Ministry for the Environment
Manatū Mō Te Taiao

Ministry for Primary Industries
Manatū Ahu Matua

To: Hon David Carter, Minister for Primary Industries
Hon Amy Adams, Minister for the Environment

Water Reform: Objectives and limits - Presentation on National Objectives Framework

Other Dept Tracking Number:	B12-417	**MfE Tracking Number:**	12-B-00053
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Security Level:	IN CONFIDENCE	**Number of Attachments:**	1 Appendix
Action Sought:	Nil- note only	**Response/Signature Needed by:**	23/1/2013.

Water Reform Directorate Contacts

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	Withheld under Section 9(2)(a)			
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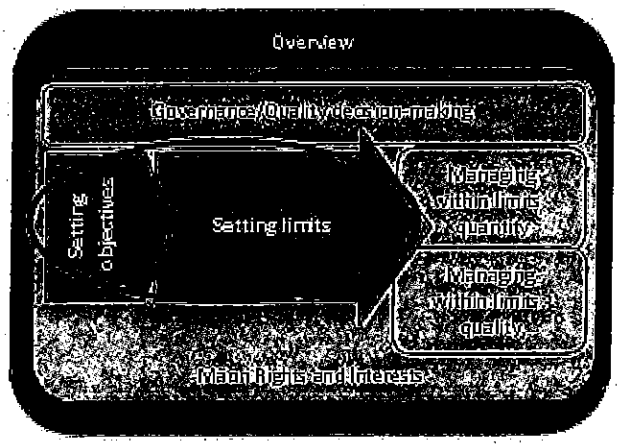
Executive Summary

1. On 23 January, Ministers will meet to discuss the introduction of a National Objectives Framework (NOF) as part of Government's proposed water reform strategy. To introduce this discussion, Minister Adams is to make a presentation on the NOF and its implications for local decision-making.



2. The following briefing note was prepared at your request and provides you with the elements of this presentation, including slides and further talking points.

3. This presentation covers the following issues:
   a. The existing requirements in terms of minimal standards of water quality in the Resource Management Act and in the National Policy Statement for Freshwater Management, noting that the latter does not provide much detail on how its requirements should be given effect to.
   b. The general case for setting objectives and limits to: secure the long-term sustainability of water use; protect the rights of existing users as well as existing social, cultural and economic uses of water where appropriate; drive efficiency and productivity gains; and provide certainty for businesses and investors.

c. An explanation on what is meant by freshwater 'objectives' and 'limits' and how they will work together as part of an integrated management regime which will focus on identifying the most efficient and cost-effective suite of tools (including limits) to achieve the specific objectives for each particular catchment, providing adjustment timeframes for resource users.
d. The potential role of the National Objectives Framework to ensure – including by providing more clarity on how existing national objectives should be given effect to – that regional and local freshwater objectives will be set in a consistent, cost-effective and well-targeted way, through a high quality process.
e. Options around the design and scope of the proposed National Objectives Framework.
f. A detailed example of how the National Objectives Framework would work and what its potential implications might be when it comes to dealing with the issue of periphyton (slime).

Recommended Action

We recommend that you:

a) **Note** that on 23 January Ministers will meet to discuss the introduction of a National Objectives Framework as part of Government's wider water reform strategy.

b) **Note** the attached slides and talking points for your presentation on the National Objectives Framework.

Kay Harrison
Director, Water Reform Directorate

Date 17/1/13

Hon David Carter
Minister for Primary Industries

Date

Hon Amy Adams
Minister for the Environment

Date

Minister's feedback on quality of briefing note:	**1**	**2**	**3**	**4**	**5**
1 = Was not satisfactory 2 = Fell short of my expectations in some respects 3 = Met my expectations 4 = Met and sometimes exceeded my expectations 5 = Greatly exceeded my expectations					

National Objectives Framework

Assisting the setting of objectives and limits in catchments

Existing Requirements

- Existing bottom lines in RMA (s.70)
- Existing "standards" in RMA- schedule 3 (a mix of numeric and narrative)
- The NPS requires councils to set freshwater objectives and limits- but process not prescribed
- The NPS requires water quality to be maintained or improved at a regional scale
- The NPS sets a national bottom line to safeguard life-supporting capacity etc, but does not prescribe at what level and how it is achieved

There are a number of existing "bottom lines" and requirements
RMA s. 70 "bottom lines". Discharges must not:
-produce conspicuous oil or grease films, scums or foams, or floatable or suspended materials:
-produce any conspicuous change in the colour or visual clarity:
-emit objectionable odour:
-render fresh water unsuitable for consumption by farm animals
-produce significant adverse effects on aquatic life

Schedule 3 provides water quality standards for water bodies classified in a regional plans for particular uses. These are a mix of narrative and numeric standards.
A regional plan can not contain water quality standards that are less than those in schedule 3. However, standards are not compulsory and many RC's choose not to have any. Where they do exist in regional plans, the rules to implement them are generally aimed at point-source discharges and do little to manage diffuse discharges. Would be replaced by the NOF

The NPS recognises that that it is impractical to maintain or improve water quality everywhere, and that some flexibility is required to allow some "unders" and "overs" in terms of water quality. The NPS suggests that this is done at a regional scale, so that a decline in water quality in one part of the region could be off-set by an improvement in another part of the region, so that the overall water quality in the region is at least maintained or possibly improved. How this will be implemented in regional plans is unclear. Further guidance and direction is required. The national objectives framework provides a frame for regional conversations and decision making in this space. The implementation of the maintain and improve policy is key to providing for economic growth. Existing regional planning documents generally require water quality to be maintained and improved. The NPS provides for a more flexible policy.

Freshwater Objectives

- Describes the outcome desired for a water body e.g. ecological health, recreational fishing
- Each objective has attributes that must be managed e.g. algal slime, E.coli
- Provides for both environmental and economic values
- Set in regional plans at a management unit scale
- Critical to setting robust and relevant limits

Freshwater objectives describe the outcome the community (including the national community) wants from a water body e.g. Safe guarding lifer supporting capacity, swimming, recreational fishing.

Each objective has a number of attributes which must be managed for. These are defined in terms of biophysical attributes of the water body (e.g. concentration of dissolved oxygen, temperature, clarity or suspended sediment concentration, algal cover) to achieve the objective (e.g. safeguard life supporting capacity, protecting human health, maintaining water quality to safeguard stock drinking water) This enables limits for the taking of water and the discharge of contaminants to be set, management methods to be implemented and to monitor the achievement of the objective.

