Environmental Markets: How can they work for water quality and climate change?

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Auckland Public Policy Seminar

April 2009

www.motu.org.nz

Funders

- Foundation for Research Science and Technology
- Environment Bay of Plenty
- Ministry of Agriculture and Forestry
- Ministry for the Environment
- Tindall Foundation
- Morgan Family Foundation
- Fletcher Building
- Meridian Energy

Collaborators

Water

- NIWA
- GNS-Science
- CommonGround
- Chapman Tripp
- Nutrient trading study group – various stakeholders. 2007 - 2009

EcoClimate { Integrated Research on the Economics of Climate Change Impacts, Adaptation and Mitigation

Motu

GNS SCIENCE TE PŪ AO

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INFOMETRICS

Landcare Research Manaaki Whenua

NIWA Taihoro Nukurangi

agresearch

NZCEE

Climate change policy dialogue 2007

- Provide technical solutions to technical problems.
- Combine economic experts' knowledge of emissions markets with the expertise and experience of private sector participants.

Climate Change Leadership Forum 2008

Outline

1. Common misconceptions
2. How does ‘cap and trade’ work?
3. When do environmental markets work?
4. Improving water quality in Lake Rotorua
   - Sharing costs
   - Long time frames
5. Emissions trading
   - Measuring emissions
   - Price risk
6. Key things to remember

Common Misconceptions

Common misconceptions

Environment

- Trading itself creates environmental gains
- Emissions trading systems are a sham and do nothing for the environment

Regulatory stringency

- Trading allows actors to avoid regulation
- A trading system is self regulating

Misconceptions about initial allocation of tradable units

- There is an efficient way to initially allocate units
- Giving free units to firms will protect workers
- If emitters aren't given units equal to their projected emissions, profitability will fall
- Introducing emissions trading is costly to NZ

How does ‘cap and trade’ work?

The cap is the limit on emissions from sources covered by the system

– This defines the environmental goal

Example: cap = 100 units of goop

This cap is divided into units or allowances

Example: 1 kg of goop

These units are allocated among ‘points of obligation’.

What are ‘points of obligation’?

Legal actors (firms, landowners, government bodies) must:

- Report information that can be used to infer emissions
- Surrender emission units that match their inferred emissions
- Face strong penalties if they do not

Example: producers of products (widgets and boggles) that create goop.

