

FLAG MEETING NOTES: 14 July 2014

Purpose:	Waimea Plains Freshwater and Land Advisory Group (FLAG)– Meeting 3
Date:	14 July 2014
Time:	9.30am-12.30pm
Venue:	TDC Council Chambers
Present:	<p>FLAG members: Nick Patterson (chair) Mirka Langford Philip Woollaston Gavin O'Donnell Martin Rutledge Pierre Garguilo Lawson Davey Andrew Kinnimoth Heather Arnold Zane Mirfin (council representative on FLAG) Matt Hippolite (iwi representative on FLAG)</p> <p>Staff: Mary-Anne Baker (Environmental Policy Planner) Lisa McGlinchey (Environmental Policy Planner) Joseph Thomas (Resource Scientist – Water) Glenn Stevens (Resource Scientist - Water & Land) Andrew Burton (Resource Scientist – Land) Steve Markham (Manager Environmental Policy)</p> <p>Guest Presenter: Greg Carlyon (ex Horizons Regional Council staff)</p>
Apologies:	none
Notes taken by:	Lisa McGlinchey (supplemented by other staff)
Definitions and Abbreviations	FLAG=Freshwater and Land Advisory Group NPSFWM= National Policy Statement for Freshwater Management 2014 NOF= National Objectives Framework TRMP = Tasman Resource Management Plan Unconfined aquifer = are those where permeable strata are open to the ground surface. Surface water (rainfall and/or river flow) is able to seep from the ground surface directly to the aquifer. Confined aquifer = are those where permeable groundwater bearing strata are separated from the land's surface by an impermeable layer (such as silt or clay) that prevents surface water from directly seeping into the aquifer. Groundwater migrates to confined aquifers from an unconfined recharge area located elsewhere. AGUA= Appleby Gravel Unconfined Aquifer UCA=Upper Confined Aquifer LCA= Lower Confined Aquifer
<p><i>Note: records of discussion points have been grouped into similar topics and are not necessarily in the order discussed at the meeting.</i></p> <p>Note: Session 3 on the agenda for this meeting (Management Objectives and Attributes) was deferred until the next FLAG meeting due to time constraints.</p>	

Session 1 – Soils Resources and Land Use on the Waimea Plains

Confirmation of previous meeting notes

Meeting 2 meeting notes accepted by the FLAG group as an accurate reflection of the meeting.

Dean Rainham involvement in FLAG

The FLAG discussed the merits of including Dean Rainham (Horticultural consultant with Agfirst Consultants) as a member of the group or utilising his skills on an as-needed basis. Some members noted that fertiliser use was a key issue to be considered by the FLAG and that use of Overseer for market gardening was a key knowledge gap for the group. It was suggested that staff confirm Dean's knowledge in this aspect. Some concerns were expressed regarding the extent that other experts could also be of use in the group. Members also reiterated that while economics are important, other values of water are also important and the group will be considering all values in their recommendations to Council.

Following discussions, the group identified the following points:

- Dean Rainham is to be brought onto the FLAG group to attend each meeting as an advisory member (without voting rights - in keeping with the Terms of Reference)
- Dean's participation in the FLAG is as a knowledgeable and enthusiastic individual, rather than a representative of a specific industry sector
- Other national experts can be asked to provide advice as needed.

Action: *Mary-Anne to confirm Dean's knowledge of Overseer for use in market gardening and extend an offer to Dean to join the Waimea FLAG.*

Action: *during discussions Mary-Anne also noted her upcoming attendance at the ECan/Landcare Matrix for Good Management workshop (6 August) and is to report back to the FLAG on outcomes.*

Presentation 1: Soil Resources and Land Use on the Waimea Plains

Andrew Burton (Resource Scientist - Land) gave a presentation in two parts on the soil resources and the land use information held by Council.