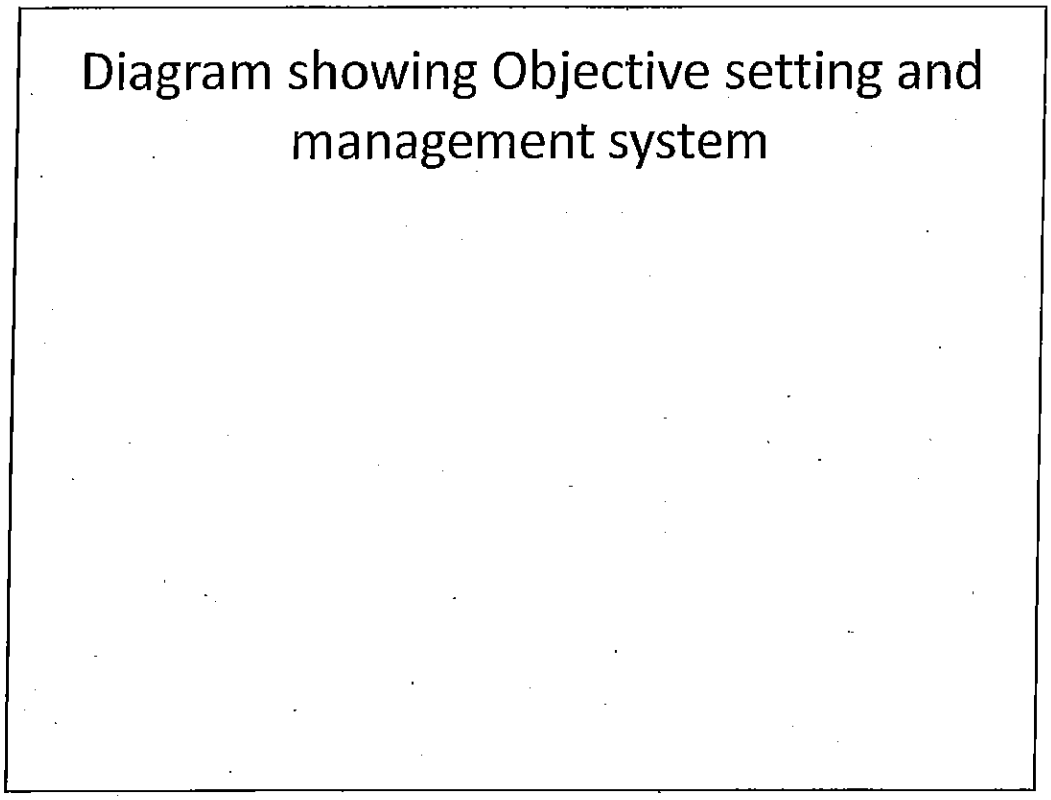
They are set at a level that provides for the desired balance of outcomes- both economic and environmental outcomes.

Objective attributes are of most use when they are described in measurable terms (numeric). This allows for robust limit setting and for the limit to be directly relevant to the objectives for the water body.

These are set in regional plans at spatial management unit scale (they can also be set by river type e.g. Canterbury plan)

There is confusion at a regional level on what objectives and limits are. Further guidance and possibly regulation is required to achieve consistency in how objectives are expressed in plans, as well as the level they should be set at.

Diagram showing Objective setting and management system



This is a draft. We will provide a completed version before Wednesday 23 Jan meeting

Note that the Management regime circle in this diagram is the same process as shown in slide 8

Objective setting process

River A: Community and council decide on what they want to use the river for

They choose ecosystem health so there are 8 things they will have to manage for, including slime

For slime there are 4 'bands' (may or may not be numeric)
Bands A, B & C will meet the objective

Objectives:
Mahinga kai
Ecosystem health
Swimming
...
etc

Objective: ecosystem health
Must manage:
- slime
- ...
- ...

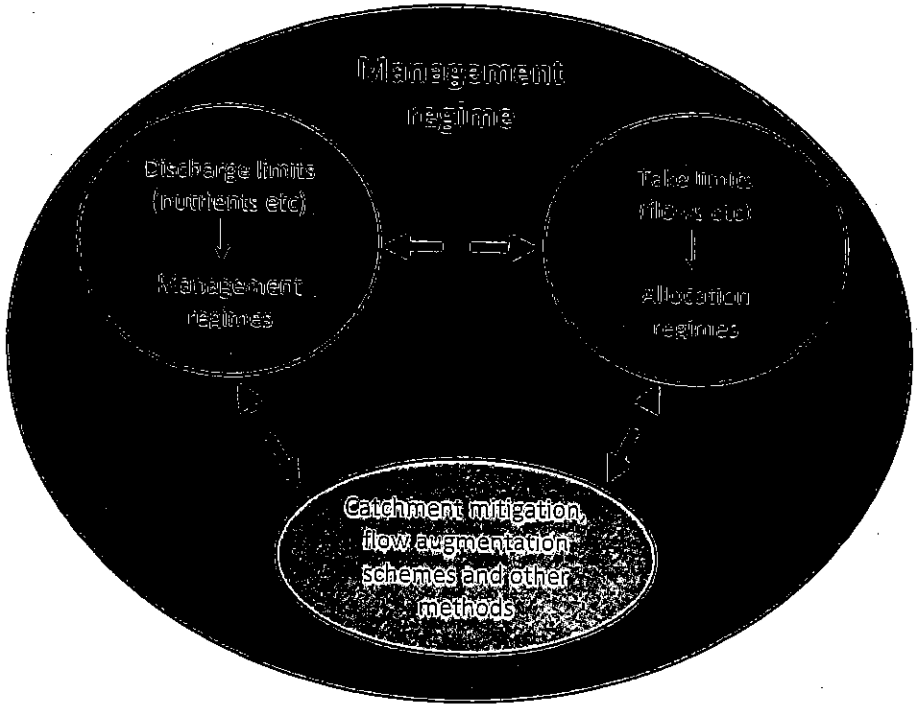
A	B	C	D

They need to identify the state of River A...

A	B	C	D
		X	

Once the management regime needed to meet the settings is identified, answer the questions

Questions:
- Is this the right objective
- Is this the right setting (should we maintain, not improve)?



A	B	C	D
		X	

...and decide on a setting whether to maintain or improve the state of River A...

Options for National Objectives Framework

- Provides standard menu of objectives- everybody uses the same currency
- Provides bands for each objective attribute needed to manage for that objective
- Compulsory numeric objectives could be an option for those national objectives (in NPS) that would apply to all water bodies
- LAWF recommend an additional national objective, for human health (secondary contact)
- There are also options on timeframes, and whether these are set nationally or regionally

The national objectives framework provides a standard menu of objectives for which a water body can be managed (see NOF tables).