Trading

Sources with insufficient units must buy more on the market

Sources with excess units can sell

Example: The widget manufacturer buys units from the boggle maker

All trades are recorded in a registry

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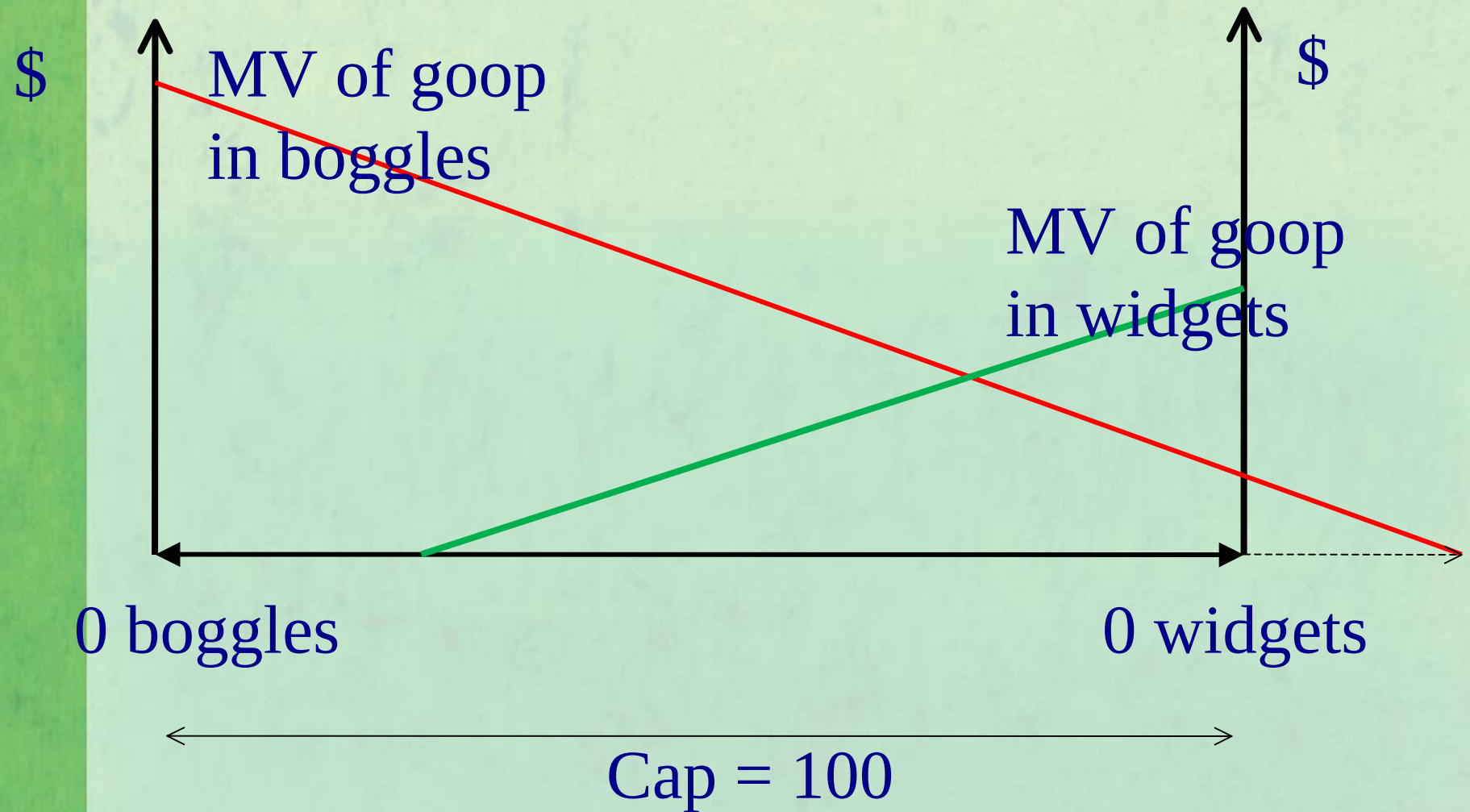
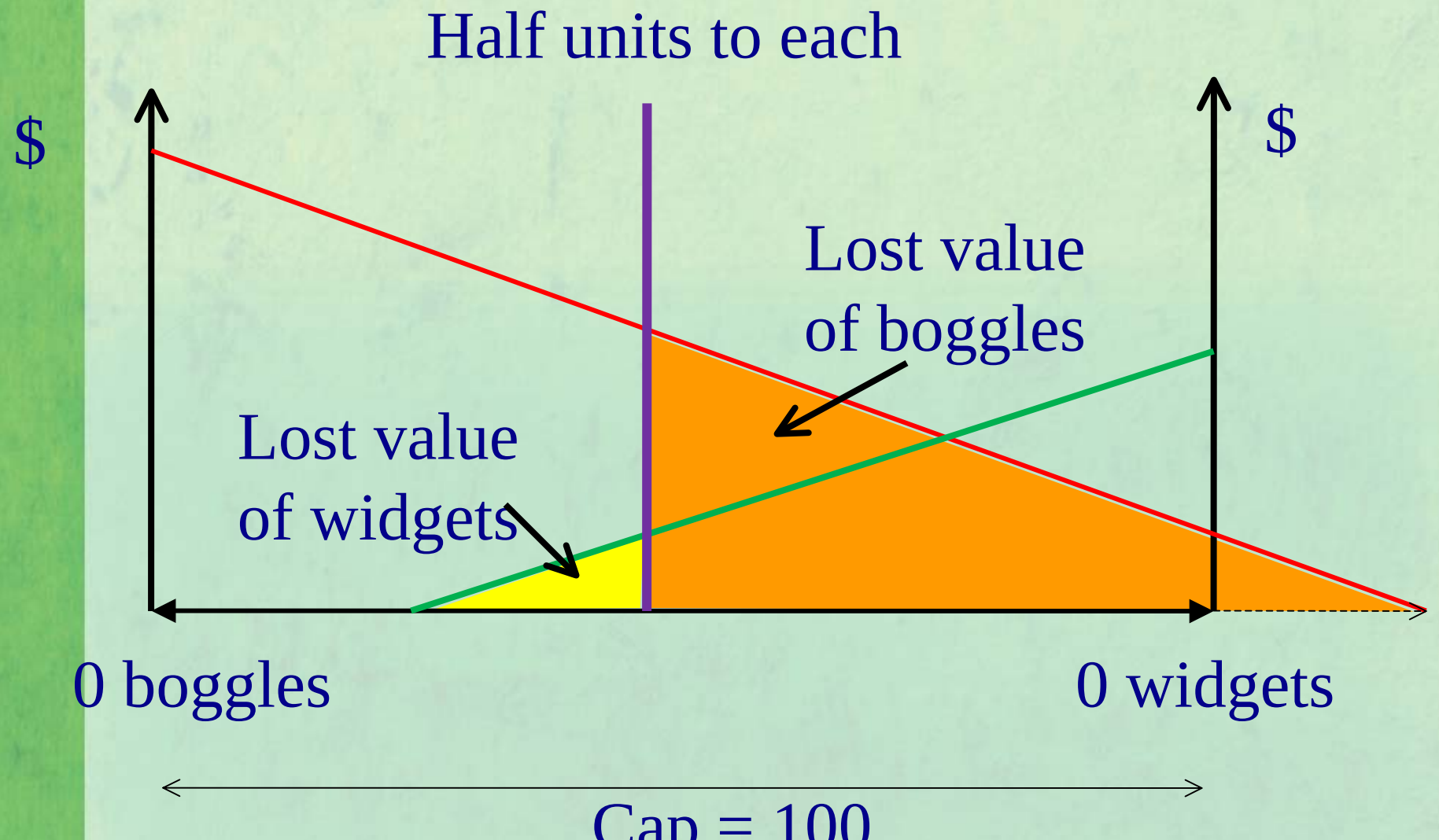
Trading should have no effect on the environment

- There are still 100 goop units
- The two firms will emit 100 kgs of goop between them.

