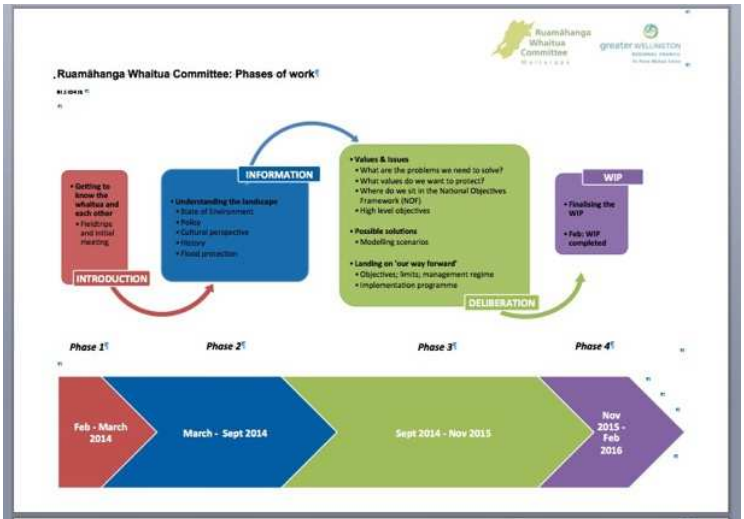
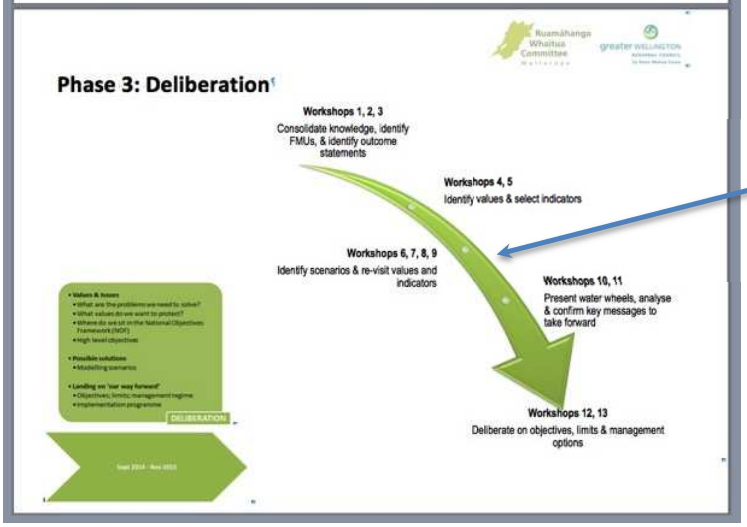
Meeting Notes: Ruamāhanga Whaitua Committee

Deliberations Phase 3 - Workshop 29

September 19 2016 4:00pm – 8:00pm

Carterton Events Centre





Workshop 29

Summary This report summarises notes from a workshop of the Ruamāhanga Whaitua Committee held September 19 2016 at the Carterton Events Centre.

Contents These notes contain the following:

A Workshop Attendees

Workshop Attendees

Attendees:
Committee: Ra Smith, Esther Dijkstra, Peter Gawith, Andy Duncan, Aidan Bichan, Russell Kawana, Philip Palmer, David Holmes, Mike Ashby, Colin Olds

GW Project Team: Mike Thompson, Natasha Tomic, Alton Perrie, Hayley Vujcich, Richard Parks, Grace Leung, Alastair Smaill, Murray McLea, Horipo Rimene.

Modellers: Richard Storey, Michelle Sands, John Bright, Nick Taylor, Mike Toews, Jim Sinner, Mat Allan.

Water Wairarapa: Michael Basset-Foss, Bruce Geden

Independent Facilitator: Michelle Rush

Apologies: Rebecca Fox, Vanessa Tipoki, Mike Birch, Chris Laidlaw

B Workshop Purpose

Workshop Purpose

The workshop purposes were:

1. To continue the work started at the previous meeting developing the bundle of 'management options' for the aspirational future.

2. To describe the management option bundle(s), and all the assumptions associated with them, in a clear, unambiguous manner so that everyone – RWC, Modellers and Project Team know what is intended, and what is required.

3. To hear and understand the final wording for the water allocation options.

4. To hear about, and understand the Water Wairarapa future land use scenarios.

5. To hear and understand the full details of Scenario 1 – "Business as Usual."

Purposes 1-4 where achieved with Purpose 2 requiring more work in upcoming workshops. Insufficient time was available for the presentation of Purpose 5 but the Committee were given a handout of the report.

Workshop Agenda

The agenda is below.

TIME	Task	Who
4:00	Welcome, Introductions, Karakia, Housekeeping, Purposes, Agenda	Peter Gawith, Ra Smith, Michelle Rush
4:10	Water Allocation Options	Mike Thompson
4:20	Management Options	John Bright
4:25	Context for management option bundling exercise that we are continuing	Alastair Smaill
4:30	Workshop Session – Generating Management Option Bundles (continued from previous workshop)	Michelle Rush
5:30	Plenary report back – identify similarities and differences; confirm bundle(s)	
6:30	**Dinner**	
7:00	Water Wairarapa Scenarios	Michael Bassett-Foss
8:00	Close	

C Follow Up Actions

Follow Up Actions

- Mike Thompson to check figures in report especially in Kopuaranga and other locations where figures appear low.
- Project team to collate management option bundles into one table and do a first cut at refining them for consideration by the Ruamāhanga Whaitua Committee (RWC) at the next meeting.

Questions from RWC following overview of agenda

Q: Is there enough information to make scenarios at sub-catchment level?
A: Yes although there is a question over how scenarios are modelled to make the most of the modelling and to maximise the amount of information through modelling scenarios.

Q: Is the Natural Resources Plan on hold until the whaitua process is complete?
A: No, the plan process continues. Hearings will be in 2017 when the whaitua process is complete.

A: Should submissions be part of information presented to the whaitua process?
Q: The whaitua should avoid litigation of submissions at this stage, but submissions content could possibly inform the whaitua process. A lot of the submissions don't relate to parts of plan to be determined by the whaitua committee.

D Water Allocation Options

Overview

RWC members were presented with work by GWRC Environmental Scientist hydrologist Mike Thompson thus far on the modelling of results from the three water allocation options agreed to prior for the Ruamāhanga.

PRESENTATION - Testing higher minimu

Questions following the presentation:

Q: What is the status of Parkvale Stream?
A: There is current insufficient data for Parkvale.

Q: What about the Upper Ruamāhanga?
A: Current minimum flow is 2.4 which means water is available for allocation but analysis suggests water availability would be considerably reduced using a minimum flow of 10.

Q: Habitat loss occurs sometimes at lower than MALF, should MALF be used as the baseline?
A: Figures compare habitat available at MALF as baseline, this is a commonly used indicator but there are potential caveats, see below.

Q: What is the flow that most adequately describes optimal habitat?
A: Science has pointed to MALF as an important flow for habitat. Recent research e.g. Cawthron suggest that MALF may be low/underestimate for certain species. Previously discussed loss of 10-15% habitat as guideline for small rivers, 30% for large rivers as rough guide. MALF includes habitat space as a component of flow regime, but other aspects of ecological health are impacted by other measures of flow e.g. temperature, ability of food to suspend in water column. In the context of water quantity, MALF is a useful baseline. Other aspects affecting ecological health will be covered by analysis of water quality.

Q: Figures need to be accurate. E.g. 2.7 in Kopuaranga not 2.4 and seems low in other locations.
A: **ACTION:** Mike will check.

Q: At 2.4, irrigation ceases but river may continue to drop, is this correct?
A: Correct, it is difficult to control dropping of river even after abstraction has ceased.

Q: Existing minimum low flow is linked to MALF, therefore figures in presentation show all rivers in the catchment to be suffering habitat

loss, is this correct.
A: Correct, to varying degrees although effect is not always proportional to flow.

E Water Wairarapa Scenario

Overview

Michael Basset-Foss, Water Wairarapa (WW) Project Director, gave a presentation showing WW as a potential scenario which can be modelled through the Collaborative Modelling Project (CMP).

PRESENTATION to RWC from Water Wai

Questions following presentation:

Q: Assuming a BAU scenario 12,000ha extra irrigated area in the BakerAg report seems excessive in over-allocated catchment.
A: Clarification that irrigated area is estimated to increase from the current 9,000 to 12,000 meaning a 3,000ha increase, not 12,000ha. Report assumes improved efficiency in water use and untapped groundwater.

Q: What is the effect of climate change on recharge?
A: This is one of many unknowns, as the level of rainfall increase on the Tararuas especially coming down on the Eastern side is as yet unknown and difficult to predict. Climate change data from CMP can help to provide more insight into this issue.

Q: Will existing users continue to take from the river or take from dam or use both?
A: Farmers who need more water will retain current consents but can get additional water through the water use project. This could be addressed by Whaitua policies.

Q: Is water going to be taken off the top of dam?
A: Current dam is structured to select water take from multiple water columns. Not currently looking at this level of detail for Water Wairarapa so parameters such as temperature and dissolved oxygen etc. not known from water coming out of dam.

Q: There have been questions in the media over the robustness of the modelling on the Ruataniwha Dam; how does this compare in terms of models?
A: Credit should be given to GW for determining modelling design through a collaborative process, and which therefore should be more robust. Our scenarios will be modelled through the CMP. Modelling the impacts of the Water Wairarapa scenarios also allows direct comparison with other Whaitua scenarios that may be modelled.

F Generating Management Option Bundles

Overview

- Following Workshop 28, John Bright and the project team incorporated additional management options that RWC had identified into the management option list.
- John presented the updated table of options to the Committee, explaining which had been confirmed by the modellers to be both management options and able to be modelled. Some options were a variation or subset of an option on the existing list. Others were determined as not 'modellable' or are actually policy options.
- The Committee then continued their work in break-out groups that they started during the previous workshop (Workshop 28) to:
    - identify management options to achieve their aspirational futures; and
    - confirm a bundle of management options which applied all together, are expected to achieve the aspirational future.

Plenary Report Back and Discussion of Management Option bundles

Appendix 1 contains the results from the three break-out groups. Following a report back from each group, the findings were discussed, and it was agreed that the combination of similarity among some management options, and complementarity amongst others, made for a single management option bundle for the aspirational future.

It was agreed that at the next workshop, work would need to be done to identify a 'silver' management option bundle and a 'bronze' management option bundle to achieve futures in the realm of improvement between 'business and usual' and 'aspirational' so as to provide a full range of information to inform the Committee's later decision making.

Questions & Discussion of Results

Q: Timeframes – what time scale should management options be determined at?
A: Models will look at 2025, 2040 and 2080. Some interventions will take more than 10 years to see impacts, this shouldn't limit management options. This exercise is for aspirational futures so don't be held back if an intervention may take more than 100 years to see the impacts off. Land use change will inevitably happen as will climate change and subsequent water availability.

When looking at timeframes for management options, the Committee needs to determine when it wants each to be implemented by. Other dimensions to timeframe are an estimate of when the Committee thinks the full benefit of an intervention will be reached. Modellers may play with timeframes to test the degree of impacts of a

management option.

Comment from Committee: Aphids on poplars and willows may affect ability to plant them.
Answer: Modellers don't need to know which species will be planted to model impact of plantings, only factors such as height and extent of shade provided.

Gaps identified in management options: Participants assessed the bundles for gaps, and determined the following areas were missing:

- lakes
- flood management
- cultural flows
- urban water use efficiency
- MCI and fish health
- fish barriers
- stormwater into land from roads - may need attenuation option to address.

These were discussed, and the resolutions are detailed below.