Three options are shown:

1. Framework with menu of objectives where are all optional, with no minimum standards
2. Framework with minimum standards. All objectives are optional.
3. Framework with two compulsory objectives- safe-guarding life supporting capacity and human health aspects of secondary contact (boating and wading)

For each objective (e.g. recreational fishing), the framework provides a series of bands (e.g. A, B, C) for each attribute (e.g. clarity, dissolved oxygen needed, nitrate toxicity, habitat space) to provide for that objective. A region may choose a band depending on community aspirations.

For the compulsory subset of the framework (i.e. life supporting capacity and human health), the minimum state (i.e. the bottom of the C band) provides a national bottom-line that all water bodies must meet over time, unless exception criteria can be met.

The national objectives framework does not determine what objectives (and ultimately limits) regions will set – it simply provides a framework for regional conversations and decision making. It provides choices at a catchment scale. It enables national efficiency, consistency and calibration. There is the ability for bands and metrics to be changed over time.

NOF options diagrams

Option 1-Freshwater National Objectives Framework

Objective water bodies could be managed for (choose which apply)		Level at which the objective is to be managed (choose 1)			
		A	B	C	D *Objective not provided for*
☐	Life supporting capacity *Requires management of toxic compounds, habitat space (ecological flows and levels), slime, sediment*	☐ Note each attribute is assigned bands A, B, C, D.	☐	☐	☐
☐	Human health- secondary contact (boating, wading) *Requires management of bacterial contamination (E. coli)*	☐	☐	☐	☐
☐	Animal drinking water *Requires management of ...*	☐	☐	☐	☐
☐	Drinking water - sources for treatment *Requires management of ...*	☐	☐	☐	☐
☐	Drinking water - untreated *Requires management of ...*	☐	☐	☐	☐
☐	Food gathering *Requires management of ...*	☐	☐	☐	☐
☐	Freshwater aquaculture *Requires management of ...*	☐	☐	☐	☐
☐	Irrigation water *Requires management of ...*	☐	☐	☐	☐
☐	Natural form and character *Requires management of ...*	☐	☐	☐	☐
☐	Recreational fisheries *Requires management of ...*	☐	☐	☐	☐
☐	Swimming *Requires management of human health aspects plus clarity and slime*	☐	☐	☐	☐
☐	Other objectives ... *Requires management of ...*	☐	☐	☐	☐

Option 2- Freshwater National Objectives Framework- with minimum standards

	Objectives water bodies could be managed for (choose which apply)	Level at which the objective is to be managed (choose 1) A	B	C	D Objective not provided for
☐	Life supporting capacity *Requires management of toxic compounds, habitat space (ecological flows and levels), slime, sediment*	☐ Note: each attribute is assigned bands A, B, C, D	☐	☐	☒
☐	Human health - secondary contact (boating, wading) *Requires management of bacterial contamination (E. coli)*	☐	☐	☐	☒
☐	Animal drinking water *Requires management of ...*	☐	☐	☐	☒
☐	Drinking water - sources for treatment *Requires management of ...*	☐	☐	☐	☒
☐	Drinking water - untreated *Requires management of ...*	☐	☐	☐	☒
☐	Food gathering *Requires management of ...*	☐	☐	☐	☒
☐	Freshwater aquaculture *Requires management of ...*	☐	☐	☐	☒
☐	Irrigation water *Requires management of ...*	☐	☐	☐	☒
☐	Natural form and character *Requires management of ...*	☐	☐	☐	☒
☐	Recreational fisheries *Requires management of ...*	☐	☐	☐	☒
☐	Swimming *Requires management of human health aspects plus clarity and slime*	☐	☐	☐	☒
☐	Other objectives... *Requires management of ...*	☐	☐	☐	☒

Option 3- Freshwater National Objectives Framework- with minimum standards and compulsory bottom lines

Objectives water bodies could be managed for	Level at which the objective is to be managed (choose 1) A	B	C	D *Objective not provided for*
Compulsory				
☑ Life supporting capacity *Requires management of toxic compounds, habitat space (ecological flows and levels), slime, sediment*	☐ Note: each parameter is assigned bands A, B, C, D	☐	☐	☒
☑ Human health- secondary contact (boating, wading) *Requires management of bacterial contamination (E. coli)*	☐	☐	☐	☒
Optional (choose which apply)				
☐ Animal drinking water *Requires management of ...*	☐	☐	☐	☒
☐ Drinking water - sources for treatment *Requires management of ...*	☐	☐	☐	☒
☐ Drinking water - untreated *Requires management of ...*	☐	☐	☐	☒
☐ Food gathering *Requires management of ...*	☐	☐	☐	☒
☐ Freshwater aquaculture *Requires management of ...*	☐	☐	☐	☒
☐ Irrigation water *Requires management of ...*	☐	☐	☐	☒
☐ Natural form and character *Requires management of ...*	☐	☐	☐	☒
☐ Recreational fisheries *Requires management of ...*	☐	☐	☐	☒
☐ Swimming *Requires management of human health aspects plus clarity and slime*	☐	☐	☐	☒
☐ Other objectives... *Requires management of ...*	☐	☐	☐	☒

