

## Notes from field day at “The Triangle”, 865 Balmoral Station Road, Culverden

### Speakers

John Preece – WetlandsNZ ecologist. John has an extensive knowledge of wetlands and has worked with various councils, DOC & ECAN, and private landowners

Jamie McFadden – co-owner of Hurunui Natives plant nursery and consultant

Miles Giller – QEII National Trust and Canterbury Botanical Society rep

Alastair Rutherford - Environmental Manager, Amuri Irrigation Company

Host: Nigel Gardiner - Sharemilker on the property

### Intro

- 400 ha converted to Dairy 11 years ago. 1050 cows, feed crops grown - Fodder beet & Kale
- Dry Stream runs full length of farm – always management consideration
- Hurunui Natives – early plantings before Nigel and many more since. Jamie pointed out some roadside planting of dryland mixed species – most difficult to establish due to cold, wind, dry. Kanuka on the plain is rare.
- Goal for day – to understand the values and attributes of wetlands and streams

### Wetland

#### *Nigel*

- Enhance what we have – process of topping up plants – extending buffer zones
- Existing wetland - maintained – pivot irrigator goes over
  - Weeds – 2yrs ago willow gorse and blackberry smothering the flax – sprayed
  - Current willows allowed to grow bigger then drill & poison
- Extended wetland 3 years ago on west side



## John

- Definition of wetland (RMA) – consists of plants and animals adapted to water.
  - Can condition score – start, then 5 years later re-score
- Soil - moisture is critical – plants e.g. Raupo dependant on water
  - High in organic matter – most wetlands sequester carbon – credits?
- Water source – where?
  - Groundwater – lowland “swamps” - most drained for farming
  - Off hillsides – “fens” – lower in fertility
  - Rain at higher altitude – “Bogs” – nutrient poor
- Most productive systems on the planet – provides a lot of habitat – diverse
- Functions
  - Flood attenuation – soak up and release slowly - needs scale to work; most are too small
  - Process nutrients – anaerobic systems, can absorb nitrates from different farms but again, needs scale
  - Can't expect miracles – NZ has lost 90% of wetlands; Amuri basin high 90's
- Scale of wetland required?
  - NIWA – 5 to 7% of catchment to absorb 80 – 90% of nitrates
- Changes in landscape over time
  - Early settlers needed to survive – easiest to drain swamps
  - Continued on – paid to drain – 70 Parliamentary Acts for Drainage, 1 for Wetlands - not encouraged to preserve
  - Land in ‘better condition’ meant more pasture
  - Currently – amongst highest in the world for wetland loss – still losing them. When down to 20% wetland - lose species dramatically. Need to reverse

## Miles

- Used to have incentives to drain wetlands now to restore
- Forests regarded as high value, wetlands perceived poorly
- Covenants, look at:
  - Risks – pest & weed management
  - Costs – is it manageable?
  - Stock: can be advantageous for sheep to graze – reduce rank grass. Some destocked altogether
- High altitude bogs can be easier to manage
- A lot of wetland re-creation in Southland
- Test with *Carex secta* planting; if it grows keep going
- Look after we have already got! Can pop up anywhere/everywhere hydrology is restored

## Water source 1<sup>st</sup> & 2<sup>nd</sup> driver of wetland!

- Historically more wetland area fed by surface water streams from base of hills
- Adjacent drain carrying 7mg/litre of nitrate (1mg/L considered healthy)

- Option to redirect into existing wetland as extra water source, with potential to filter out some degree of nitrate
- Border dike to centre pivot - have different impacts on water tables and nutrient loads of streams
  - *Jamie* – at bottom end of catchment, springs in border dike era now drying up



*Alistair*

- Switch to pivots over last 10-15 years improved water quality and efficiency – not the leaching or run off as with border dike
  - Pahau Restoration Project – sediment ponds resulted in drop in phosphorous (which attaches to soil particles)
  - Economic & environmental pressure to make pivots even more efficient
  - Canals all piped, improving pressure – open races suffered leakages and more friction
  - Unforeseen reduction in groundwater increasing the nitrate concentration – new problem to tackle
- Farm Environment Plans – good management practice
  - Fenced setbacks – not polluting waterway
  - Don't actually require planting and enhancement work – would get push-back, but many doing it anyway.