Management options added at plenary

To address the gap in management options specifically for the lake, **it was agreed** to add the following management options to the bundle:

- Growing macrophytes on lake bed
- Removing sediment from lake bed
- Lake opening to management flushing and recharge at barrage gates and mouth.

Flood management, urban water use efficiency, MCI, fish health, fish barriers, stormwater

Flood management was considered picked up in one way or another by various management options, as was urban water use efficiency, MCI and fish health (more outcomes or measures rather than management options) and it was agreed that the remainder (including stormwater as it would be hard to show a difference through modelling) were better revisited when policy options are discussed later in the process.

G Water Allocation Scenarios

Water Allocation Scenarios

The Committee discussed and **agreed** that the management option bundle for the aspirational future needed to include the cultural flows scenario for the water allocation regime.

H Farm Mitigation Bundles

Farm Mitigation Bundles

Question: What farm mitigation bundle are we assuming?
Answer: The Committee agreed that the aspirational management options bundle will also include farm level mitigations identified by Richard Muirhead. There were 3 level mitigation bundles identified; easy, medium, hard. Which one will be used for aspirational scenario?

Agreed: Committee agreed to use 'hard' one for aspirational future (installing wetlands, riparian buffer strips, reduction in fertiliser, efficient irrigation, GMP) in timeframe as modelled.

I Scenarios Affecting Hydrology

Defining different scenarios

In discussing the management option bundles, Three 'futures' hitherto discussed were identified as entailing fundamental changes to the hydrology of the catchment: it was proposed and agreed that each of these be run as a 'stand-alone' scenario with all other factors as 'business as usual' (except for Water Wairarapa which is including a BAU + approach, e.g. a higher level of on-farm mitigation for instance), so that the impact of each can be clearly distinguished. Having multiple small scale dams was discussed but not agreed as a separate 'stand-alone' scenario. Analysis will be done looking at small scale dams.

1) Building a dam – Water Wairarapa scenario for Black Creek.

2) Artificial Recharge – RWC to scope this out.

3) Re-plumbing the lake – RWC to scope this out.

Next Steps for Management Option Bundle

Agreed: The Committee agreed for the project team to collate the bundles identified into one table for the Committee to refine at the next meeting.

Business as Usual Scenario

There was not sufficient time for the presentation of the fully worked up Business as Usual scenario.

RWC members were given a hard copy of the draft report instead.

Next Workshop A reminder of items for the next meeting was given:

Confirmation of the management option bundle for the aspirational future.

Discussion and confirmation of attributes from the master list to be used to assess impacts on the bio-physical values from the RWC Value Set.

A reminder about the social science modelling workshop (tomorrow).

Closure The meeting closed with a karakia at 8:10pm.

Appendix 1 – RWC Aspirational Future Management Option Bundles (as of workshop 19/9/16)

Ruamāhanga Whaitua Committee Identification of Management Options for achieving the Aspirational Future – Workshop 5/9/16 & 19/9/16
Group 1: Aidan, Vanessa, Peter, Mike Toews (GNS), Mike Thompson, Murray, Grace (and Nick Taylor TB) 19/9

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
1	Planting hill country/erosion control (retire hill country)	Improve water clarity Reduce phosphorous Mana whenua benefit Greater water retention Diversity/biodiversity + amenity values	Eastern hill country Soft sediment soil types	All farm plans to be fully operational within 10 years	Running lighter stock on soft soil can help reduce soil erosion Assume farm plans = good/best practice and will achieve intent of this option Can rates rebates be given to those who implement?
2	Stock exclusion	Improve water quality Mana whenua benefit Natural character Habitat	Whole catchment (category 1,2,3 waterbodies) Total exclusion for -deer -cattle -pigs	2022	Total exclusion does not necessarily mean total fencing. Could be other management practices to exclude stock
3	Riparian enhancement (planting of natives, not just retirement of land)	Improve water quality Create sediment traps Natural character Biodiversity	Whole catchment, all land uses targeting high risk areas where cross-surface flow enters waterways	2022	Farm + environment plans Needs ongoing maintenance plan
4	Municipal wastewater discharges to water – discharge to land (with deficit irrigation)	Improve water quality -faecal coliforms & other pathogens -nutrients Cultural health of waterways	Masterton, Carterton, Greytown, Featherston, Martinborough	Implement by 2025. Benefits are immediate.	Frequency, volumes, storage capacity, deficit threshold (soil moisture)

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
		(includes swimmability, ecosystem health & mauri) Increases awareness Alternative source of nutrients for food production.			
5	On-site wastewater (black water, grey water) - no discharge to water	Improve water quality Cultural health of waterways	Households & business Across the region High density housing e.g. rural subdivision, Gladstone, Taueru	Implement by 2025. Immediate benefits	Locations Frequency How much
6	Urban stormwater treatment -heavy metals -sediment -nutrients Settling ponds Wetlands Operational 95% of the time	Improve water quality, swimmability (public health)	Masterton, Carterton, Greytown, Featherston, Martinborough	2040	
7	Water allocation: -natural storage (managed aquifer recharge)	Reliably meet all foreseeable demands on water (in line with values): • Irrigation • In-stream • Cultural • Urban • Stock	Whole catchment		Future demand projection.
8	Water harvesting Dam(s) -on farm -community schemes -urban harvesting				
9	Efficient water use				

The Group 1 Proposed "Bundle" for achieving the Aspirational Ruamahanga Whaitua Future:

Mgt Opt No.	Group 1 - Aidan, Peter, Mike Toews, Mike Thompson, Murray
	To address sediment issues:
1	Hill country erosion control
2	Stock access
3	Riparian enhancement
	To address wastewater issues:
4	Municipal discharge to land
5	On-site wastewater
6	Storm water (urban)
	To address water allocation issues
7	Natural storage – ManagedAquifer Recharge
8	Harvesting • On farm • Community scheme • Urban
9	Efficient use

Group 2: Esther, Andy, Philip, Michelle Sands, Harvey, Hayley

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
1	Effluent discharges are all to land -WWTP -agricultural & industrial effluent -septics	Treat all poo similarly to get it out of the water - Reduce E. coli, nitrogen, phosphorous -Reduce offense to cultural values (everybody) All WWTPS have similar regime Benefits to Amenity and recreation Benefits to Health	WWTP discharges occur within a 10km radius of existing plants	All discharge to land by 2025	Deficit irrigation to cropping system Land should be suitable for irrigation Require storage Also note that policy discussion could consider management of emerging contaminants
2	Solids separator for agricultural effluent discharge to land		Agricultural effluent discharges -dairy -piggeries -any other intensive agricultural areas	Installed and used by 2025	
3	No cultivation of steep land for winter crops (but allow for spray & direct drill)	Sediment reduction of risk of overland flow to water	On medium hill country	Immediately	
4	Space planting of trees on steep slopes	Sediment mitigation (erosion reduction) Continued pasture grazing Targeting	Eastern Hill country -soft bed rock -applies broadly at landscape scale LUC classes 6e & above	All plants in by 2040	% removal efficiency

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
		sheet/gully/rill erosion.			
5	Sediment traps -farm & catchment scale	-sediment mitigation & associated P -biodiversity values	Farm scale -all farms with a sediment yield similar to Eastern Hill country Catchment scale	Farm-scale traps all in place by 2040	Will require good land owner buy-in.
6	Management of sediment from cultivation	Targeting CSAs			
7	Discharge / Land Use Limits:	Why? To deal with Nitrogen, so as to manage periphyton; and deal with catchment cumulative effects on lakes	To discuss at policy discussion		
8	Management of erosion prone land -retirement from livestock Afforestation in Manuka	Reducing sediment 60% comes from 4% of land Targeting CSA's.	Very steep land - Eastern hill country Land prone to river erosion Surce model identifies about 5% of land contributing large amounts of sediment	Retirement of all lan b y 2025, 'good' state by 2040.	Permanet retirement to woody vegetation. Will be time before bush reaches "good" state.
9	Attenuation bundle -wetland reinstallment -manages areas that get flooded -land compaction - improvement -micro-damming -ephemeral buffers		Need more time to elaborate	Need more time to elaborate	Need more time to elaborate

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
	-riparian planting -river bed level management to maintain aquifers (This needs further discussion and elaboration)				

Other policy options/questions:

- Want to revisit policy option for effluent disposal practice to look at maximising area that effluent can be spread to so that P concentration problems are avoided
- WOF for septics: some known problem areas (high number of rural residential over the top of aquifers used for water takes e.g. Opaki).
- Nitrogen management:
  o Interest in examining sub-catchment load and trading mechanisms as a policy option
  o Land use discharge limits could be determined by land use capacity (or similar?) system – requires further information to decide which system.
- Model output
  o Want to know where nodes for sub-catchment N limits are located so that a "where" for management options are applied. Need to have values or aspirations that are mapped on the catchment.

The Group 2 Proposed "Bundle" for achieving the Aspirational Ruamahanga Whaitua Future:

Mgt Opt No.	Group 2 - Esther, Andy, Phillip, Michelle Sands, Hayley
	To address sediment issues:

Mgt Opt No.	Group 2 - Esther, Andy, Phillip, Michelle Sands, Hayley
8	Management of Erosion prone land including - Retirement from livestock and Afforestation in Manuka
3	No cultivation on steep land
4	Space planting on steep slope
5	Sediment traps
6	Management of sediment from cultivation on rolling land
	To address wastewater issues:
1	All discharge to land Waste water treatment plants Agricultural & Industrial Septics
2	Solids separator for agricultural
	To address water allocation issues
	Urban water efficiency *(NB: this option put forward but was not teased out as a detailed management option by this group)*
	To achieve attenuation:

Mgt Opt No.	Group 2 - Esther, Andy, Phillip, Michelle Sands, Hayley
9	Stormwater INTO, not onto land (roads and urban) Wetland re-installment Management of areas that get flooded (upland flooding) Land compaction improvement Micro-damming Riparian planting River bed level management to maintain aquifers

Group 3: Russell, Ra, David, John Bright, Shane, Mike Grace (Matt, 19-9-16)

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
1	Construct new wetlands in natural wetland areas Increase wetland coverage	Nutrient treatment Sediment retention Increase habitat Indigenous fish	Near rivers & low areas Subcatchments Landowners Any property where the topography allows Council land DoC reserves Wairarapa Moana & Onoke margins	50% of potential wetland topography is wetland in 10 years	Align with nutrient management and farm plans Regulatory encouragement Managed wetlands as part of farm plans "Ducks Unlimited"
2	Wastewater discharged to land No discharge to river.	Public health Mana Ecosystem health River water quality & MCI Support irrigation in low flows - resource Reduce pathogens Reduce nutrients	Wairarapa wide District Councils Henley Lake	2030 all to land Full disposal including storage.	Wastewater is a resource Stormwater separation Greywater options Blackwater options Meeting projected population growth
3	Stormwater managed & separated from waste water Stormwater management on site	Reduce contamination Reduce discharge to streams Increase efficiency of WWT Reduce impact of SW on natural/built environment Retains groundwater recharge	Wairarapa wide Identify & maximise soakage potential Everyone – retrofit existing (% soakage) -requirement for new	Immediate for new residential & industry Target biggest sources For existing - 50% soakage reduction in SW leaving site by 2030	Stormwater is a resource Treated by natural process before returning to aquifers & river
4	Building on-land sediment traps i.e. bunding	Reduce runoff especially overland flow Nutrient reduction	Farms/TLAs – on -farm paddocks -district council lands	50% hot spots bunded by 2020	Build into nutrient and farm plan management Regulatory support