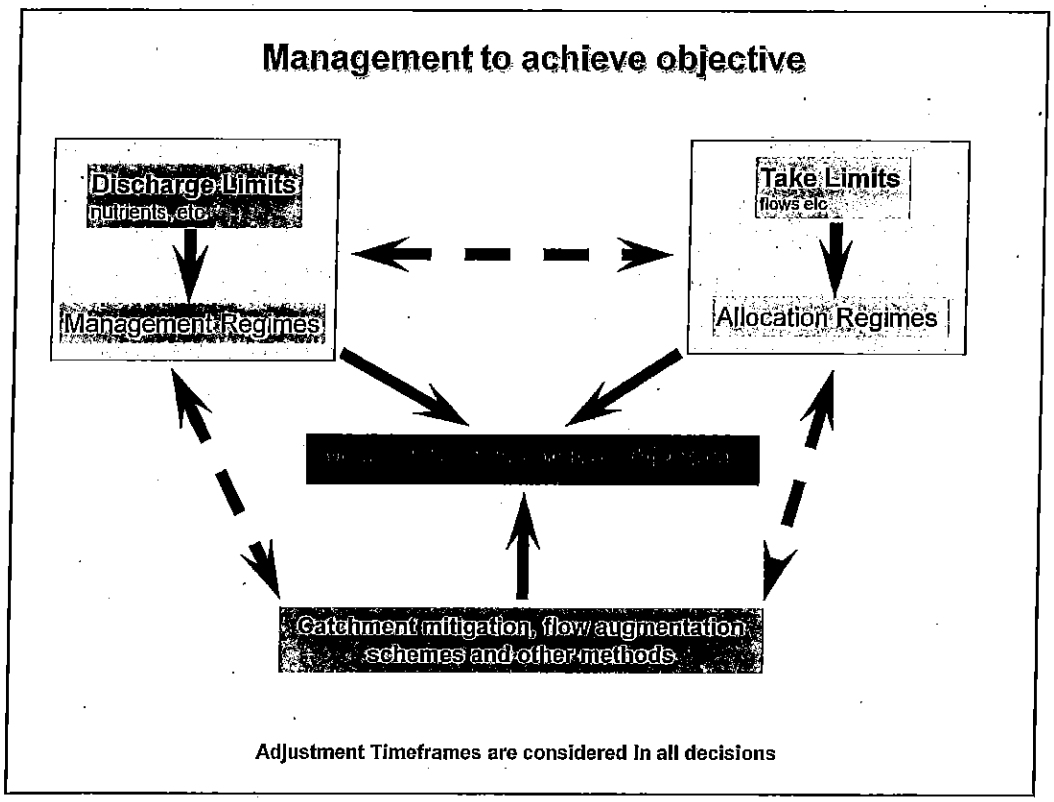
Management Framework

- The goal in water management is to achieve the freshwater objective in each catchment, and in doing so provide for the values and uses that the community desires (including national values)
- Three management variables- discharge limit, take limit, other management and mitigation methods (see next slide)
- Management variables need to be balanced to achieve the least cost/greatest benefit solution to achieving the freshwater objective

The goal in water management is to achieve the freshwater objective in each catchment, and in doing so provide for the values and uses that the community desires (including national values)

For a particular freshwater objective there are a number of alternatives for management. See diagram on next slide. The three management variables are interconnected and various combinations should be considered before being set in the regional plan. There will be an optimum balance that will achieve the least cost/greatest benefit solution to achieving the freshwater objective. The amount of flexibility will depend on the individual catchment characteristics. A continuing problem is that these variables are considered in isolation e.g. The take limit is already set in the plan, and all the focus in on a new discharge limit, with little catchment mitigation considered. This approach is not integrated, not flexible, and is unlikely to reach an optimum solution. They should be considered together in an integrated way, and if necessary limits that are already in the plan should be changed.

Example: Algal biomass is a problem in a lowland stream, causing very low dissolved oxygen levels which is having an adverse effect on fish, and on recreation. There is a nutrient enrichment issue, high daytime temperatures, and pressure from water takes in mid-summer. The take limit is already set in the plan. Solutions range from reducing the nutrient load, reducing temperatures and light by shading by riparian planting, and adding flow at critical times. A focus on reducing nutrients is unlikely to be inefficient without other solutions. Riparian planting at a sub-catchment scale would be very effective, as would adding some flow in mid- summer. Riparian planting needs to be concentrated where it will be effective (and costs shared across resource users). Various combinations of flow and nutrient input need to be considered. The solution may be to increase flow in summer by incentivising some water uses to use groundwater as an alternative, including changing the take limit in the plan. Storage may also be part of the solution. The three variable are considered in an integrated way to achieve a single numeric objective i.e. a range of different limit outcomes will achieve the same objective.



This is a draft. We will provide a completed version before Wednesday 23 Jan meeting

Limits

- Defines and controls the total amount of water that can be taken from a water body and the total amount (a load) or maximum concentration of contaminants that can be discharged in a catchment
- Can be used to control activities on land that lead to discharges
- Set in regional plans at a catchment or sub-catchment scale

Defined as a total contaminant load e.g. tonnes of N/yr (and in some cases a concentration), or a maximum take volume e.g. cubic metres/yr, or flow (and includes flow constraints such as minimum flows) for an management unit, usually a catchment or sub-catchment (or aquifer)

Limits are an effective way to control cumulative effects

Provides certainty on the amount of resource use available to users

Limits are sometimes confused with allocations, which are individuals share of the limit.

The reform package will provide further guidance and direction to regional councils on the setting of limits and how they are expressed in regional plans

Adjustment Timeframes

- The adjustment timeframe to meet a limit in over-allocated situations is the key to providing resource users with time to adjust, and to finding the least cost solution to over-allocation
- Occurs where:

  -the water quality in a water body doesn't meet a national bottom line

  -the water quality doesn't meet the level that is required to provide for an objective that the community desire

Adjustment timeframes are a key tool in mitigating the economic impacts of clawing back resource use, in places where this is necessary. LAWF has recommended that adjustment timeframes should be set regionally, and that there should be no deadline for when national bottom lines must be met (in terms of achieving a particular water quality in a water body)

The adjustment timeframe relates to how quickly resource users need to respond, not the time it takes for water quality changes to occur within a water body. There is a timeframe "sweet spot". Timeframes should not be so long that there no incentive for resource users to change their practice, but not so short that there is unnecessary economic impact

The time for the water quality in the water body to improve to a level that achieves the objective may be considerably longer than the time resource users respond and will be different in each catchment

Impacts

- Initial and preliminary analysis suggests that the bottom line (relating to safeguarding life supporting capacity) where the most risk exists is for algal slime (periphyton). We could expect that 7-8% of our river length may be below the bottom line proposed by the NOF reference group
- Mitigation (e.g. nutrient management) could achieve most of the reduction needed for phosphorous and up to half the reduction required for nitrogen at a national scale
- Mitigation of impact provided by adjustment timeframes

Initial and preliminary analysis suggests that the bottom line (relating to safeguarding life supporting capacity) where the most risk exists is for algal slime (periphyton). We could expect that 7-8% of our river length may be below the bottom line proposed by the NOF reference group

On farm mitigation (e.g. nutrient management) could achieve most of the reduction needed for phosphorous and up to half the reduction required for nitrogen at a national scale. This preliminary analysis didn't consider catchment wide mitigation, varying flow by changing take limits and the use of flow augmentation, nor adjustment timeframes.

Officials are working with councils to analyse different objective and limit choices, so that better analysis will be available before final decisions are made.

Regional councils are currently setting numeric objectives for slime that are more stringent (30%-45% cover) than the proposed national bottom line (generally to protect other values than life supporting capacity such as recreational or aesthetic values). Setting a national bottom line will broaden the discussion about what is acceptable

Bottom line maps

Withheld Under
Section 9(2)(f)(iv)
of the OIA.