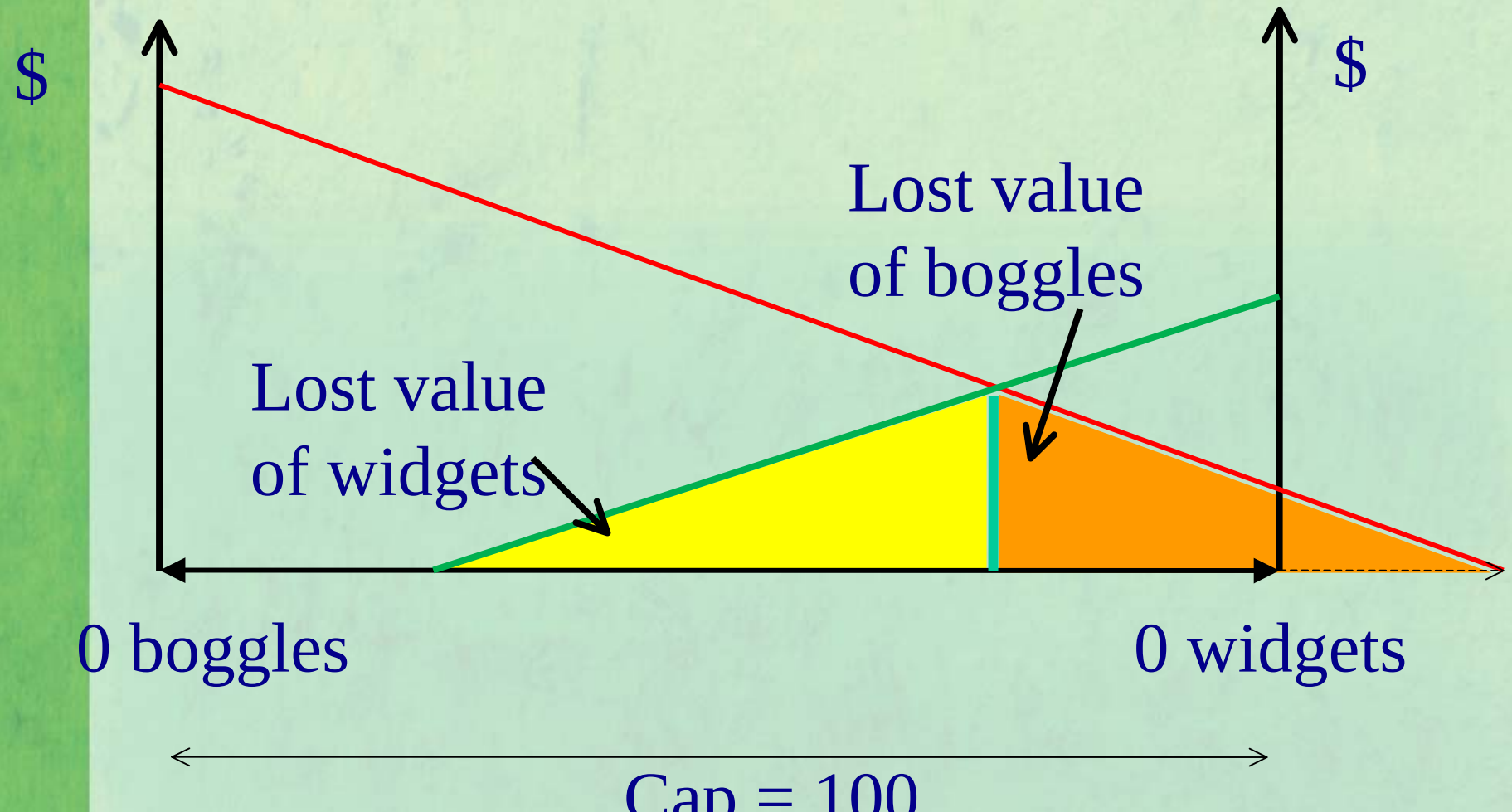
Value of products producing goop



Regulation without trading



Regulation with trading



Trading allows those with high reduction costs to pay those who can reduce more easily – the environmental goal can be achieved at lower cost.

Private actors have an incentive to use their information

When do environmental markets work?

Pollutant such that it doesn't matter much **where** or **when** the emissions happen – only the total amount.

Yes: greenhouse gases from fossil fuels, nutrients in lake, protecting fish stocks, water in irrigation system

Maybe: agricultural GHGs, water throughout catchment, habitat

No: biodiversity, toxic waste

When do environmental markets work?

Clearly defined cap: wide coverage

- don’t have to estimate business as usual or baseline
- key actors covered – no leakage from system

Clear measurement and strong compliance possible

- Minimises uncertainty
- Protects property rights in units

When do environmental markets work?