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
		Enhances streams, wetlands through pathogen removal	-regional council lands -public lands Targeted critical sources/hotspots Flat/gentle river/lake margins Free draining soils		Best practice fit for purpose utilisation appropriate to soil conditions i.e. drainage Bundle bunds with riparian management options Setbacks
5	Return Ruamāhanga to Wairarapa Moana 100%	Remove sediment Improve water quality Improve recruitment of native fish Restore mauri by bringing entities together Connectivity	Cutoff Jury Island Iwi Wairarapa community Farming GW WDC	2018 Stage 1 research starts (see 'Other Details') 2030 100% of river returned	Research component to investigate: - Unknowns re ecosystem cost/benefits - Limits/limitations of infrastructure - farming impacts -climate change
6	'Precision' riparian planting -targeted to areas of greatest benefit (sediment + nutrients + water use)	Increase habitat for both aquatic & terrestrial biodiversity Reduce nutrients and sediment.	Where benefit is greatest (Committee needs to decide 'how far down the curve to go') Model everywhere to start	Phased in over 15 years Benefits realised in 30 years+	
7	Reduced fertiliser use e.g. via precision farming	Reduce nutrient run-off	Everywhere there is farmland	Start now & complete within 5 years	
8	Total allocation is reduced to the allocation limit i.e. where over-allocated	Restore/improve groundwater levels and surface flows. Comply with NPSFM	Any resource that is over-allocated	Right away	
9	Farm only to land's capacity, soil	Maintain long-term economic viability while reducing water	Everywhere (where we have adequate research)	Achieve land use change within 30	

No.	What **Describe the management option**	Why **What will the management option achieve? (Why are you doing it?)**	Where **Where/to whom does the management option apply?**	Timeframe **Describe the timeframe(s) if relevant**	Other details **Describe any other assumptions of relevance**
	classification (requires land use 'zoning' map)	use, N & P runoff to achieve ecological sustainability		years. Aspiration within 10-15 years	
10	Water metering for urban areas + lifestylers	Reduce water use & improve aquifer levels and surface flows	Universal	Now	

Group 3 Proposed "Bundle" for achieving the Aspirational Ruamahanga Whaitua Future:

Mgt Opt No.	**Group 3 – David, Ra, Russell, John, Mat, Jim**
	To address sediment issues:
6	Precision riparian planting
4	Sediment traps/bunding
7	Reduced fertiliser use via precision farming
9	Farm according to land capacity/classification
	To achieve attenuation:
1	Constructed wetlands

5	Ruamāhanga returned to Lake Wairarapa
	To address water allocation issues
8	Total allocation reduced to allocation limit
10	Water metering for everyone
	To address wastewater issues:
2	Wastewater discharge to land only
3	Storm water separated from waste water

Gaps identified during plenary discussion

What Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where/to whom does the management option apply?	Timeframe Describe the timeframe(s) if relevant	Other details Describe any other assumptions of relevance
Growing macrophytes on lake bed		Both lakes		
Removing sediment from lake bed		Both lakes		
Lake opening to management flushing and recharge at barrage gates and mouth		Barrage gates and mouth		

Agreements made at plenary regarding On-Farm Mitigation Bundles and Water Allocation Regimes

Aspirational Future Management Option bundle to make the following assumptions:

What Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where/to whom does the management option apply?	Timeframe Describe the timeframe(s) if relevant	Other details Describe any other assumptions of relevance
On-farm mitigation bundle "Hard Option" to be included		As modelled	As modelled	
Water Allocation – Cultural Flows Scenario to be used for the modelling				

Next Steps

Project Team to identify synergies in the three proposed 'bundles' and bring them together as one bundle for consideration at next RWC workshop.

Agreements made at plenary regarding scenarios

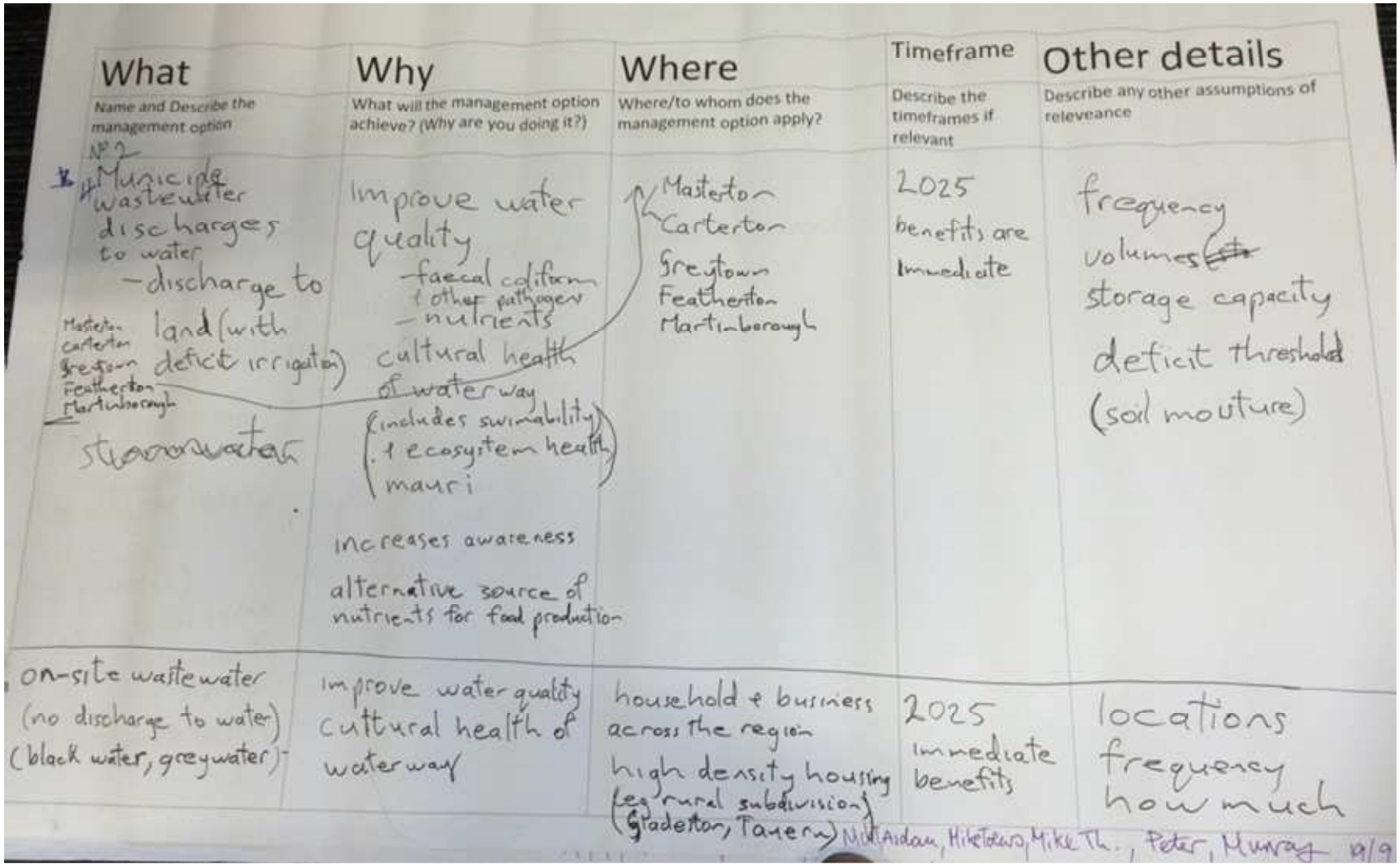
Three 'futures' entail fundamental changes to the hydrology of the catchment: it is proposed that each of these be run as a 'stand-alone' scenario with all other factors as 'Business as Usual' (except for Water Wairarapa which is including a BAU + approach, e.g. a higher level of on-farm mitigation for instance), so that the impact of each can be clearly distinguished:

1) Building a dam – Water Wairarapa scenario for Black Creek.

2) Artificial Recharge – RWC to scope this out

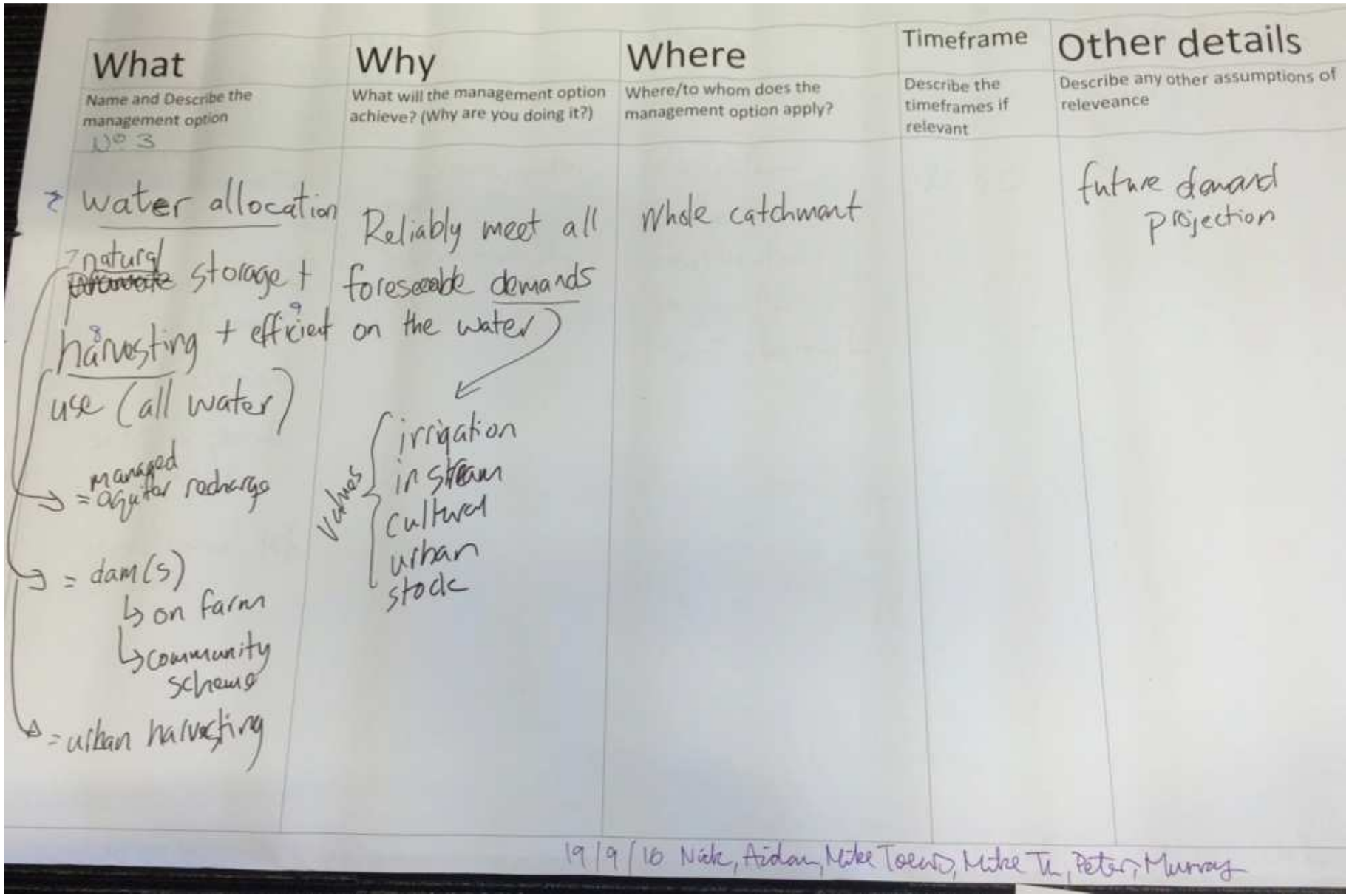
3) Re-plumbing the lake – RWC to scope this out.