Example for slime (periphyton)

- Slime is an attribute for objective to support life supporting capacity
- The NOF reference group suggested potential thresholds for slime cover (Band A less than 20% cover, Band B 20-40%, Band C 40-55%
- Nutrients, flow, temperature and habitat are drivers of slime growth

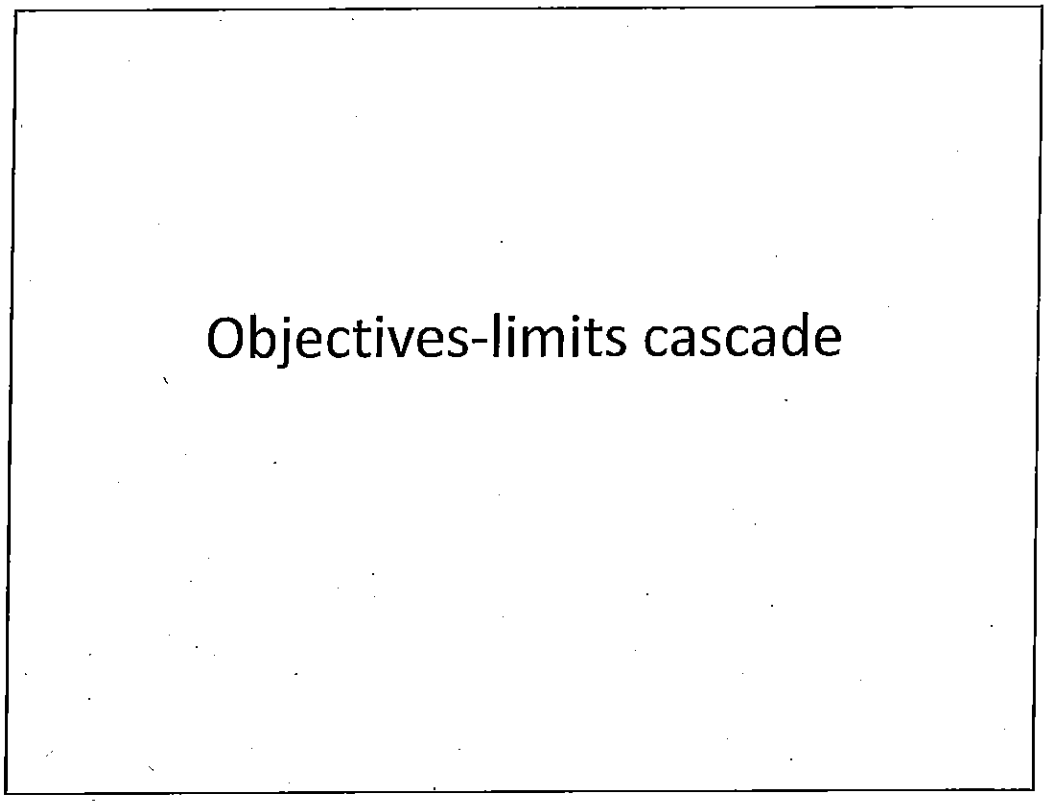
Slime (periphyton) is a type of algae that is one of the parameters that is used as an indicator of life supporting capacity. Higher levels of slime will dominate over other life forms such as invertebrates and fish, to the point where the ecological community is no longer balanced and could be considered unhealthy. The NOF reference group has suggested that the bottom of the "C band" be at an ecological "tipping point" before the ecosystem "crashes".

Nutrients, flow, temperature and habitat are drivers of slime growth. The response to nutrients and these other drivers is highly variable by river type. Determining nutrient requirements for a particular slime cover requirement, and hence setting a limit for nutrient discharge in a catchment requires site specific investigation.

The width of the bands are such that there is choice on where the community will set a numeric objective for slime (which will be a single number for a particular spatial management unit). The community can not set an objective below the bottom of band C, and is restricted in setting one outside the band where the existing slime level resides.

For example:

1. The existing slime cover in a management unit is 65%. The water quality in this water body is unacceptable and it is considered "over-allocated". There are frequent algae blooms which reflect significant nutrient enrichment and/or alteration the natural flow regime. The slime objective for this management unit must be set at 55% or lower (how lower is a choice).
2. The existing slime cover is 30%. There are occasional blooms reflecting low nutrient enrichment. The community must set an objective within the band (between 20 and 40%). There is some headroom potential within the management unit which will allow for more nutrient discharges or more water to be taken (or both). There is further work to be done on how the "maintain and improve overall water quality" policy is implemented at a regional level. This will determine the extent of flexibility.

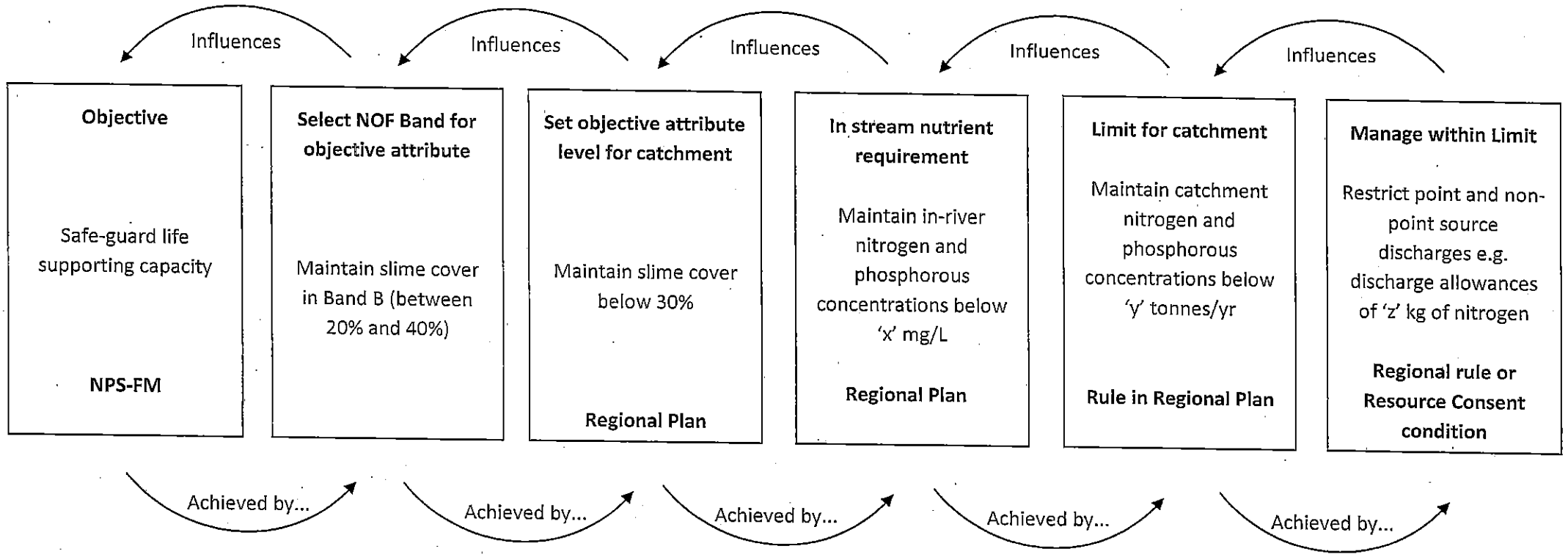


The attached diagram shows a cascade of objectives-limits system, moving from broad scale and high level objective (national level), to a smaller scale and more specific measures. It shows how a series of decisions can be made in a logical series so that specific measures set at an enterprise and catchment level actually achieve the desired outcome. An example is shown for algal slime which leads to the setting of a nutrient limit and then a management regime at an enterprise level.