Key points from Soils Resources Section:

- Past information from the Fundamental Soils Layer
- In 2011 Council began more detailed soil mapping for the Waimea Plains starting with the Redwood Valley, Appleby and Waimea-West areas. This showed much more variability of soil types.
- The new data is to a 1:10,000 scale suitable for property level use and allows for remapping of land productivity classifications and soil versatility mapping
- Further work looking at water holding capacity and plant rooting depths is planned to assist with irrigation management (as has been done for Takaka)
- *[The budget for completion of soil mapping on the Waimea Plains has been reduced and this will affect the time frame for collection – it is hoped to have the rest of the Waimea Plains mapping complete within 3 years]*

Questions and topics of discussion arising from Andrew's presentation on Soils:

Where have the leaching vulnerabilities come from – was it a quantitative or subjective methodology?

The methodology gives low, medium or high categories, but can also provide numerical ranges within these. It provides a good indicator of leaching.

Some of the nitrogen-phosphorus ratios seem unusual – there is much more phosphorus than seems normal?

The nitrogen-phosphorus ratio will depend on the phosphorus retention capabilities of the soil. Nitrates are not well retained and tend to leach out.

Has work been done with lysimeters to track nutrients?

No – only 2-3 national soil sites are monitored in Tasman. However Canterbury soils have been tested with lysimeters and the Tasman soil types that are similar to those in Canterbury (and have been named using Canterbury soil names) are likely to have the same rates.

How well does the soil modelling match with reality?

The models are robust, but the key is the quality of soils information going into the models. The dataset behind the model is what is really needed.

Dr Joy recently gave a presentation in Nelson on politics trumping science in water management (eg the Nitrates range) – how could this affect the FLAG process?

[SM] Decisions need to be science driven and politics kept out of it. The decision to use nitrate toxicity as a national water quality attribute, rather than chronic levels, does not prevent the FLAG from looking at what the science says is best for local limit setting.

[JT] The national attributes relate only to river and lake systems, not to groundwater. The FLAG will need to look at what suitable limits are for the groundwater resources in Waimea. There is no real nitrogen or phosphorus issue in the Waimea River waters, but groundwater will affect the spring-fed rivers and hardness of this water also affects nitrate toxicity.

The bottom lines are set at high concentrations – our job is to protect the environment, but allow for production.

Our role is to provide advice to Council – presumably Council is only bound by the national bottom line. The FLAG can recommend higher standards. It is a daunting task that is likely to become a contentious exercise to attempt to appease all parties.

Key points from Land Uses Section:

- Council received the latest Land Cover Database version 4 (LCDB4) last week – it is from 2012 data and takes 2 years to process. The LCDB4 is considered 90-94% accurate.
- Council also has the Agribase data set and has under taken a pilot investigation of a block of land in Waimea to improve the quality of the data by removing roads, dwellings and garden areas. This showed approximately 10-12% of the area was covered in non-productive land uses.

Questions and topics of discussion arising from Andrew's presentation on Land Uses:

With increased intensification an issue for the FLAG to consider, can we extrapolate what areas are available for intensification – is it as great as people think?

Yes – through the LCDB over time we can track changes, but to get detailed results we would need to go through a process of using the LCDB, the Agribase and aerials to refine the data. We would start using the information developed previously by John Bealing and take out the non-productive landuses. The time for this would be relatively short being person-days rather than weeks.

This would be a useful piece of data – understanding current intensification and future potential.

[GS/JT] Water allocation could be used as a surrogate for intensification. Previous work looking at this identified an additional 1500ha on the Waimea Plains in addition to the 3800ha already with water allocation permits. This does not include the Council urban water take. Excluding berm land and the like, this could be between 1000-1500ha of

potentially irrigable land. There is other land further up Eves Valley and Redwood Valley as well.

[MAB] The pattern of land use may also change with the Waimea Dam due to better security of supply.

The FLAG need to consider the types of intensification. Pasture changes to other land uses, but pasture is limited, could also be other types of land use changes.

Vertical agriculture and new technologies and ideas may also change land uses – we can't just look to the past to forecast the future.

What about climate impacts? There are cooler areas – such as Appleby and Ranzau areas where growing veges would be difficult and additional irrigation may not result in greater intensification as it is too cold...