Appendix Two – Flipchart Photos



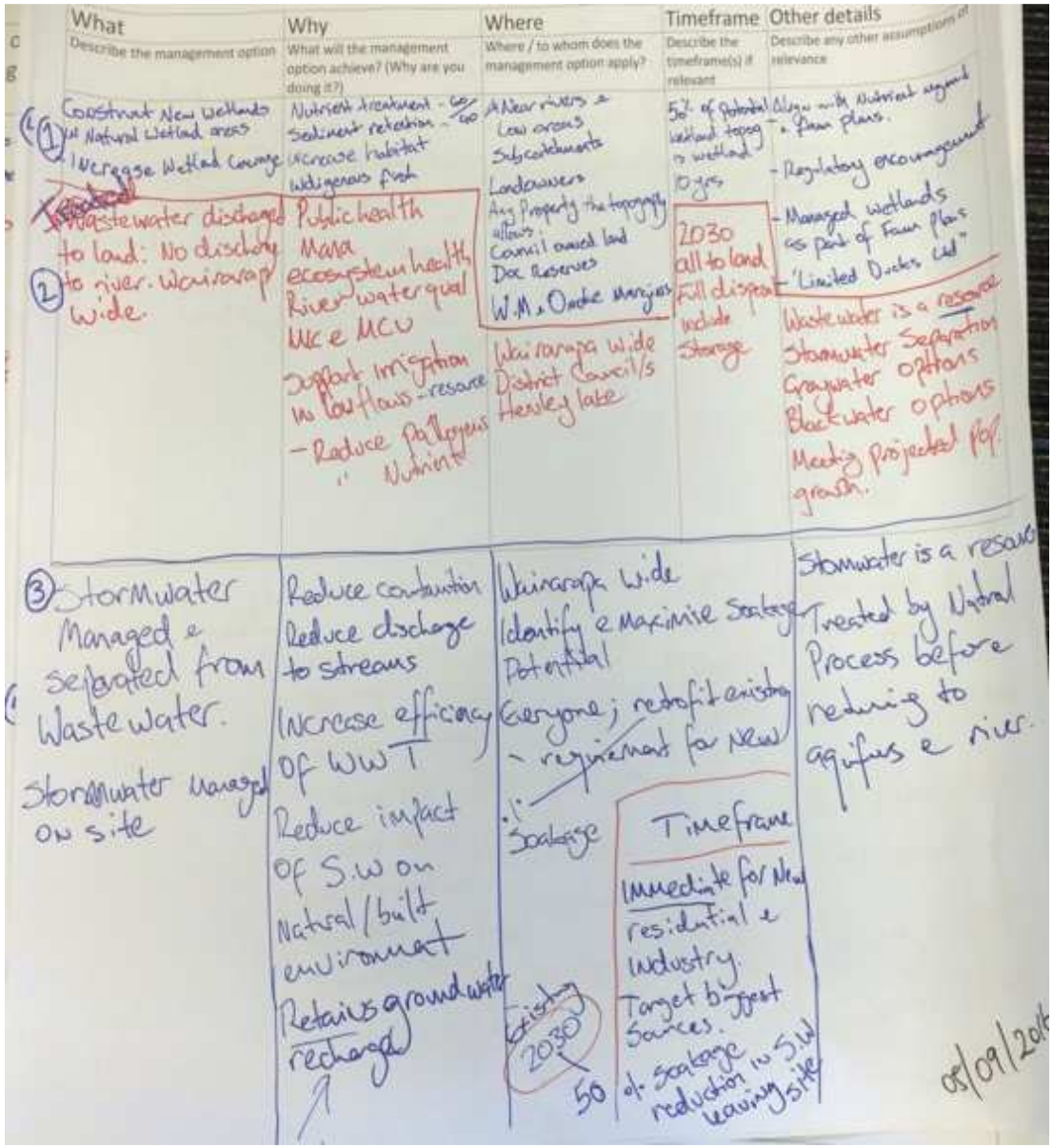
What	Why	Where	Timeframe	Other details
Name and Describe the management option	What will the management option achieve? (Why are you doing it?)	Where/to whom does the management option apply?	Describe the timeframes if relevant	Describe any other assumptions of releveance
№2 Municipal wastewater discharges to water – discharge to land (with deficit irrigation) Masterton Carterton Greytown Featherston Martinborough stormwater	Improve water quality – faecal coliform & other pathogens – nutrients cultural health of waterway (includes swimability & ecosystem health & mauri) increases awareness alternative source of nutrients for food production	Masterton Carterton Greytown Featherston Martinborough	2025 benefits are Immediate	frequency volumes ~~etc~~ storage capacity deficit threshold (soil mouture)
on-site wastewater (no discharge to water) (black water, greywater)	improve water quality cultural health of waterway	household & business across the region high density housing (eg rural subdivision) (Gladstone, Tararua)	2025 immediate benefits	locations frequency how much

Nick Aridan, Mike Lewis, Mike Th., Peter, Murray 19/9

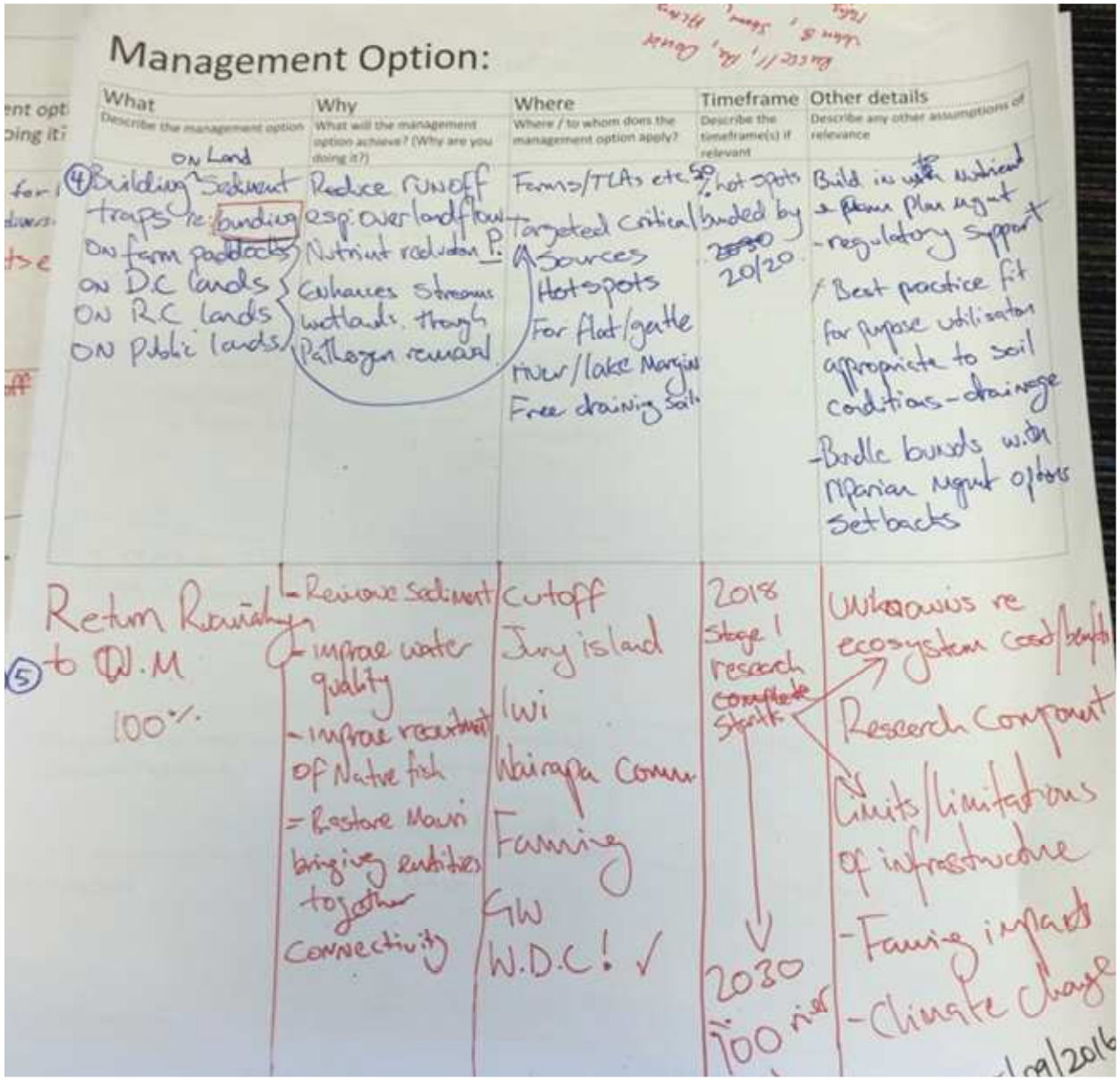


What	Why	Where	Timeframe	Other details
Name and Describe the management option	What will the management option achieve? (Why are you doing it?)	Where/to whom does the management option apply?	Describe the timeframes if relevant	Describe any other assumptions of releveance
3 water allocation 7 natural/ ~~dramatic~~ storage + 8 harvesting + 9 efficient use (all water) = managed aquifer recharge = dam(s) ↳ on farm ↳ community schemes = urban harvesting	Reliably meet all foreseeable demands on the water Values: irrigation, in stream, cultural, urban, stock	Whole catchment		future demand projection

19/9/10 Nick, Aidan, Mike Toews, Mike Tu, Peter, Murray



What	Why	Where	Timeframe	Other details
Describe the management option	What will the management option achieve? (Why are you doing it?)	Where / to whom does the management option apply?	Describe the timeframe(s) if relevant	Describe any other assumptions of relevance
(1) Construct New Wetlands & Natural Wetland areas / Increase Wetland Coverage	Nutrient treatment - N & P Sediment retention Increase habitat Indigenous fish	Near rivers & Low areas Subcatchments Landowners Any Property the topography allows Council owned land Doc Reserves W.M. Onake Mangaos	5% of Potential wetland topog is wetland 10 yrs	Align with National regional + Farm plans. - Regulatory encouragement - Managed wetlands as part of Farm Plans - 'Limited Dockets etc"
~~Wastewater discharge~~ (2) to land: No discharge to river. Waiarapa wide.	Public health Mana ecosystem health River water qual Use e MCV Support irrigation in low flows - resource - Reduce Pathogens " Nutrients	Waiarapa wide District Council/s Hensley lake	2030 all to land Full disposal include storage	Wastewater is a resource Stormwater Separation Greywater options Blackwater options Meeting Projected Pop. growth.
(3) Stormwater Managed e separated from Wastewater. Stormwater Managed on site	Reduce contamination Reduce discharge to streams Increase efficiency of WWT Reduce impact of S.W on Natural/built environment Retains groundwater recharge	Waiarapa Wide Identify e maximise Soakage Potential Everyone; retrofit existing - requirement for New Soakage existing 2030 50	Timeframe Immediate for New residential e Industry. Target biggest Sources. % soakage reduction in S.W leaving site	Stormwater is a resource Treated by Natural Process before reuse to aquifers e river. 05/09/20



Management Option:

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ON Land ④ Building Sediment traps re: funding ON farm paddocks ON D.C lands ON R.C lands ON Public lands	Reduce runoff esp: overland flow Nutrient reduction P. Enhances streams wetlands, through Pathogen removal	Farms/TLAs etc 50% hot spots Targeted critical sources Hotspots For flat/gentle river/lake Margin Free draining soils	funded by 2030 20/20	Build in with national + plans Plan Mgmt - regulatory support Best practice fit for purpose utilisation appropriate to soil conditions - drainage - Buffer bunds with riparian Mgmt options setbacks