This scheme is very similar to that contemplated for setting limits in the Canterbury zonal plans.

A significant issue in the past for the setting of take and flow limits is the lack of robust objective setting. It is difficult in most regional plans to identify the desired outcome or objective that the limit is trying to achieve. These processes have been very contentious because local communities did not have an open and robust debate on what to manage the river for. The limits appear arbitrary, at least to some. This has led to "blanket" rules across regions e.g. Regional minimum flows at 1 in 5 year low flow, 10% improvement in nutrient discharges everywhere.

Example of an Objective – Limits Cascade



Slime (periphyton) photos

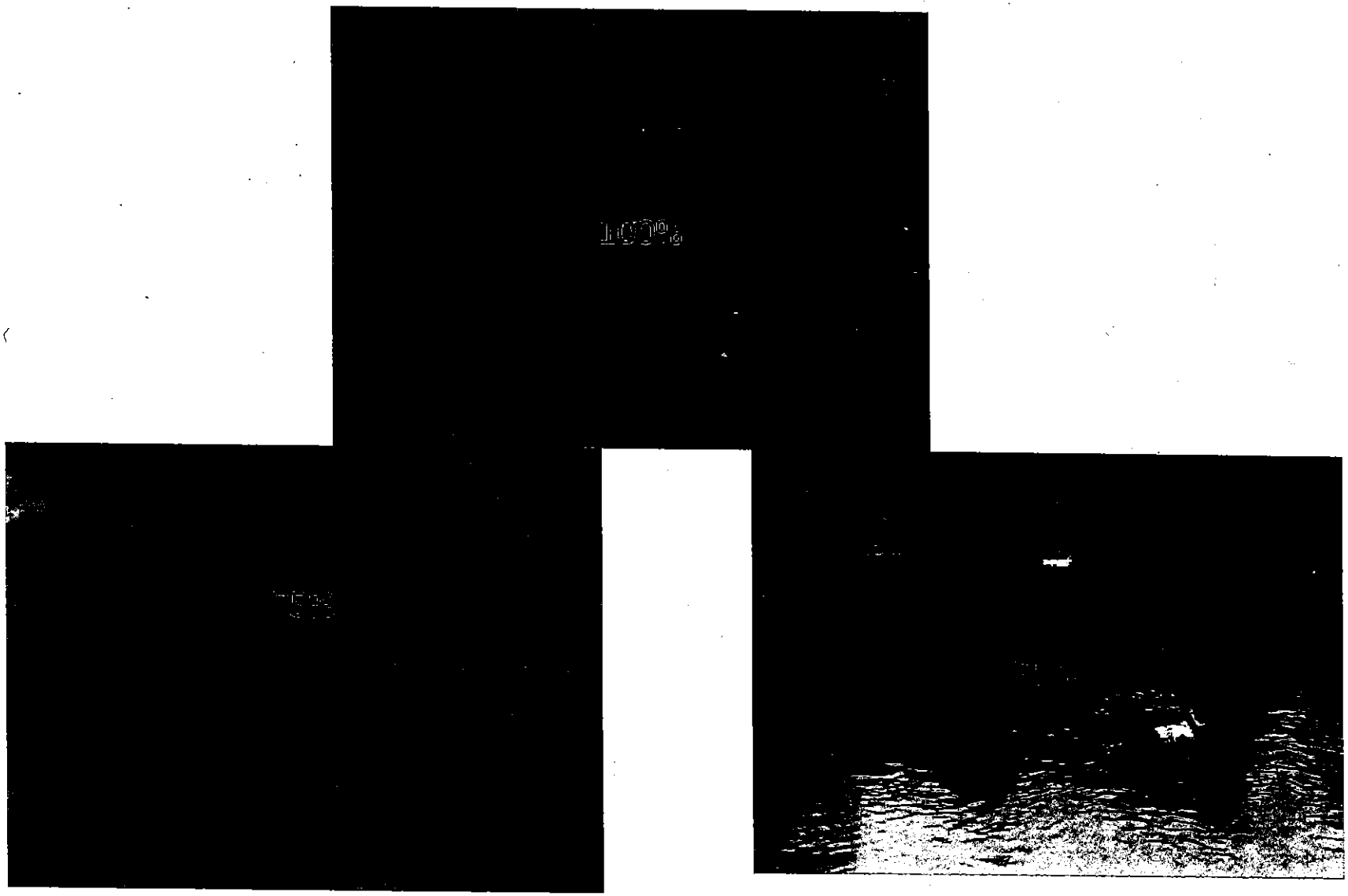
From research in NIWA Cumulative Effects MBIE programme

Photos and cover assessments by John Quinn, NIWA

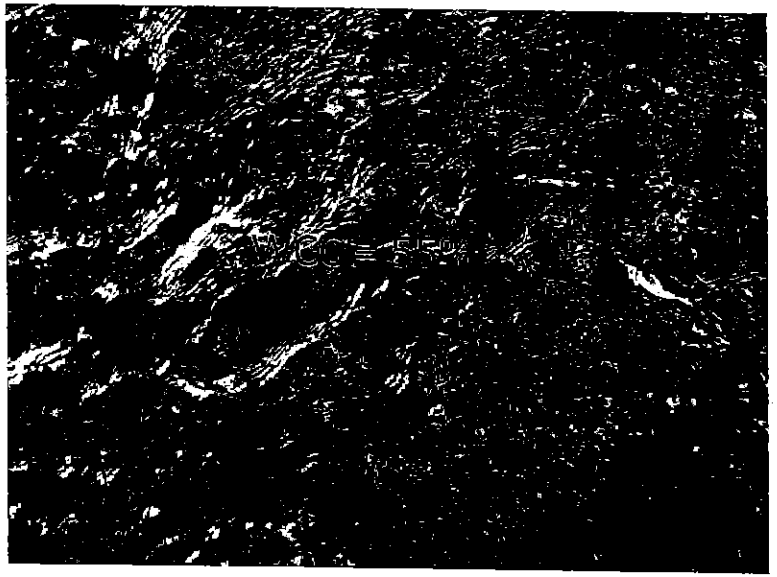
These photographs show real examples of algal slime cover on river beds.

The average river reach cover % is at the top of each page and the %cover in each photograph is shown. Note the possible bottom line is an average cover of les than 55%.