Many actors

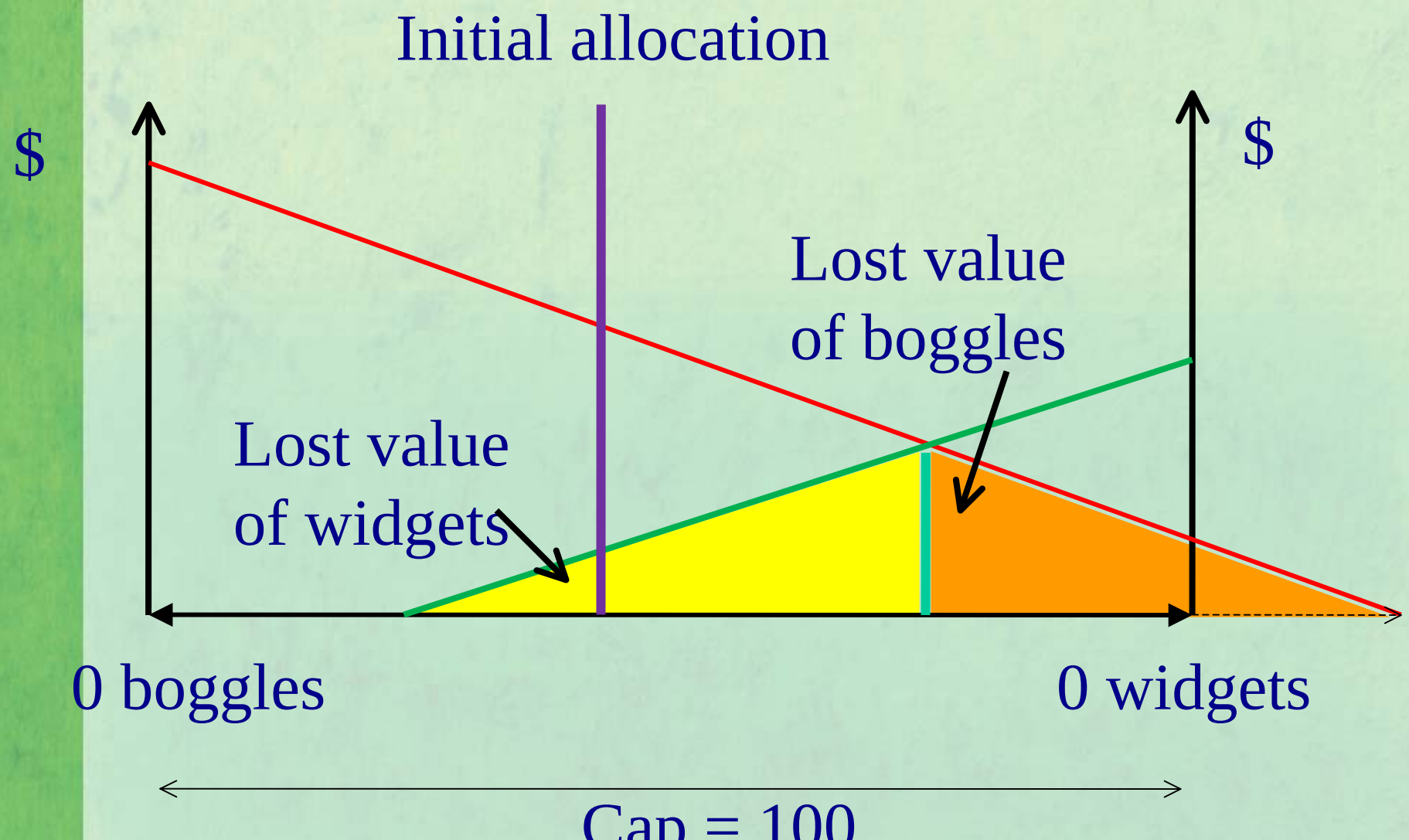
- hard to regulate
- Limits market power

Many different reduction options and technologies

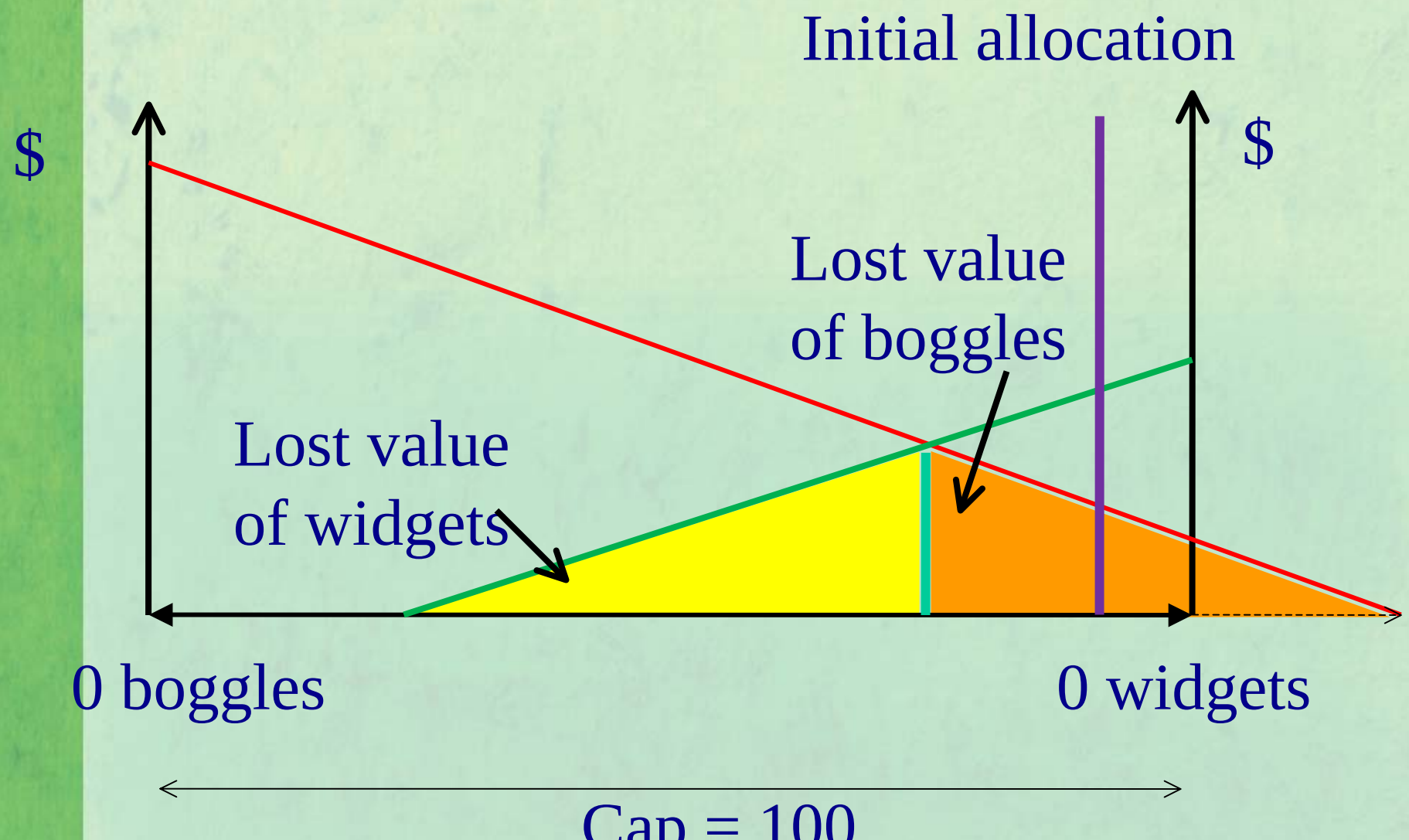
- Very hard for government to pick winners