Yes this could have impacts - there are also some soil types that are unlikely to be irrigated and planted – even if they technically can be.

There could also be new crop varieties which could mean different opportunities.

A visit with Ewers identified great differences in localised climate zones on the Waimea Plains – do we have this kind of data available?

No, we only have anecdotal information from past growers.

Adding or removing stopbanks or shelterbelts can also change the situation.

Climate parameters can be measured, but it is not cheap.

It would be good to get more information on future intensification opportunities, including what is currently pasture and on good soil types...

Economies will drive things in the future and could get large changes.

It would also be good to understand property sizes and lifestyle blocks and possible future uses.

[AB] the pilot investigation highlighted that properties less than 3ha tended to be pasture, while those greater than 3ha tended to be market garden.

Is this something a student could do?

[AB/JT] Yes. Council have also used students in the past to look at properties and water permit adequacy.

Heather noted she might be able to help out with provision of a student to do the work.

Action: *Andrew to pursue gaining further detail on land use and opportunities for intensification on the Waimea Plains. Andrew to liaise with Heather to secure student time to do the work this summer.*

Are we looking for the highest and best use of water – is it worthwhile looking at areas that have allocation but are not the best areas to irrigate – such as high leaching soils?

Allocation is only one aspect to consider – how growers manage what they are planting is also important. The risk is not just about the physical properties of the land, but also management – it could be possible to have an efficient land use on high leaching soils for example using high-precision irrigation.

Using this approach is getting into affecting peoples private property rights. The value of land reflects the water rights available and existing investment must also be considered.

We need to understand the risks and threats better to make decisions on what might need to change.

Do we have title and water allocation information?

Yes – Council have colour coded properties against the adequacy of allocation, but could also plot usage from metered data. We could also add information from land management methods – such as information from Overseer.

Session 2: Discharges, Stygofauna and Isotope Studies

Presentation 2: Point Discharges on the Waimea Plains

Lisa McGlinchey gave a presentation summarising potential point discharges on the Waimea Plains. The key water management zones considered included the Delta, Golden Hills, Waimea-West, Reservoir and Hope Aquifers/Eastern Hills zones (WM Zones).

Key points:

- The TRMP includes special areas in the aquifer recharge area including the 'Aquifer Protection Area' and the 'Special Domestic Wastewater Disposal Area' which affect what activities can be done in these areas.
- There are a variety of discharges to land and fresh and coastal water permitted without resource consent – but with conditions - in the WM Zones.
- There are currently 73 consented discharges to land and water in the WM Zones.
- Most on-site wastewater systems are permitted activities so Council only holds limited information. Data investigated suggest potentially up to 789 on-site wastewater systems within the WM Zones.
- Using on-site wastewater nitrate removal and leaching data from Environment Waikato, Bay of Plenty and the US, the onsite systems are estimated to contribute up to 2kg/ha/yr to the WM Zones. This was compared to the current TRMP permitted activity level for bird and animal effluent of 200kg/ha/yr.
- While on the whole existing point discharges may not have a significant impact on water quality, they could have both localised and cumulative impacts.

Questions and topics of discussion arising from Lisa's presentation:

The nitrogen numbers in the TRMP seem high?

The levels were set a long time ago without benefit of information now available.

[ML] Research into fertiliser use identified that using more than 200kg/ha/yr allowed higher stocking, but also resulted in nitrogen leaching increasing exponentially and was possibly the driver for use of 200kg/ha/yr.

Could the information on on-site wastewater be overlaid over soil versatility information? This would provide greater information for decision making.

Possibly, but there are other aspects we could focus our effort on too.

Straight comparison of the data may not be easily done due to some data accuracy aspects, but could be looked at if the FLAG wanted this level of detail information.

These discharges could have cumulative effects – should this be taken into consideration?

Yes, but we also need to think about what we could do about the discharges. There are options for requiring better onsite systems and management. We need to identify what will give us the biggest potential water quality improvements for time and cost.

Point sources over a certain size could have greater impacts, how is this considered?