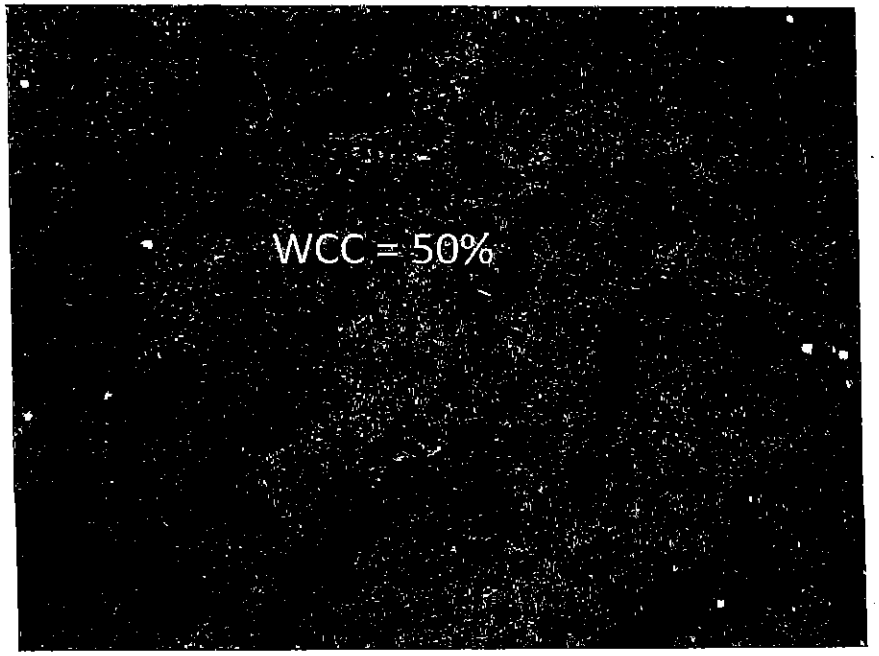
T2, Jan 2011:Reach average WCC = 44%; Chl a = 113 mg/m2; AFDM = 24 g/m2

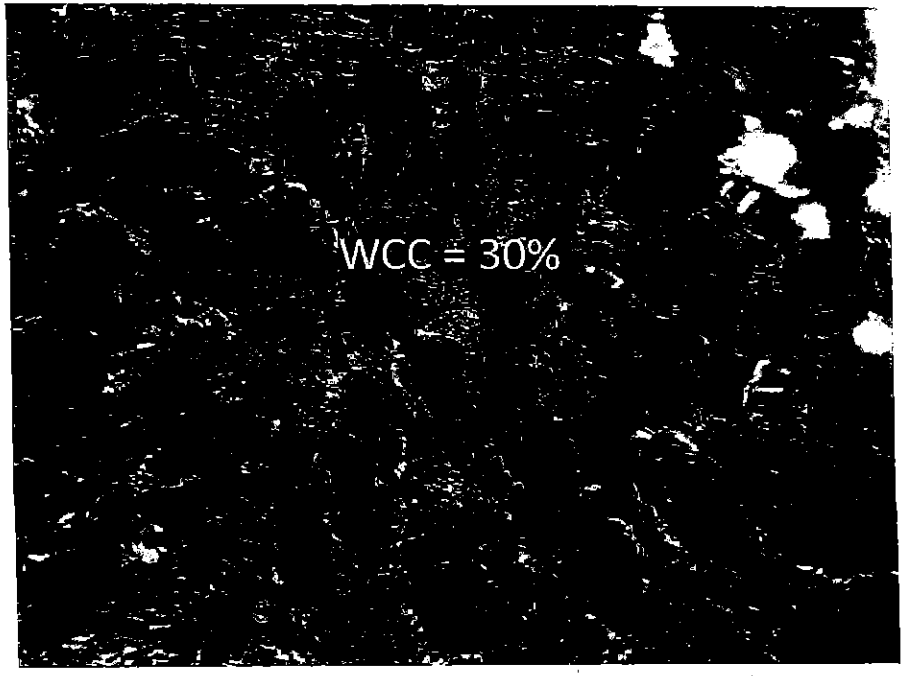


T5, Jan 2011, Reach average WCC = 47% Chl a = 206 mg/m2; AFDM = 40 g/m2

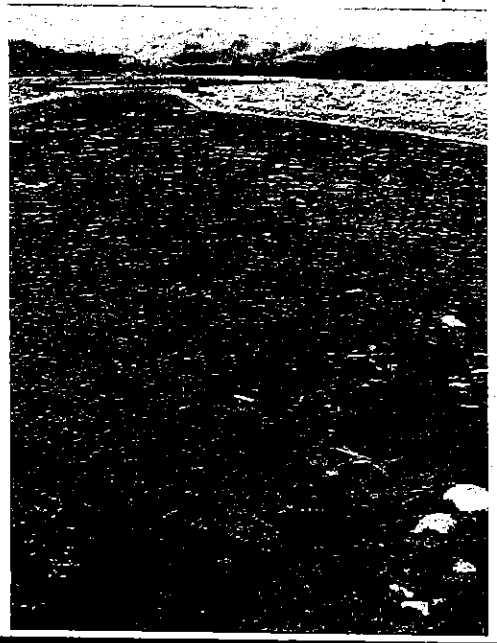


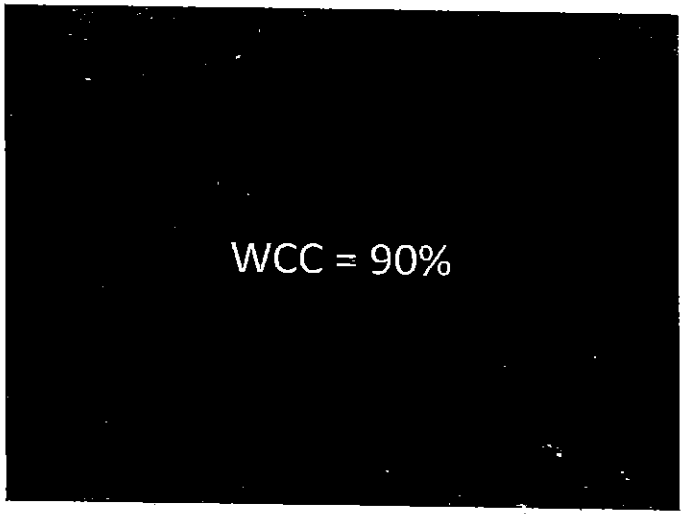
W2, Jan 2011:Reach average WCC = 28%; Chl a = 113 mg/m2; AFDM = 24 g/m2 (mat dominated)