When separating those who reduce from those who pay is politically important or equitable

Regulation with trading



Regulation with trading



Water Quality in Lake Rotorua

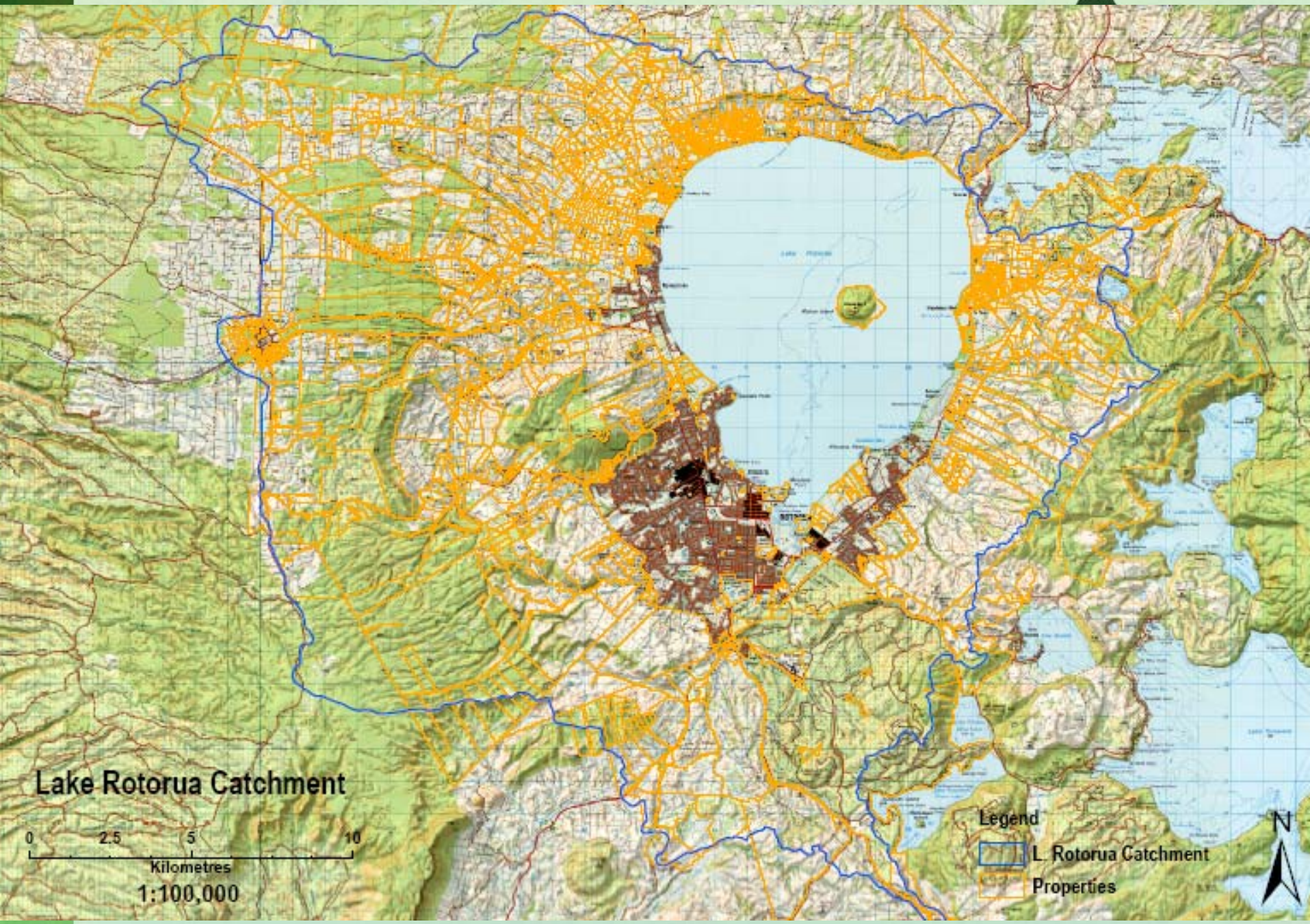
Water quality is declining in Lake Rotorua