The Aquifer Protection Area and Special Domestic Wastewater Disposal Area overly the key area of concern (the aquifer recharge area) and these areas give greater control over the types of activities allowed there. The permitted activity conditions also have size/scale requirements – activities above these sizes/scales would require resource consent.

What other discharges and contaminants could be an issue?

The current consented discharges are likely to have cumulative impacts. We also need to consider how urban discharges are dealt with. This could be through other projects such as the Catchment Management Plans which are looking at these kinds of issues.

Are there any consented wastewater overflows into fresh water?

No – discharges of untreated human or animal effluent is prohibited under rule 36.2.4.1, but there could potentially be accidental overflows or overflows in emergency situations. Consents to discharge effluent are generally required to consider contingency planning and measures that will be used to predict, prevent and respond to accidents.

Is there an issue on the margin of urban/industrial growth areas such Lower Queen St or SH6?

Possibly. It would depend on whether they connected to the Council wastewater network. There are rules in the TRMP requiring connection to the network where it is available.

Presentation 3: Stygofauna of Waimea Plains Groundwater

Martin Rutledge gave a presentation on stygofauna (animals that live in groundwater)

Key points:

- Stygofauna are animals that live in groundwater. They live in the voids between particles and as such, are relatively small.
- The voids on the Waimea Plains tend to be smaller than other areas, such as Canterbury, so we would expect local Stygofauna to be smaller as well.
- There has been only limited research on Stygofauna and they are poorly understood.
- They tend to be dominated by crustaceans and have a high level of endemism
- Some research was done in 1972 (Kuschel) in Brightwater and more recent sampling was done in 2003 (Scarsbrook & Fenwick) identifying many species, and more are likely to be identified as the 1972 samples are reviewed.
- Stygofauna feed off bacteria and fungi films on particles, with predatory stygofauna feeding on the grazers. In this way stygofauna purify the water and maintain the void spaces in a clean condition, maintaining porosity and oxygen circulation to deeper levels of the aquifers. They are important for groundwater quality and flow.
- They are sensitive to contaminants and recovery after impacts takes a long time. Chronic effects are not well understood and sedimentation and abstraction can change the habitat.
- Research could be done to identify a baseline for the Waimea Plains and identify indicator species for groundwater such as are used for surface water.

Questions and topics of discussion arising from Martin's presentation:

Have you heard of eels using aquifers to travel?

I have heard of elvers using gravels to traverse areas, but not deeply.

Do UV filters on well water kill the stygofauna?

Not sure, but likely it is not good for them.

Could the 1972 data be used to compare with repeat sampling data?

Not sure if there is sufficient information on where the samples were taken or how.

Is it useful to look at existing wells and compare those with high and low nitrate levels?

Could be interesting, but probably would not provide information key to FLAG needs for decision making.

Has any work been done since Hickey 2013 recommended further research?

Not that I'm aware of, but could look into what is happening elsewhere in the country.

The FLAG could add its support to such data being gathered, but not on behalf of the FLAG.

[JT] Biofilms are of interest to groundwater and how they affect water quality and percolation. This aspect was considered at the Hydrological Conference in 2005.

Presentation 4: Waimea Plains Groundwater Isotope Analyses

Glenn Stevens gave a presentation overviewing previous work by Mike Stewart et al (2011) investigating nitrogen, hydrogen and oxygen isotopes in groundwater of the Waimea Plains.

Action: A copy of the report will be made available on the website – Waimea FLAG page.