Return Rewards
⑤ to W.M
100%

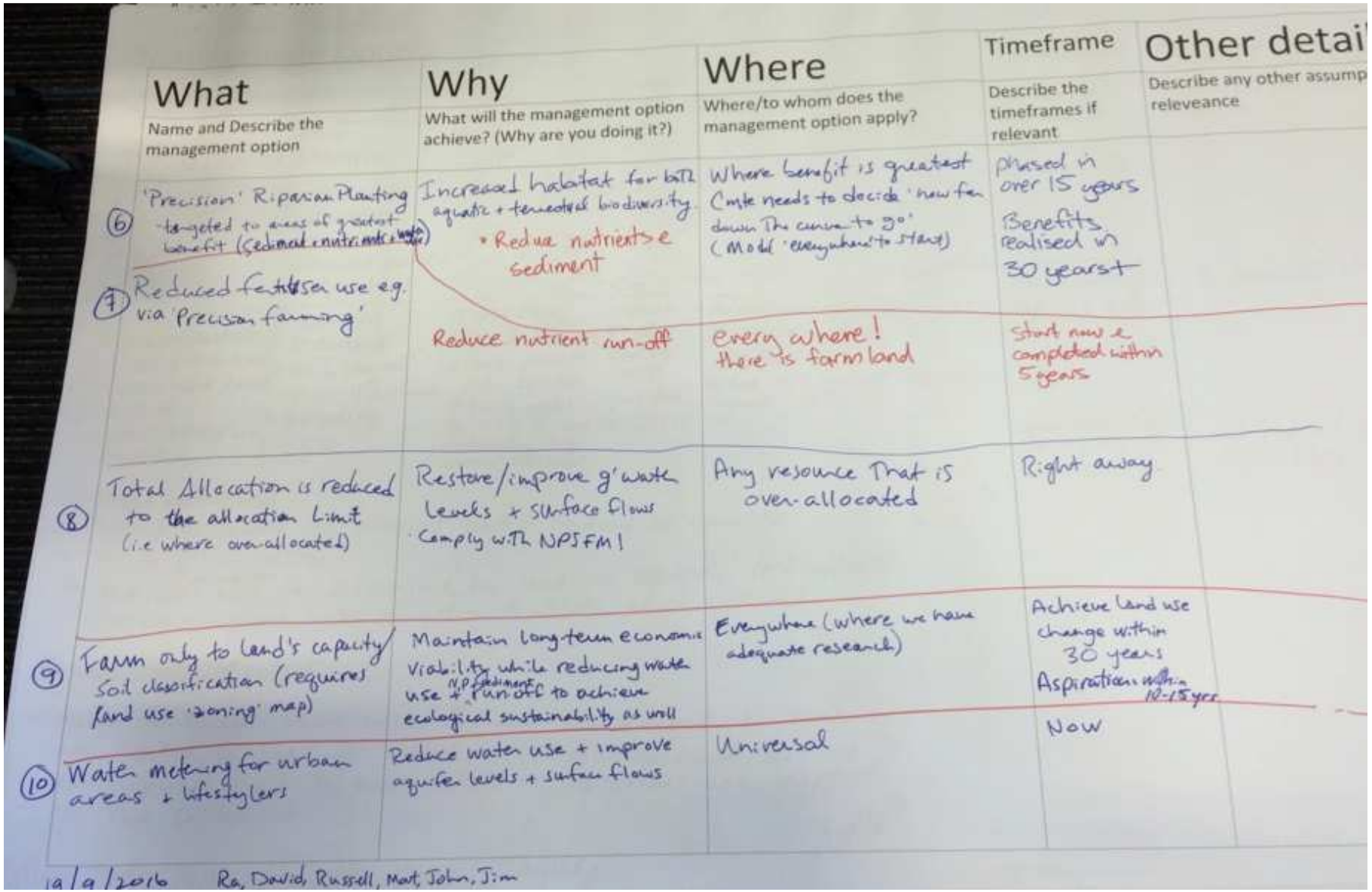
- Remove Sediment
- Improve water quality
- Improve recruitment of Native fish
- Restore Mauri bringing entities together
- Connectivity

Cutoff
Jury island
Iwi
Wairapa Comm
Farming
GW
W.D.C! ✓

2018
Stage 1 research complete Start:
2030
100 yrs

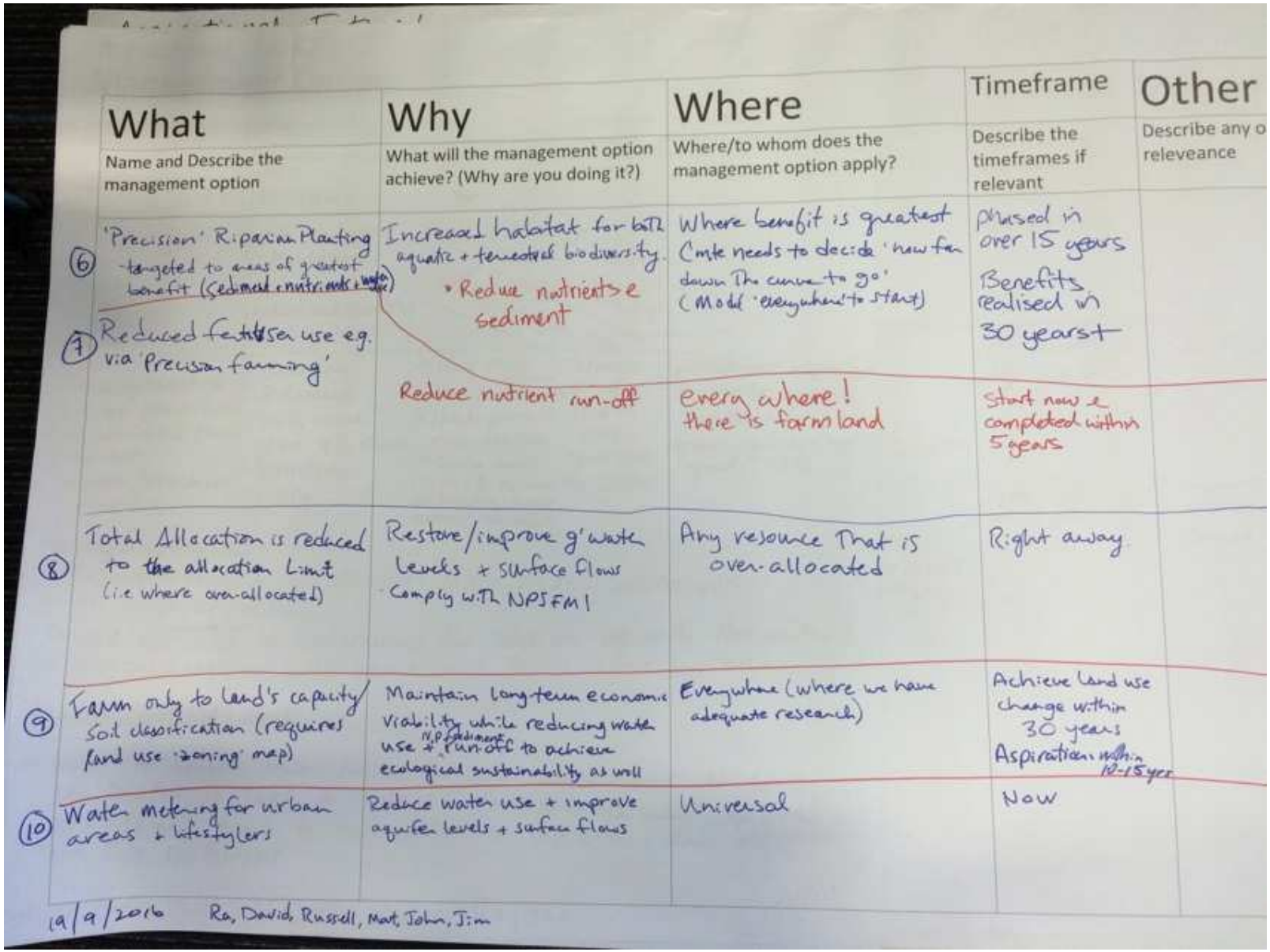
Unknowns re ecosystem condition
Research Component
Limits/limitations of infrastructure
- Farming impacts
- Climate change

/09/2016



	What Name and Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where/to whom does the management option apply?	Timeframe Describe the timeframes if relevant	Other detai Describe any other assump releveance
(6)	'Precision' Riparian Planting targeted to areas of greatest benefit (Sediment + nutrients + water)	Increased habitat for bTL aquatic + terrestrial biodiversity • Redua nutrients & sediment	Where benefit is greatest Cmte needs to decide 'how far down the curve to go' (Model 'everywhere' to start)	phased in over 15 years Benefits realised in 30 years+	
(7)	Reduced fertiliser use eg. via 'Precision farming'	Reduce nutrient run-off	every where! there is farm land	start now & completed within 5 years	
(8)	Total Allocation is reduced to the allocation Limit (i.e where over-allocated)	Restore/improve g'water levels + surface flows Comply with NPSFM!	Any resource that is over-allocated	Right away	
(9)	Farm only to land's capacity/ Soil classification (requires land use 'zoning' map)	Maintain long-term economic viability while reducing water use + N,P,sediment run-off to achieve ecological sustainability as well	Everywhere (where we have adequate research)	Achieve land use change within 30 years Aspiration: within 10-15 yrs	
(10)	Water metering for urban areas + lifestylers	Reduce water use + improve aquifer levels + surface flows	Universal	Now	

19/9/2016 Ra, David, Russell, Matt, John, Jim



	What Name and Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where/to whom does the management option apply?	Timeframe Describe the timeframes if relevant	Other Describe any o releveance
(6)	'Precision' Riparian Planting - targeted to areas of greatest benefit (sediment + nutrients + water temp)	Increased habitat for both aquatic + terrestrial biodiversity. • Reduce nutrients & sediment	Where benefit is greatest (Cmte needs to decide 'how far down the curve to go' (Model 'everywhere' to start)	phased in over 15 years Benefits realised in 30 years+	
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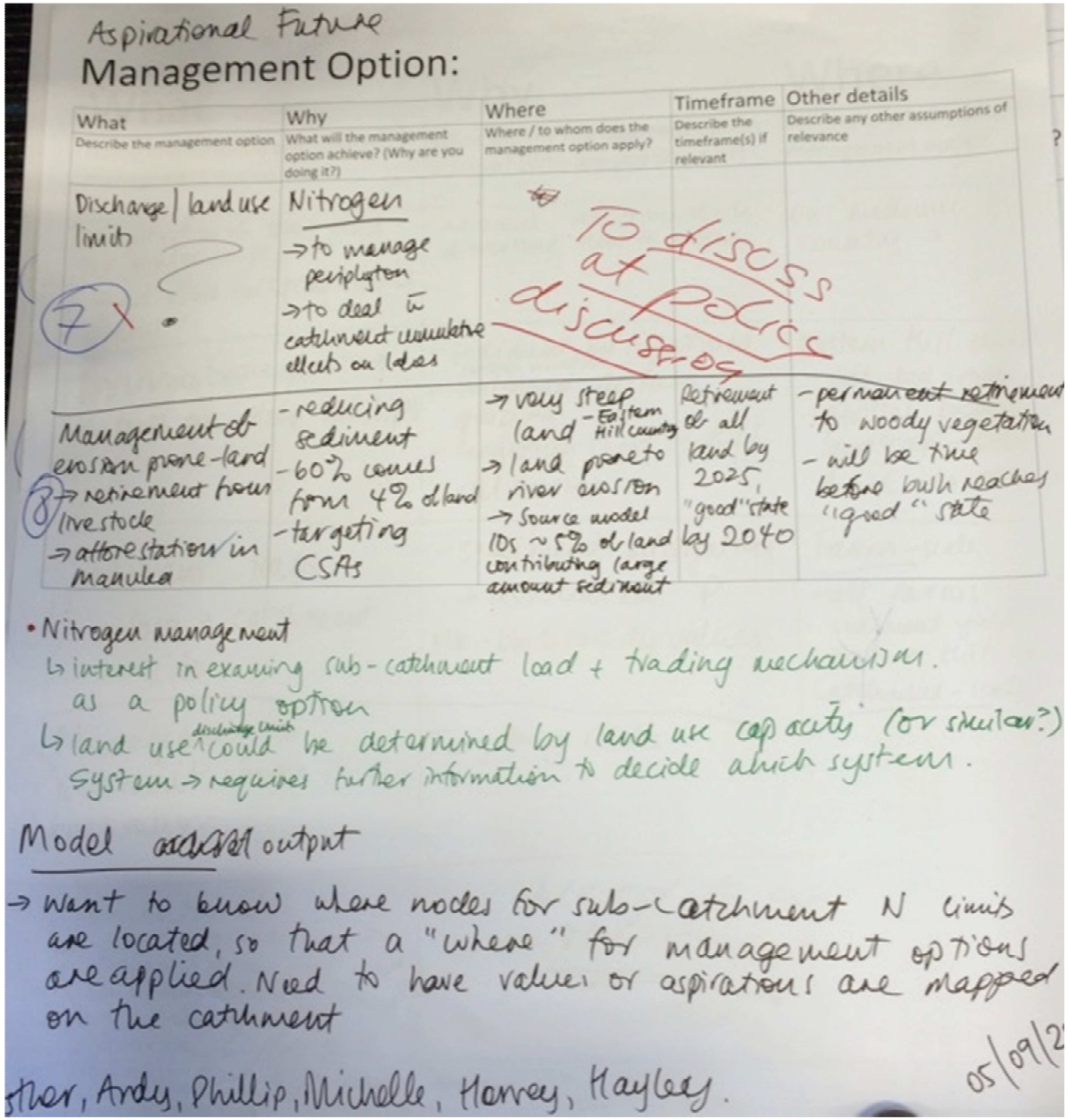
19/9/2016 Ra, David, Russell, Mat, John, Jim