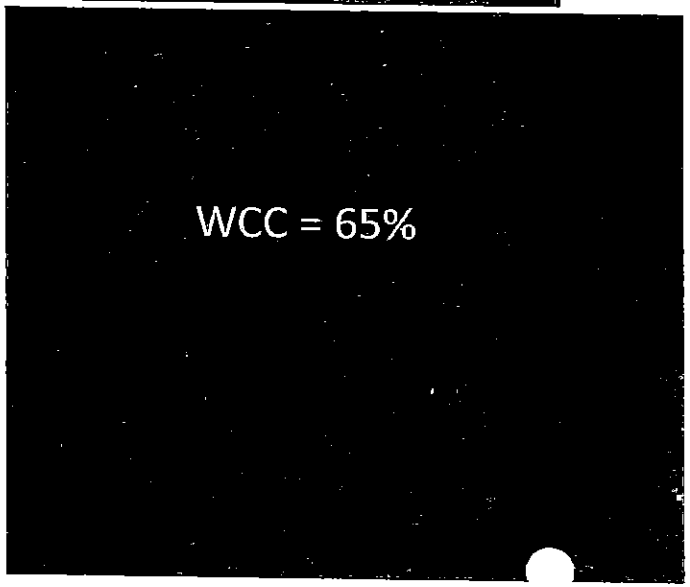


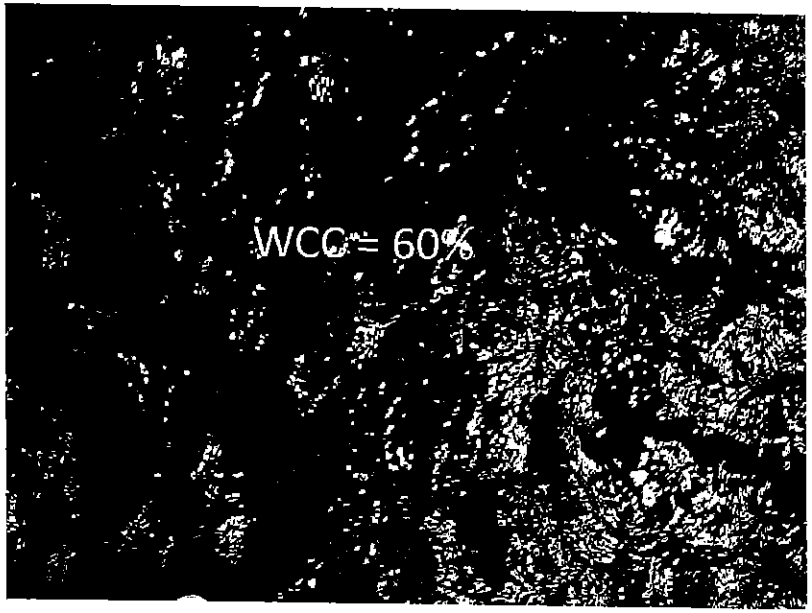


T5, Jan 2011:Reach average WCC = 69%; Chl a = 280 mg/m2; AFDM = 36 g/m2

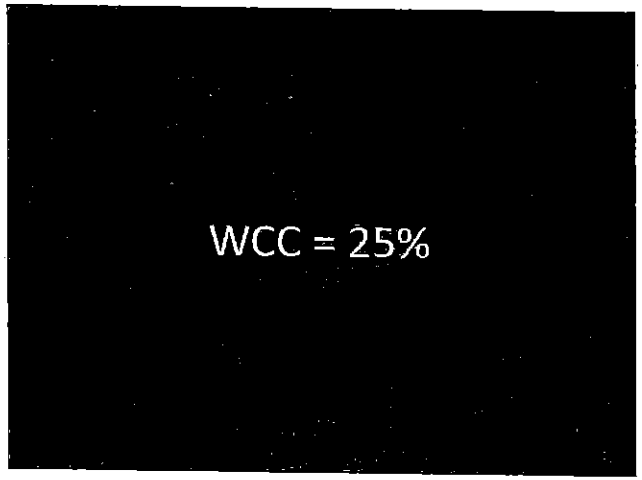


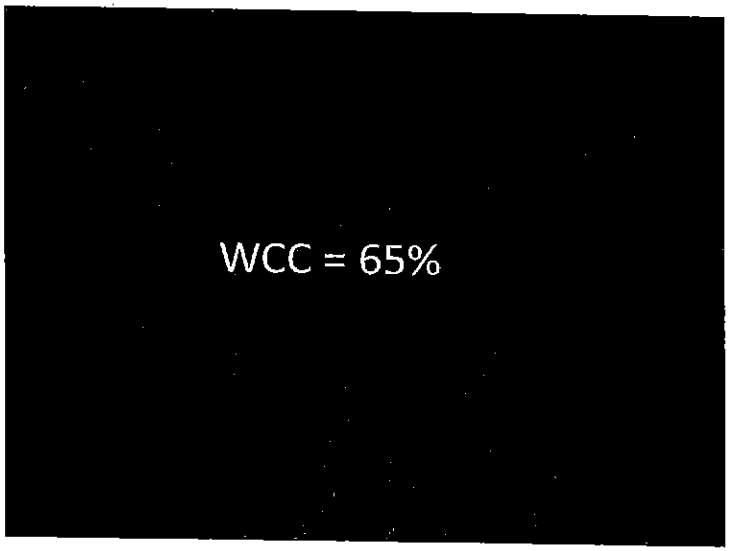


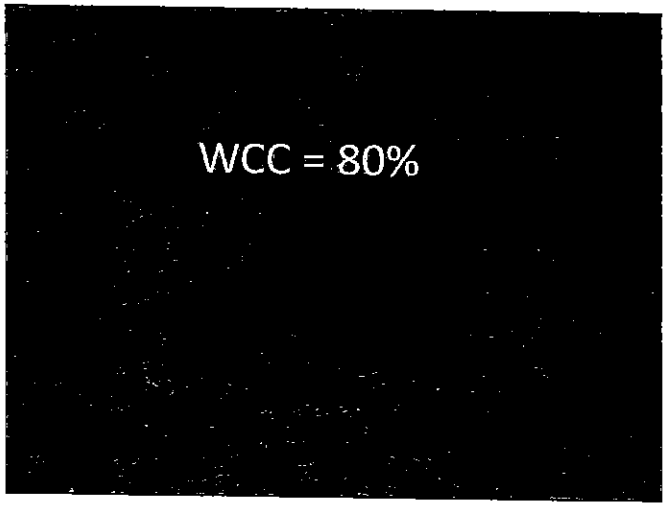




T11, Jan 2011Reach average WCC = 54%; Chl a = 137 mg/m2; AFDM = 37 g/m2







T13, Jan 2011Reach average WCC = 33%; Chl a = 68 mg/m2; AFDM = 21 g/m2