Key points:

- Use of nitrates on Plains since 1940s, elevated concentrations measured since 1960s
- Hydrogen isotope sampling since 1972, Nitrogen isotope sampling since 1998
- The confined aquifers are recharged by river sources in the southern and eastern areas and by rainwater infiltration from the Eastern Hills and Hope areas
- Near the rivers recharge to the unconfined aquifers is dominated by the rivers. Elsewhere, recharge is dominated by rainfall infiltration.
- Results indicate some recharge (leakage) of water from the UCA into the underlying LCA in the Hope area (where the UCA passes directly above the LCA).
- Low nitrate concentrations in surface waters result in lower nitrate concentrations in groundwater where recharge is dominated by river leakage
- Highest nitrate concentrations are associated with rainfall infiltration
- Models suggest two kinds of nitrate contamination: widespread diffuse nitrate inputs attributed to the combined use of inorganic and manure fertilisers and strong point source attributed to historic piggery effluent
- Highest nitrates located at, and down gradient of historic piggery and historic market gardening area
- Nitrates moving northwards through the aquifer systems and will take decades to flush through the aquifer systems
- Nitrate levels in the LCA reducing, but nitrate in the northern part of the LCA likely to continue rising for 20 years regardless of potential decreases in future inputs as existing contamination moves through the aquifer.
- Uncertainty about current levels of nitrate leeching to aquifers, historic nitrate contamination may be masking current land use impacts inputs
- Need to ensure that current land use practices are sustainable
- Intensification of Waimea Plains land use will require careful nutrient management

Questions and topics of discussion arising from Glenn's presentation:

Did the nitrate model for the LCA just stop at the year 2040 as opposed to being the end date for increase?

Yes - the model suggests an increase in nitrates in the LCA to at least 2040 and this could possibly continue beyond then.

Is the Rabbit Island sampling site well away from where the biosolids are put?

Yes – the sample well is also down into the LCA so it is well separated.

Have Council tested the 100yr old water in the LCA?

Not for nitrate isotopes – nitrate samples are about \$30 each, but isotope samples are in the order of \$1500 per sample.

What is drop-off in model attributed to?

Changing landuse, closure of piggery, move to lifestyle blocks etc. Also better landuse practices and more efficient fertiliser use.

It is good that the nitrate levels appear to be dropping? Are there other parts in NZ where a move to lifestyle blocks also show a decreasing trend?

Possibly – we can look into this. Just need to find areas that are moving into lifestyle blocks – perhaps around Auckland.

Generally high intensity land uses results in higher nitrates. There is also the national groundwater database which staff can access and review.

The effect of the piggery continues to be raised and the potential for soil nitrate testing was discussed – has this been progressed?

Staff discussions on this concluded that testing would be problematic and potentially expensive to identify the exact areas where the effluent ponds existed on the large property. It was considered more cost effective to undertake groundwater quality sampling of bores 'downstream' from the site. This will help tell us what is coming out of the area. Some targeted groundwater quality sampling of the piggery plume area has been approved and Glenn S will be undertaking this in the coming weeks as time allows. Previous groundwater tests suggest the nitrates from the area are dropping off, how long it will take for this site to cease being a source is not so easily answered.

Are there specific TRMP rules in this area?

Yes the Aquifer Protection Area and Special Domestic Wastewater Disposal Area cover the aquifer recharge area – which includes the piggery site on the sth-eastern boundary.

Session 3: Horizons One Plan Experience

Presentation 5: Horizons One Plan

Greg Carlyon – an ex-Horizons Regional Council staff member gave the FLAG a verbal overview of his views on the development of the Horizons One Plan and the lessons learned from this experience, with particular regard to the setting of water quality limits.

Key points:

- Horizons was the only regional council with a fully operative suite of plans which were up for review. The decision was made to have a fully integrated plan with a rolling review.
- Upfront discussions identified what was really important and resulted in four regional challenges that were focused on (the "Big Four"):
 - Water quality
 - Water quantity
 - Biodiversity
 - Sustainable land management
- The Plan used a carrot-and-stick method to implement
- Links with the Long Term Plan were included – particularly where non-regulatory methods were identified such as in managing biodiversity – these needed the required long term funding to achieve
- Overall the process took ten years (from start to getting out of the high court) including four years of community and stakeholder engagement before any plan writing was started.
- 400 stakeholders were identified across the four big issues – with less than 10 having to 'grit it out with'
- The aim was for the shortest plan with round 20 pages – it ended up at ~400
- Water quantity was relatively easy – there had been a shift to large scale irrigation and companies were regularly spending in the order of \$500,000 to obtain consents. The Plan implemented minimum flows and allocation of groundwater allowing a great reduction in consent costs.
- Water quality more difficult to address – the large catchments were split up into 130 subcatchments and values, limits and targets were set for each catchment. In each catchment the highest value was provided for.