Aspirational Future

Management Option:

What Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where / to whom does the management option apply?	Timeframe Describe the timeframe(s) if relevant	Other details Describe any other assumptions of relevance
Discharge / land use limits (7)	Nitrogen → to manage periphyton → to deal w catchment cumulative effects on lakes	To discuss at policy discussion		
Management of erosion prone-land (8) → retirement from livestock → afforestation in manuka	- reducing sediment - 60% comes from 4% of land - targeting CSAs	→ very steep land - Eastern Hill country → land prone to river erosion → Source model IDs ~5% of land contributing large amount sediment	Retirement of all land by 2025, "good" state by 2040	- permanent retirement to woody vegetation - will be time before bush reaches "good" state

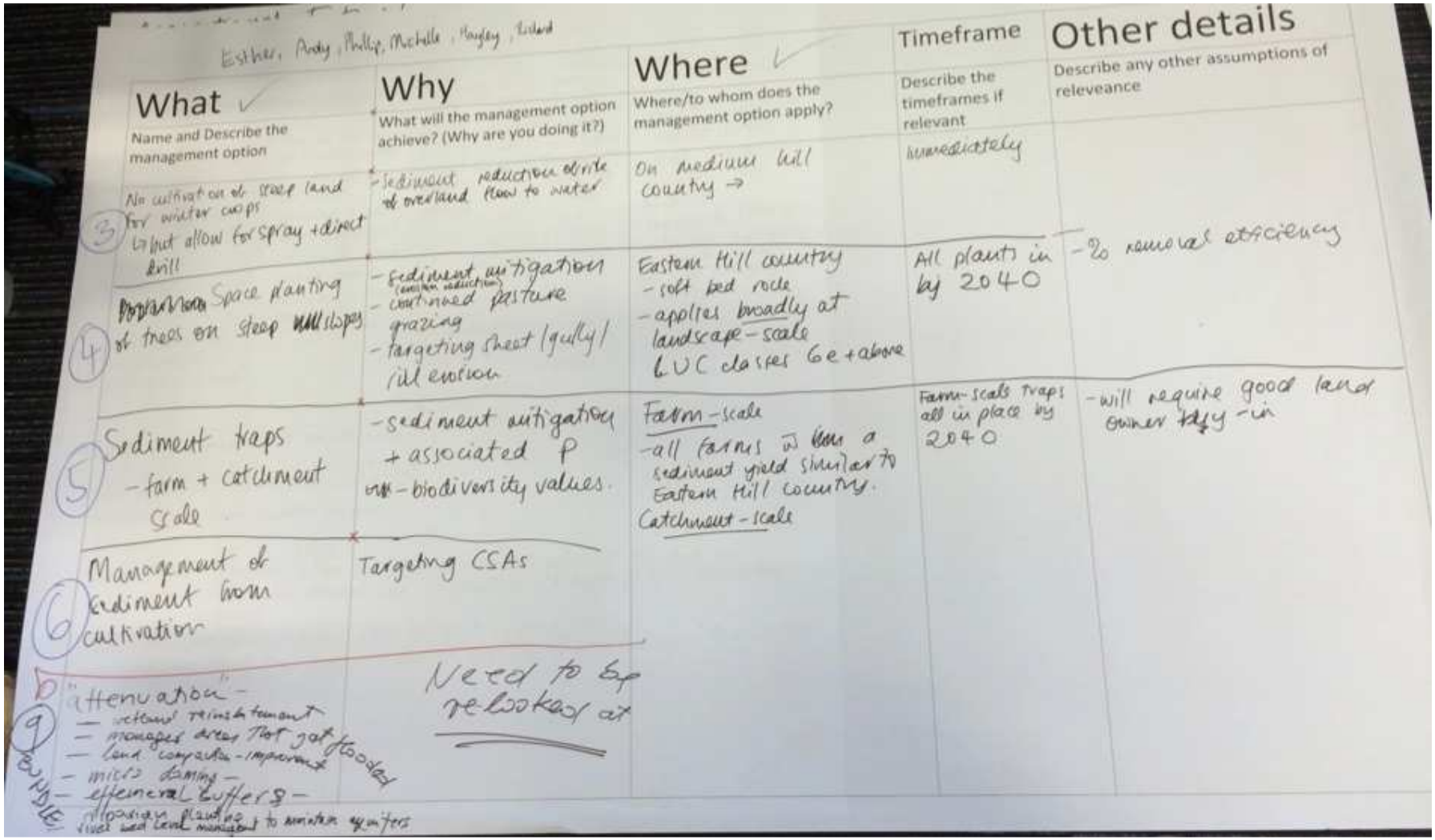
- Nitrogen management
  - ↳ interest in examining sub-catchment load + trading mechanisms as a policy option
  - ↳ land use (discharge limits) could be determined by land use capacity (or similar?) system → requires further information to decide which system.

Model ~~output~~ output

→ want to know where nodes for sub-catchment N limits are located, so that a "where" for management options are applied. Need to have values or aspirations are mapped on the catchment

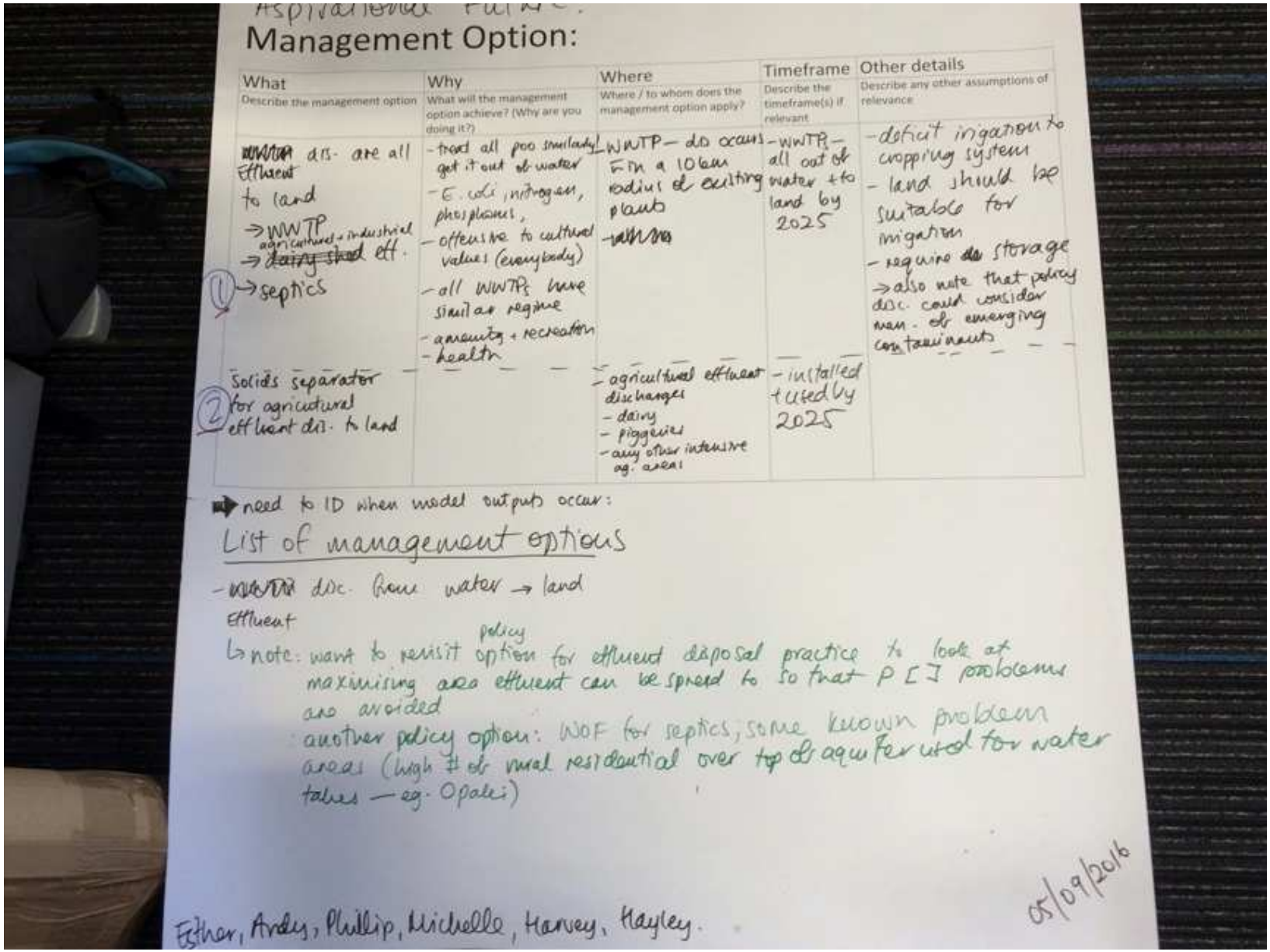
Esther, Andy, Phillip, Michelle, Harvey, Hayley.