- Excess nutrients (N & P) are entering the lake
- Increased frequency of algal blooms
- Affecting recreation, tourism, the ecosystem, NZ's clean green image…

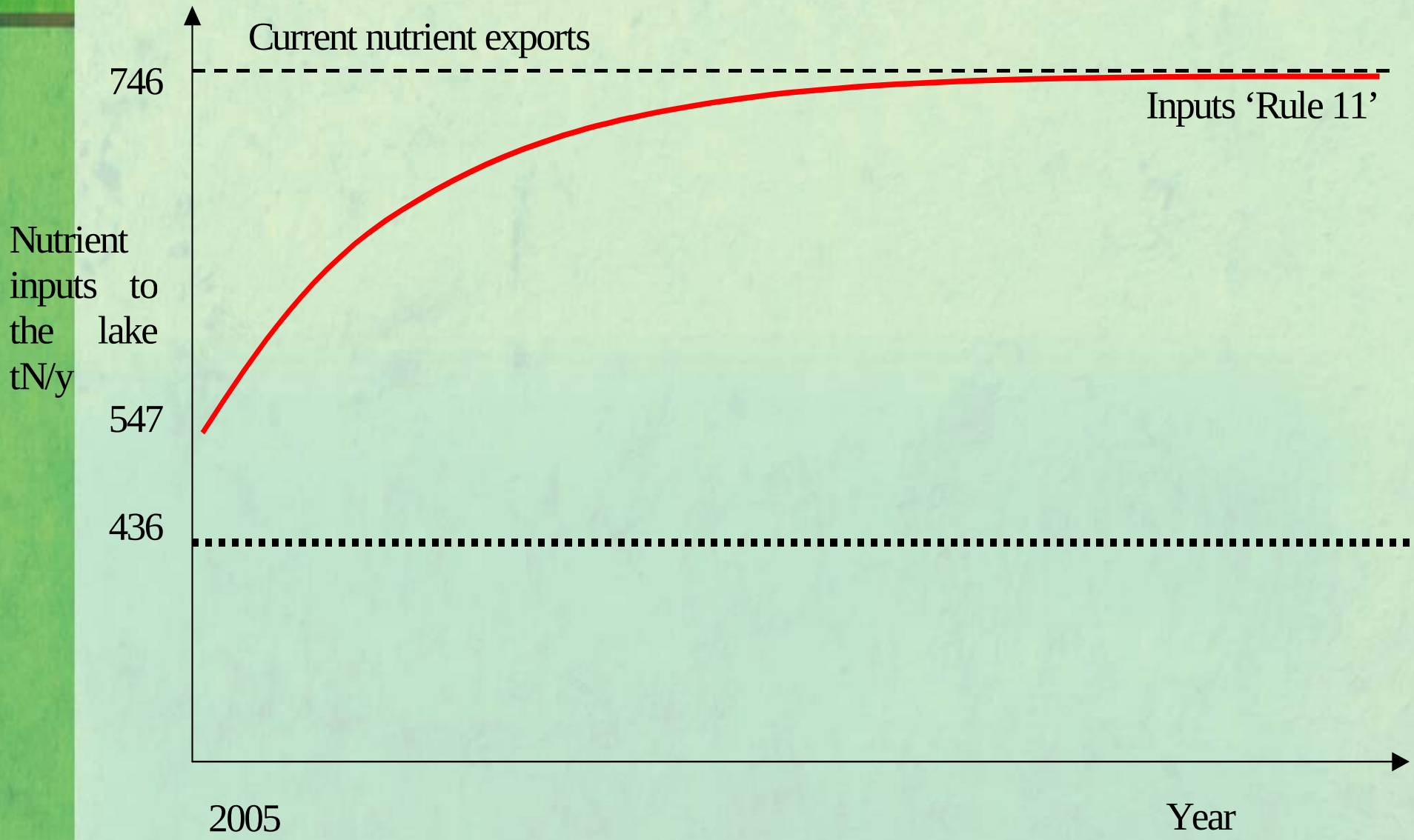
Many of the 'easy' nutrient reduction options have already been undertaken