- *John* – need stop situation of wetland loss getting worse with better advice. People do FEP's for different reasons, from straight compliance to environmental concern.
- *Jamie* – the process of an integrated restoration of wetlands over multiple farms is in transition.
  - Less and less farmers doing nothing as good work done by neighbours adds peer pressure
  - Got to have farmers on-side – motivated and empowered – more so than regulated

### *Jamie*

- Implications of removing stock?
  - Ecosystem change can create the unexpected
  - Needs much thought – every site is different
- Slow moving streams – when planted water can back up into paddocks during weather event; good/bad?
- Within 2km of rivers natives not an option due to Old Mans Beard spreading out of rivers
  - Options – flax, carex secta – can spray with tordon/grazon for weeds
  - New wetlands – coprosma, toe toe, flax, carex
- Costings - \$12 to \$13 all up - in the ground
- The bigger the plants the better. For trees get 6-8ml stem size
- Eco source seeds – Lake Station, Hamner, Waipara
  - Pittosporum and broadleaf from altitude are tougher.
- Guards – gone away from (plastic!). Currently testing biodegradable option

### **Gravel Pit**

#### *Nigel*

- Keen to divert water from Dry Stream into the gravel pit, develop wetland and return to creek after improving in quality
- Expert assessment – viable project
- Consent process – stalled.
  - Managed by Fonterra rep - \$20K spend on 5 consents includes costs such as design engineer @ \$300/hr
  - Suggestions
    - Need changes to RMA to make doing good work easier
    - *Alistair* – unable to use AIG funds in the battle
    - Zone Committee – in early stages of looking at barriers to such projects and how to address them
    - Global consent – streamline with one process to cover everything

## Dry Stream



### *Jamie*

- Began plantings 10-12 years ago and topped up since, bridges added for centre pivot
- 5 km downstream it flows underground
- Original plantings – Toe Toe (tot toi), Muehlenbeckia astonii, Harakeke (flax), Carex secta
  - Carex will recruit; Flax not so much and at 10-15 yr stage
- To allow flood flow don't plant the inside bends

### *John*

- Following natural course with bends and undercuts allowing varied habitat
  - When straightened, as in drains, flow is faster – more flood prone
- Mussels evident – dead and alive. Evolved from the sea into a different species
  - Not common. Status – at risk and declining
  - Most a similar size – up to 40 years old. A few smaller, but no juveniles
  - Breeding – male spurts sperm, female ingests and fertilises
  - All eggs go downstream and need to get up.
  - Eggs latch onto fish gills (Koaro), parasitical for a few days before dropping off upstream

- Very little recruitment – Koaro fish (a whitebait species) no longer present – need more forested riparian strips (shade), don't like high temps. Nationally in decline; reflects NZ's biodiversity crisis. Unknown if cockabullies' can do the same job.
- Mussels likely a remnant population



- Mussels in high numbers can filter dirty lakes
- Need an interconnected ecology - Ki uta ki tai – from the mountains to the sea
  - Forest – streams – fish – mussels
  - Diverse ecology with shade trees to reduce temp and evaporation
    - Dry Stream – plant carex low in undercuts for some shade benefits
  - Trout – remove to give native fish a chance

#### *Alistair*

- Dry Stream heads through AIC shareholders properties
- Collective action
  - Drone mapped to foothills, north and south branch
  - Large sections with meandering stream and wide planting
  - Opportunities? – weirs? Predatory fish removed?
- Most farmers keen, some suspicious, some want to look after trout.
- In 2 years' time hopefully changes noticeable

#### *John*

- Took net sample and lifted some rocks
- Found a healthy invertebrate community – healthy ecosystem

- Native macrophytes (aquatic plants) don't take over
- Mayflies, Stoneflies, 3 species Caddisflies – on the macroinvertebrate community index as sensitive to pollution.
- Dobsonflies or 'toe biters' – large pincers – largest of stream insects



### *Nigel*

- Test water twice a year at the top where the drain comes in (7.5 mgN/L) and at the bottom – Hills Laboratories test kit
- Similar date/flow/water clarity
- Result – roughly half the time it's better at the bottom than the top and half the time it's the same.
  - To achieve 1mgN/L need more riparian/wetland scale