- Point source discharges provided clear consenting limits and reduced consenting timeframes down from the previous 2-4 years timeframe
- For non-point sources the Council challenged the local science community to match instream needs with the 'right to pollute'
- There was discussion on how to allocate the 'right to pollute' and it was decided not to 'grandfather' the allocated portion and instead to align on the basis of 'natural capital' linked to the best use of the land and allocating nutrient loss based on land class. This was a more difficult path, but was seen as giving greater consideration to the future.
- Horizons recognised that achieving instream values couldn't be rushed – it was thought to take a generation – but this was ambitious - we might hope to stabilise situation rather than reduce levels in a single generation.
- Need to make decisions on logic and good quality science, not on fringe stakeholder issues, etc. However during the court process the idea 'it is about the science' became 'it is about balancing community interests'.
- Industry were offered the opportunity for permitted activity status if they could sort out the issues within their industry, however industry did not want this, but still wanted the permitted status anyway. The Environment and High Courts confirmed the stance of the One Plan – that good quality science was the primary driver to decision making.
- Perception is reality – if stakeholders are feeling aggrieved or think their interests are not included in proceedings then that is as good as real.
- There is no easy solution.
- Greg thought community engagement was a critical process, before lawyers get in on the planning.
- Some people want to think 'we can have our cake and eat it too', but this just isn't possible
- If a stakeholder group is wanting to 'let some streams go' they need to be publically up front about this and justify their reasons – and there are some legitimate reasons for this.
- The process needs to be good fun – need to love having a good argument along the way.

Questions and topics of discussion arising from Greg's presentation:

Dr Joy recently gave a presentation in Nelson and mentioned that the Manawatu River was one of the most polluted rivers in the world – can you bring it back?

Yes I think we can. There are some legacy issues we still don't fully understand but I think it is possible to make a difference. It is healthy to have opposing views raised in discussions.

How much time and effort was spent looking at historic issues?

One of the learnings was that the science was new – we were looking for science that could be implemented – something that hadn't really been done before. For example nitrogen was not being considered, yet now this is common place. There is no excuse for industry bodies not being up with the play.

The Waimea FLAG have a small aquifer so luckily we are dealing with timeframes people can understand – hopefully we will be able to see improvements in our lifetimes – there is potential for disillusionment elsewhere in the country where they could take lots of action but see not real results.

How did you get the 'natural capital' approach through the process?

Grandfathering doesn't provide for future generations and stifles innovation. I think we got it through as people didn't really understand the implications initially until the court hearings.

With the effort put in to wider community engagement – what lessons are there for the FLAG to keep our community informed?

It was a very difficult process. There were a lot of emotional pleas from stakeholders – some even suggesting suicides might result – these need to be looked into but decisions made in context. The One Plan process would have benefited from a FLAG type arrangement.

What was the financial cost to the Council?

All up it cost \$8Million to achieve a second generation fully integrated plan, however the coastal plan wasn't really changed. Horizons decided to 'capitalise' the plan costs and spread the funding of this work over future generations so it is likely it will cost \$12-14Million in the end. The costs included staff planning and science time and lots of external science was funded through Envirolink.

Are industry more in tune with the issues now?

Yes – everyone has come a long way in the ten years. However other examples such as the recent Ruataniwha decision show we don't always learn from the past – the decision on nitrate toxicity reflected that meeting a nitrate limit was seen as too hard.

Session 4: Future Planning

Benchmarking with HortNZ

Mary-Anne identified there is an opportunity to work with HortNZ on benchmarking work, particularly for market gardening. Chris Keenan is able to come to Nelson in September (17 or 19th) to discuss this. There is also a possibility to invite local HortNZ members along for a few hours discussion with Chris on the same day.

