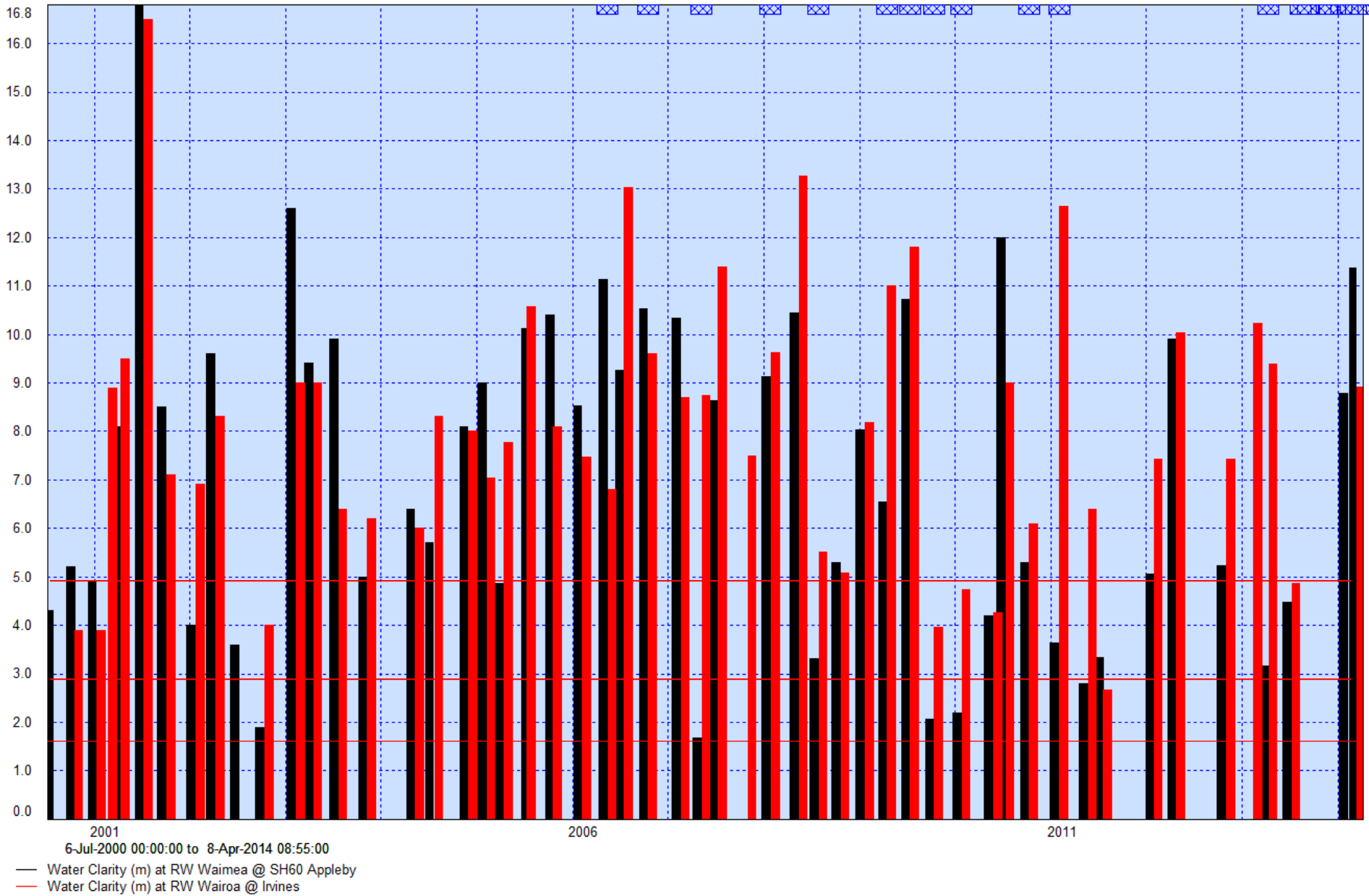
Recommended limits for Base-Flow Water Clarity in the Waimea Catchment

Waimea – >3m (ie “good”)

Wairoa – >5m (ie “excellent”)



Water Clarity in the Waimea River



Phormidium Coverage in Relation to Soluble Nitrogen and Phosphorus Concentration March 2013