05/09/2



Esther, Andy, Phillip, Michelle, Hayley, Richard

	What Name and Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where/to whom does the management option apply?	Timeframe Describe the timeframes if relevant	Other details Describe any other assumptions of releveance
3	No cultivation of steep land for winter crops ↳ but allow for spray + direct drill	- Sediment reduction of/site of overland flow to water	On medium hill country →	Immediately	
4	Space planting of trees on steep hill slopes	- Sediment mitigation (erosion reduction) - continued pasture grazing - targeting sheet/gully/rill erosion	Eastern Hill country - soft bed rock - applies broadly at landscape-scale LUC classes 6e + above	All plants in by 2040	- % removal efficiency
5	Sediment traps - farm + catchment scale	- sediment mitigation + associated P + - biodiversity values.	Farm-scale - all farms in [illegible] a sediment yield similar to Eastern Hill country. Catchment-scale	Farm-scale traps all in place by 2040	- will require good land owner buy-in
6	Management of sediment from cultivation	Targeting CSAs	Need to be relooked at		
9	"Attenuation" — wetland reinstatement — managed areas that get flooded — land capable - improvement - micro damming - - ephemeral buffers - riparian planting river and land management to maintain aquifers				



Management Option:

What Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where / to whom does the management option apply?	Timeframe Describe the timeframe(s) if relevant	Other details Describe any other assumptions of relevance
~~WWTP~~ dis. are all Effluent to land → WWTP agricultural + industrial → ~~dairy shed~~ eff. (1) → septics	- treat all poo similarly / get it out of water - E. coli, nitrogen, phosphorus, - offensive to cultural values (everybody) - all WWTPs have similar regime - amenity + recreation - health	- WWTP – dis occurs from a 10km radius of existing plants - ~~others~~	- WWTPs – all out of water + to land by 2025	- deficit irrigation to cropping system - land should be suitable for irrigation - require ~~dis~~ storage → also note that policy dec. could consider new - or emerging contaminants
Solids separator for agricultural effluent dis. to land (2)		- agricultural effluent discharges - dairy - piggeries - any other intensive ag. areas	- installed + used by 2025	

➡ need to ID when model outputs occur:

List of management options

- ~~WWTP~~ disc. from water → land

Effluent

↳ note: want to revisit policy option for effluent disposal practice to look at maximising area effluent can be spread to so that P [ ] problems are avoided

another policy option: NOF for septics, some known problem areas (high # of rural residential over top of aquifer used for water takes – eg. Opaki)

Esther, Andy, Phillip, Michelle, Harvey, Hayley.

05/09/2016

(1 +  + 2

Discharge to land.

Water Quality

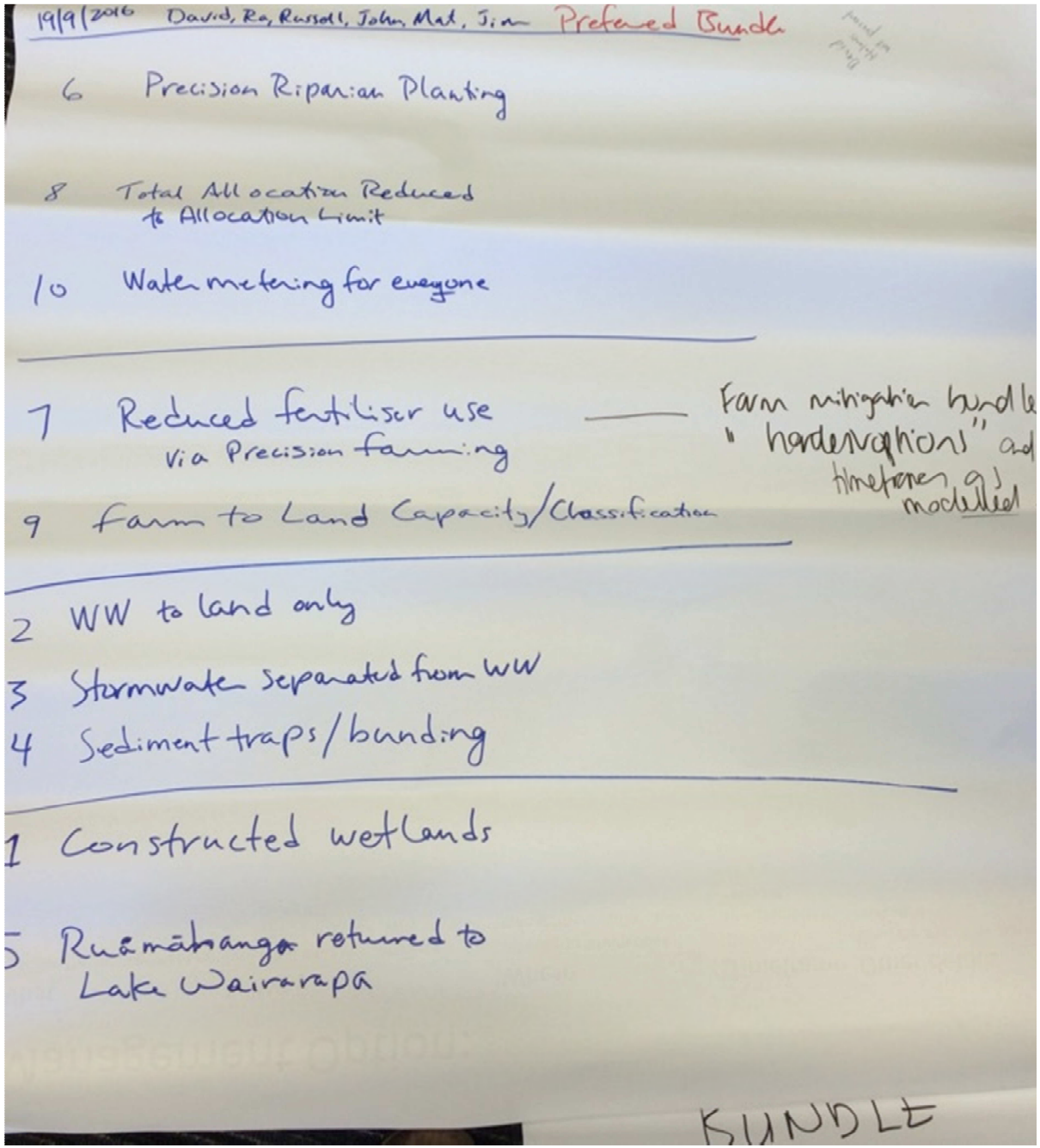
Waste water allocation?

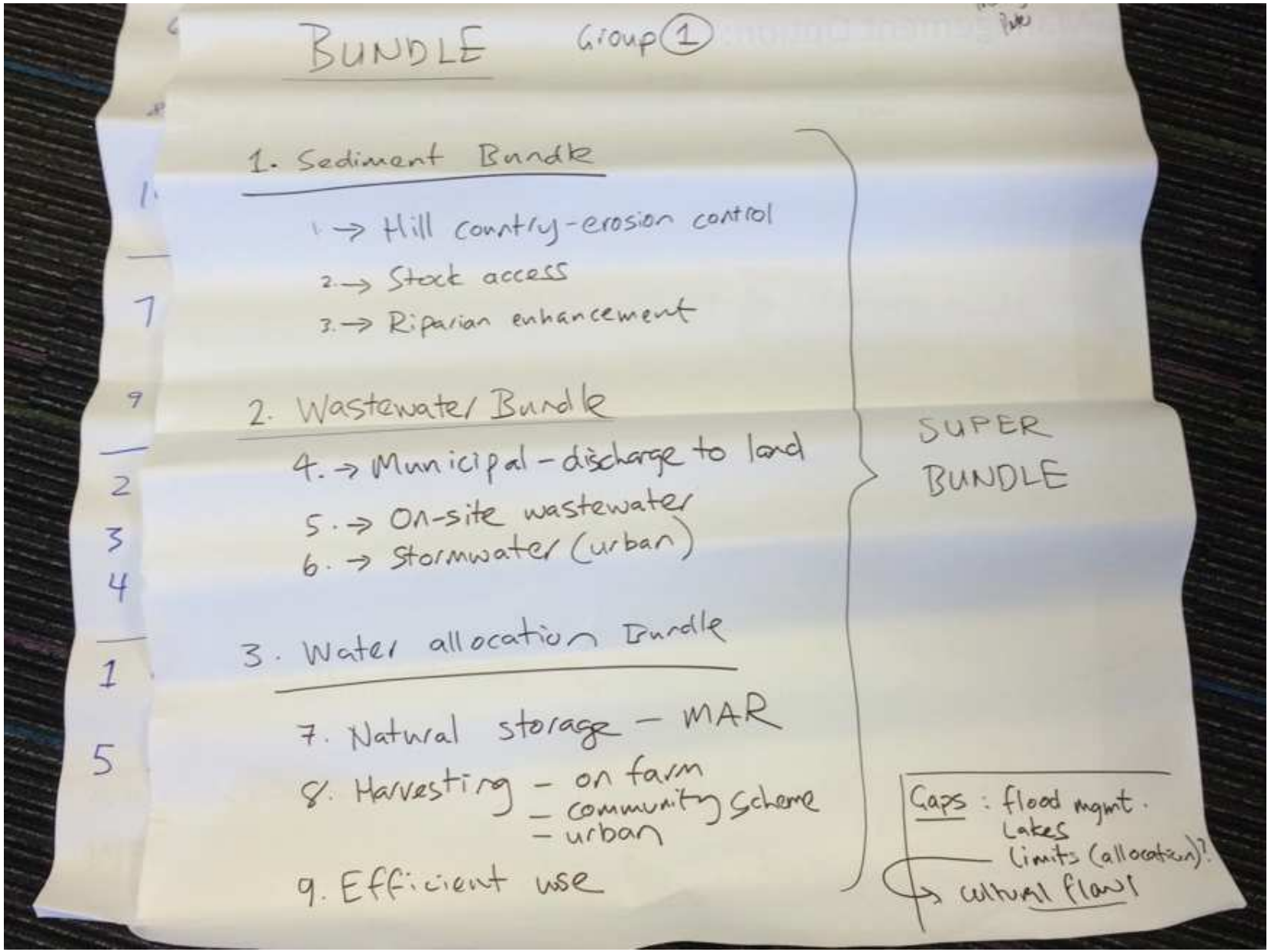
Limits?

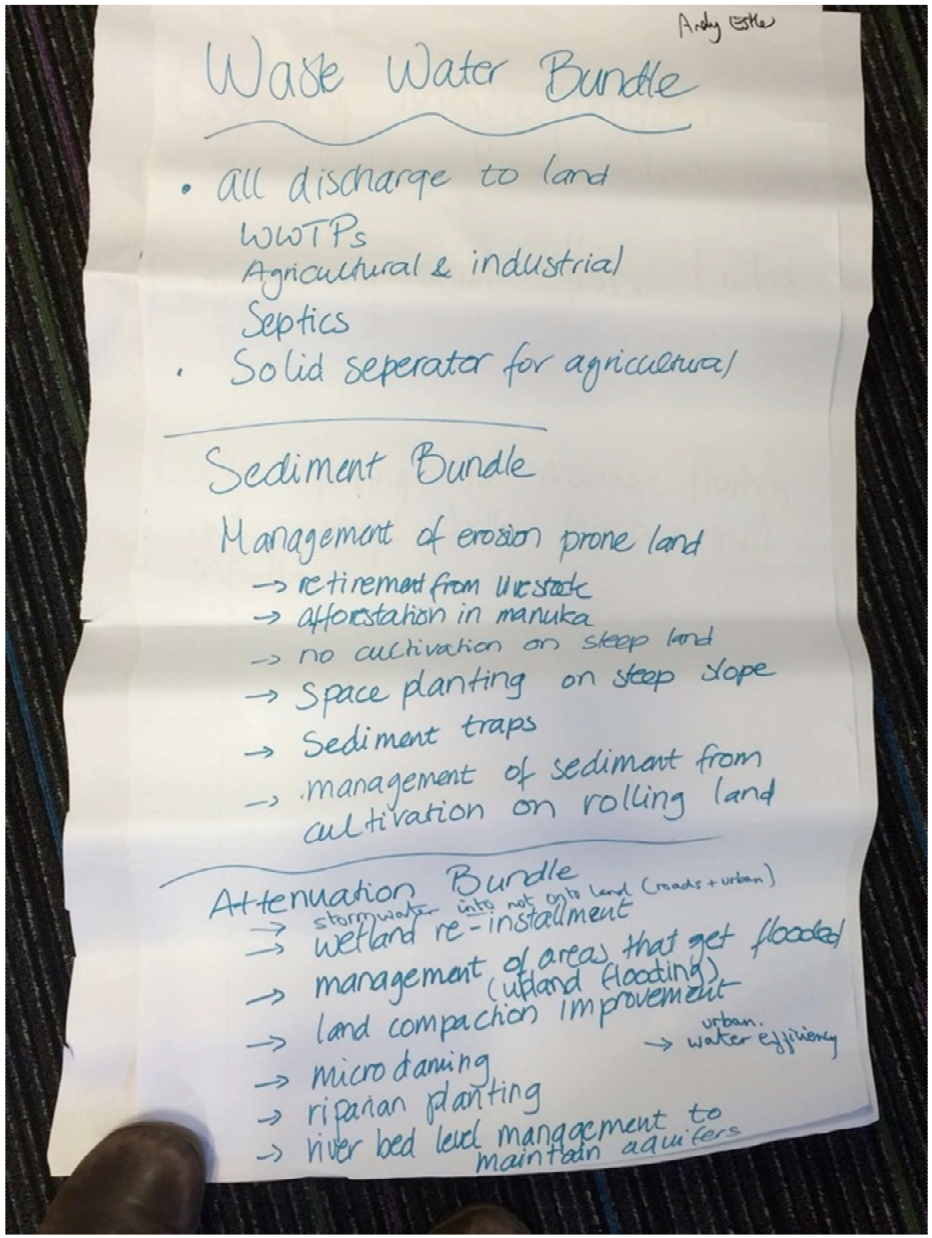
8, 3, 4, 5, 6 } sediment.