The FLAG agreed to meeting on the afternoon of the 17th with Chris while also retaining the already scheduled meeting on the 15th.

Action: Mary-Anne to confirm meeting on 17th with Chris Keenan and invite local HortNZ members to a morning session with Chris. Venue to be confirmed.

Agenda Items for Next Meeting

- Management objectives and attributes
- NPSFWM 2014 update
- Estuarine Effects – where does the FLAG 'line' stop with respect to effects on the estuary and coast
- Review of status of action points from previous meetings

FLAG Chair

The FLAG agreed that Nick Patterson was to continue as chair for the group.

Field Trip

The suggestion of a field trip was raised and considered a good idea by members. A suggested route was to start at the Wairoa Gorge and follow the river down through the plains with a stop to visit an orchard or market garden to see management practices and ending with a visit to Pearl, Neimann and possibly O'Connors Creeks. It was estimated this might take 3hrs.

Action: Mary-Anne to investigate route and transport options with either a single bus or 4-wheel drives (liaison with Mirka and other members for vehicles)

Action Points – Council Staff

No.	What	Who
1	Mary-Anne to confirm Dean Rainham's knowledge of Overseer for use in market gardening and extend an offer to Dean to join the Waimea FLAG.	MAB
2	Mary-Anne to report back after attending the ECan/Landcare Matrix for Good Management workshop (6 August)	MAB
3	Andrew to pursue gaining further detail on land use and opportunities for intensification on the Waimea Plains. Andrew to liaise with Heather to secure student time to do the work this summer.	AB
4	A copy of the Stewart et al 2011 Groundwater Isotopes report to be made available on the website – Waimea FLAG page.	LM
5	Mary-Anne to confirm afternoon FLAG meeting on 17 th Sept with Chris Keenan and invite local HortNZ members to a morning session with Chris. Venue to be confirmed.	MAB
6	Mary-Anne to investigate route and transport options for field trip in November with either a single bus or 4WD vehicles (liaison with Mirka and other members if 4WD vehicles needed)	MAB

Action Points – FLAG members

No.	What	Who
1	none	

Next meeting

Date	15 September (Meeting 4)
Time	9.30-12.30
Venue	TDC Council Chambers
Chair	Nick Patterson
Draft Agenda Items	<ul style="list-style-type: none"> • Management Objectives and Attributes • NPSFWM 2014 update • Estuarine effects • Review of action points from previous meetings
Preparation	See FLAG action points above

Subsequent meetings

Date	17 September (Meeting 5) – to be confirmed – HortNZ liaison meeting
Time	1.30-4.30
Venue	To be confirmed
Chair	Nick Patterson

Date	17 November (Meeting 6)
Time	9.30-12.30 meeting followed by lunch and Waimea Plains field trip 1.00-4.30
Venue	TDC Council Chambers
Chair	Nick Patterson

Information and resource documents identified during meeting

Date	Title	Author/Source
2012	Nutrient loads from septic tanks. 6 November 2012	Environment Bay of Plenty Report
2011	Nitrate Sources and Residence times of Groundwater in the Waimea Plains, Nelson - in Journal of Hydrology (NZ) 50(2): 313-338 2011*	M.K. Stewart, G. J. Stevens, J.T. Thomas, R. van der Raaij, V. Trompetter
2008	On-site Wastewater Treatment System Environment Discharge Performance Appraisal For Oasis Clearwater S2000 (Trial 3). November 2008. EDPA 010/08.	Environment Bay of Plenty Report
2007	On-site Wastewater Treatment System Environment Discharge Performance Appraisal For the Biolytix BF6 2500 PAT. May 2007. Number EDPA002/07.	Environment Bay of Plenty Report
2003	Overview Of Issues Related To Nutrient Management Of Lake Taupo Wastewater Treatment And Disposal. June 2003	Environment Waikato Report

**Key documents to be added to the online document library.*

FLAG MEMBERS PLEASE NOTE: If you have any questions or need anything between meetings, then please contact Mary-Anne Baker by email: marya@tasman.govt.nz or by phone ddi 03 543 8486.