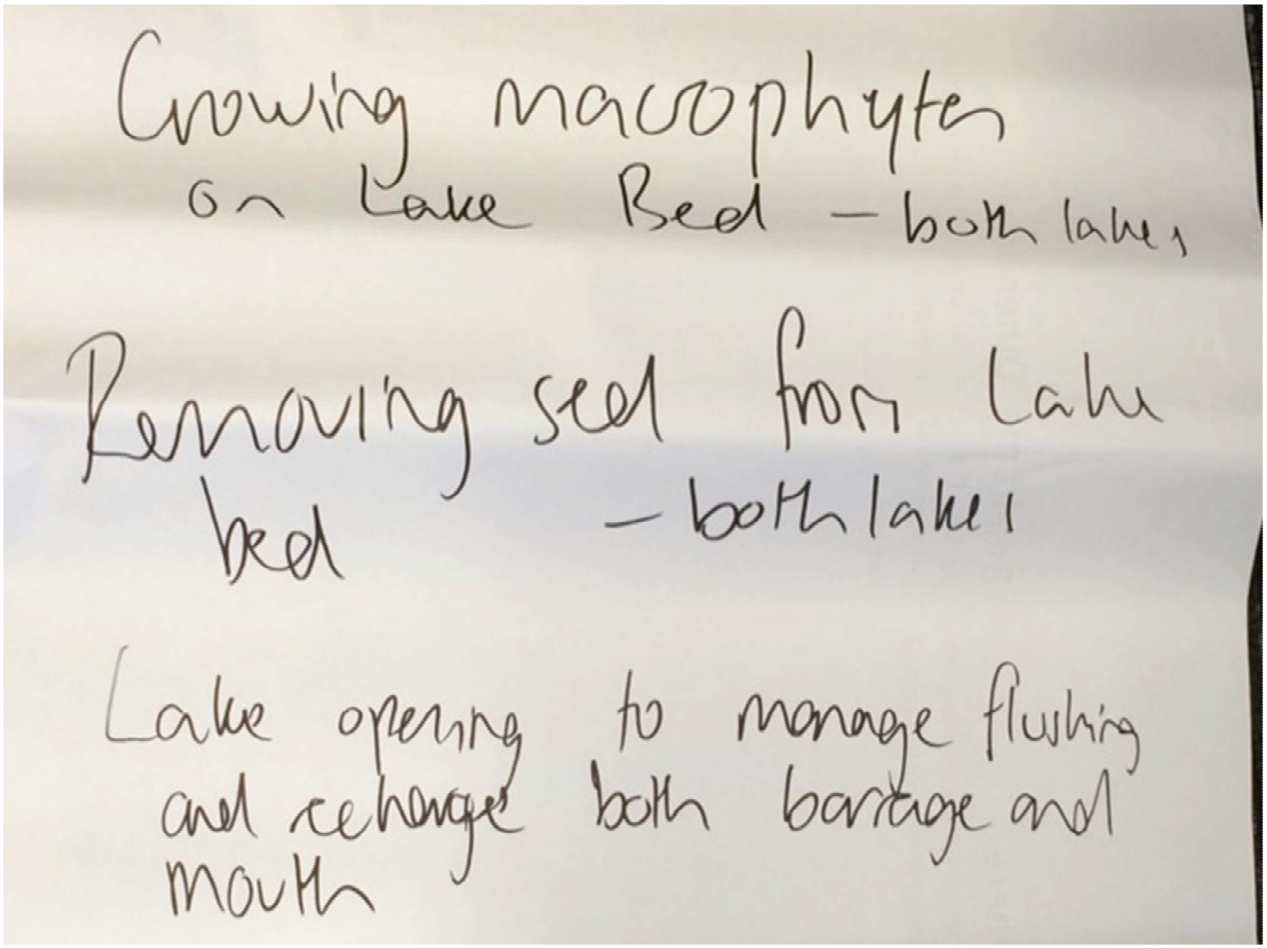
Sediment

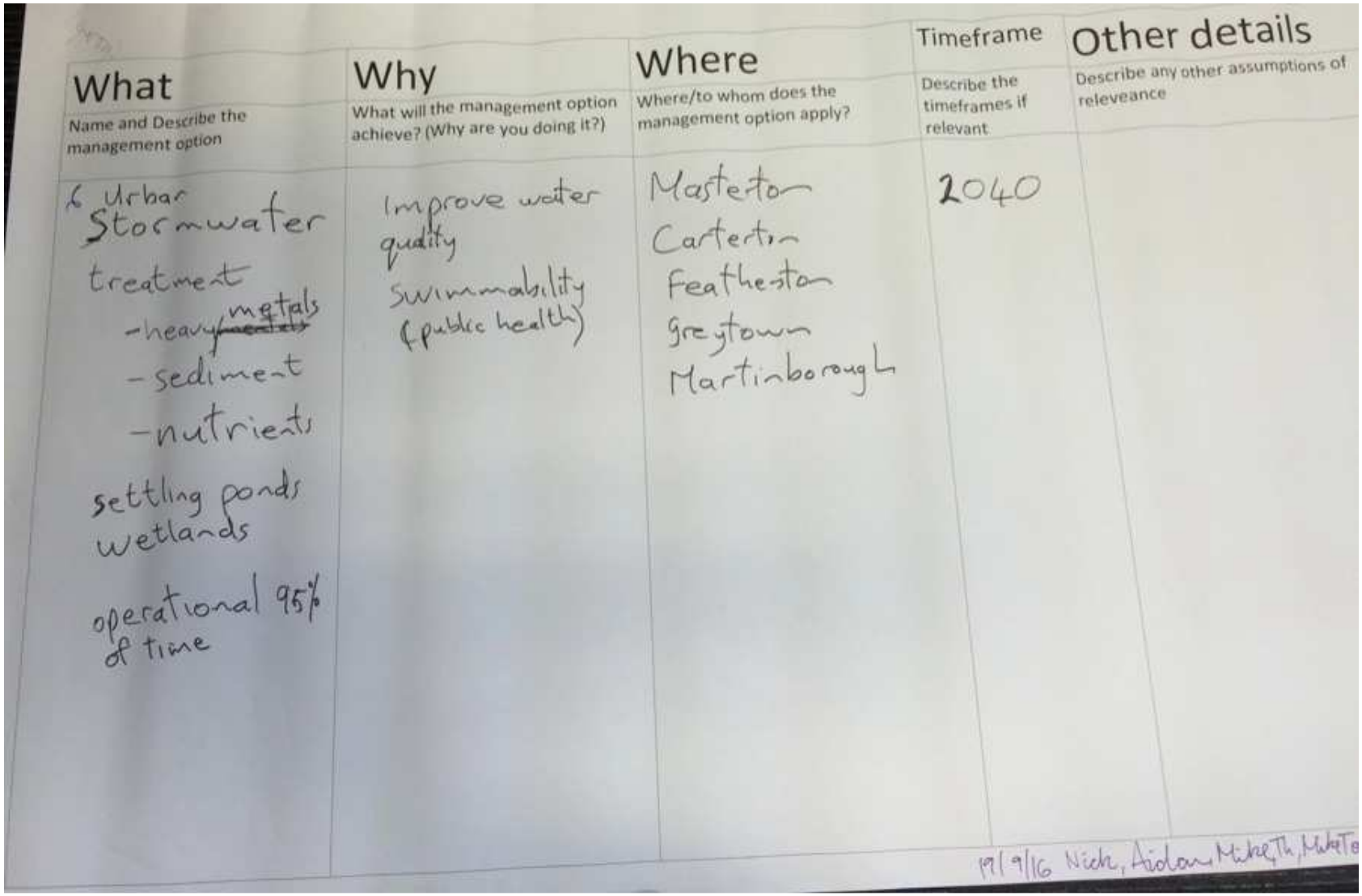
9 attenuation bundle.


19/9/2016 David, Ra, Russell, John, Mat, Jim Prefered Bundle
6 Precision Riparian Planting
8 Total Allocation Reduced to Allocation Limit
10 Water metering for everyone
7 Reduced fertiliser use via Precision farming
9 Farm to Land Capacity/Classification
Farm mitigation bundle
" hardenvations" and timeframes as modelled
2 WW to land only
3 Stormwater Separated from WW
4 Sediment traps/bunding
1 Constructed wetlands
5 Ruamatranga returned to Lake Wairarapa
BUNDLE


BUNDLE
Group (1)
1. Sediment Bundle
1 → Hill country - erosion control
2 → Stock access
3 → Riparian enhancement
2. Wastewater Bundle
4 → Municipal - discharge to land
5 → On-site wastewater
6 → Stormwater (urban)
3. Water allocation Bundle
7. Natural storage - MAR
8. Harvesting - on farm
- community scheme
- urban
9. Efficient use
SUPER BUNDLE
Caps: flood mgmt.
Lakes
Limits (allocation)?
→ cultural flows


Waste Water Bundle
• all discharge to land
WWTPs
Agricultural & industrial
Septics
• Solid seperator for agricultural
Sediment Bundle
Management of erosion prone land
→ retirement from livestock
→ afforestation in manuka
→ no cultivation on steep land
→ Space planting on steep slope
→ Sediment traps
→ management of sediment from cultivation on rolling land
Attenuation Bundle
→ stormwater into not onto land (roads + urban)
→ wetland re-installment
→ management of areas that get flooded (upland flooding)
→ land compaction improvement
→ urban. water efficiency
→ micro damming
→ riparian planting
→ river bed level management to maintain aquifers


Growing macrophyten
on Lake Bed – both lakes
Removing seed from Lake
bed – both lakes
Lake opening to manage flushing
and exchange both barrage and
mouth



What Name and Describe the management option	Why What will the management option achieve? (Why are you doing it?)	Where Where/to whom does the management option apply?	Timeframe Describe the timeframes if relevant	Other details Describe any other assumptions of releveance
6 Urban Stormwater treatment -heavy ~~metals~~ metals -sediment -nutrients settling ponds wetlands operational 95% of time	Improve water quality Swimmability (public health)	Masterton Carterton Featherston Greytown Martinborough	2040	

19/9/16 Nick, Aidan, Mike Th, Mike Te