- E.g. sewage reticulation, land retirement, stream fencing…

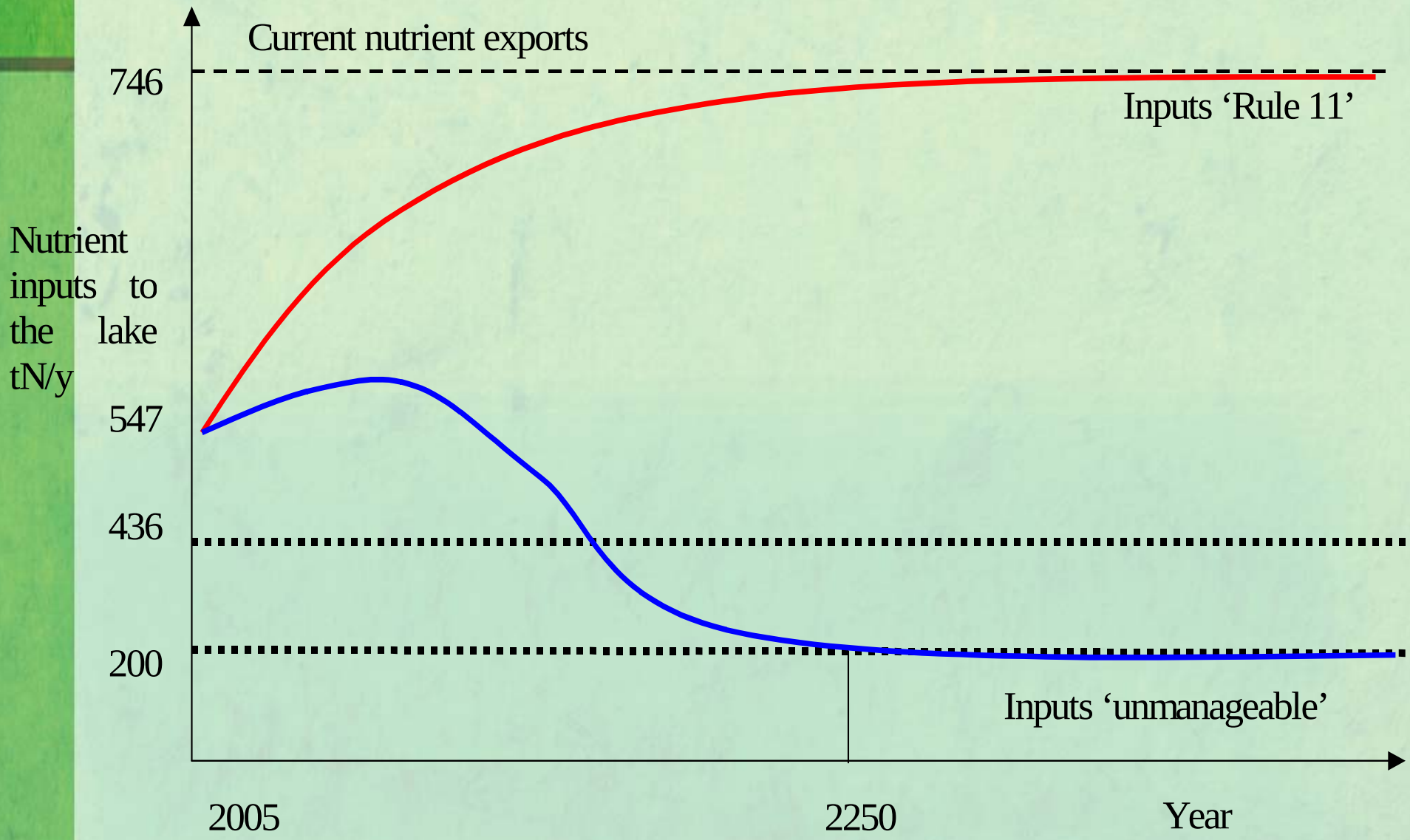
…. BUT nutrient loss is still too high

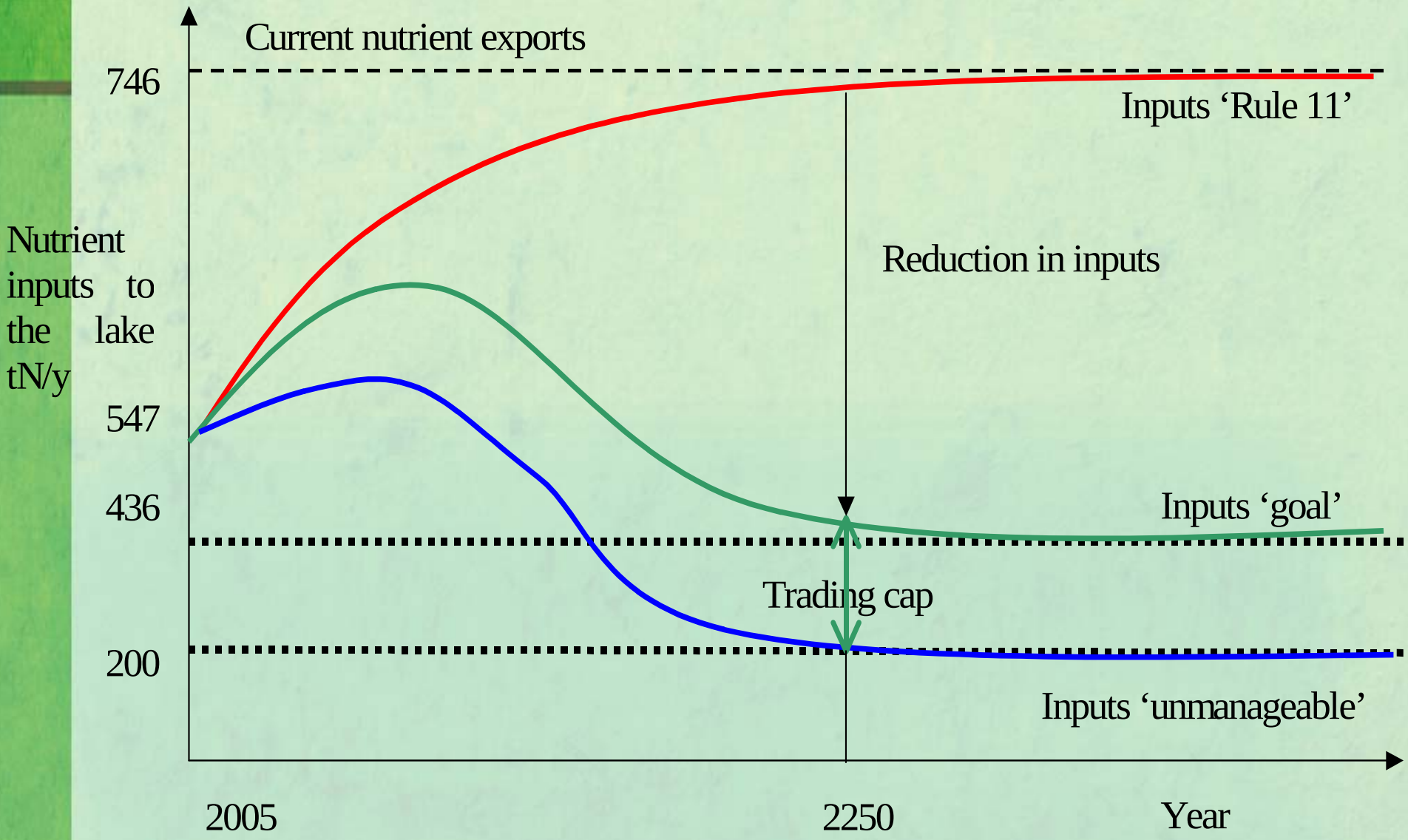

Lake Rotorua Catchment
0
2.5
5
10
Kilometres
1:100,000
Legend
L. Rotorua Catchment
Properties
N

Key feature: large reductions

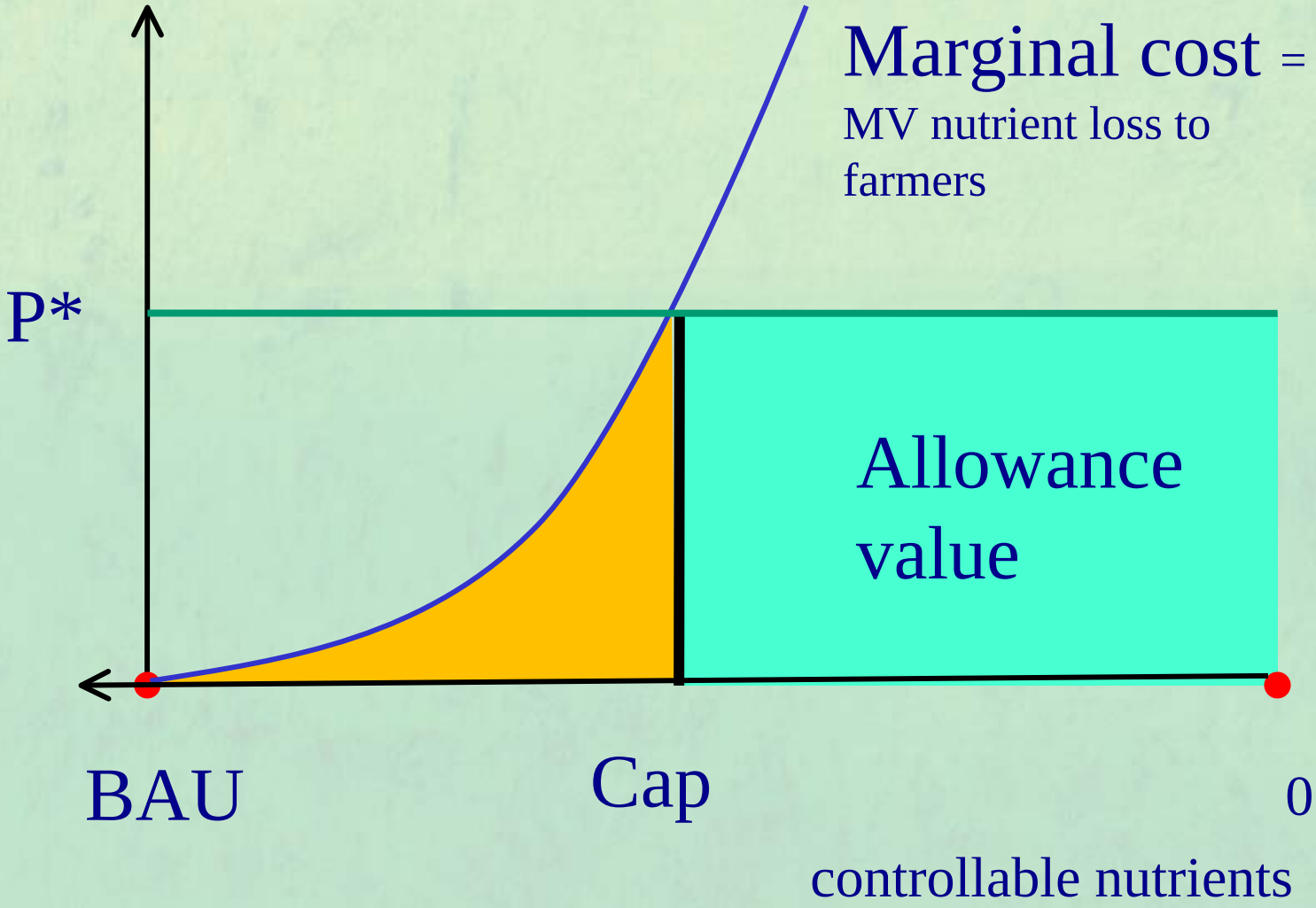


Key feature: long time frame




Current nutrient exports
746
Inputs ‘Rule 11’
Nutrient inputs to the lake tN/y
Reduction in inputs
547
436
Inputs ‘goal’
Trading cap
200
Inputs ‘unmanageable’
2005
2250
Year

Allowance allocation and cost sharing



Allowance allocation determines cost sharing

Landowners pay mitigation costs.

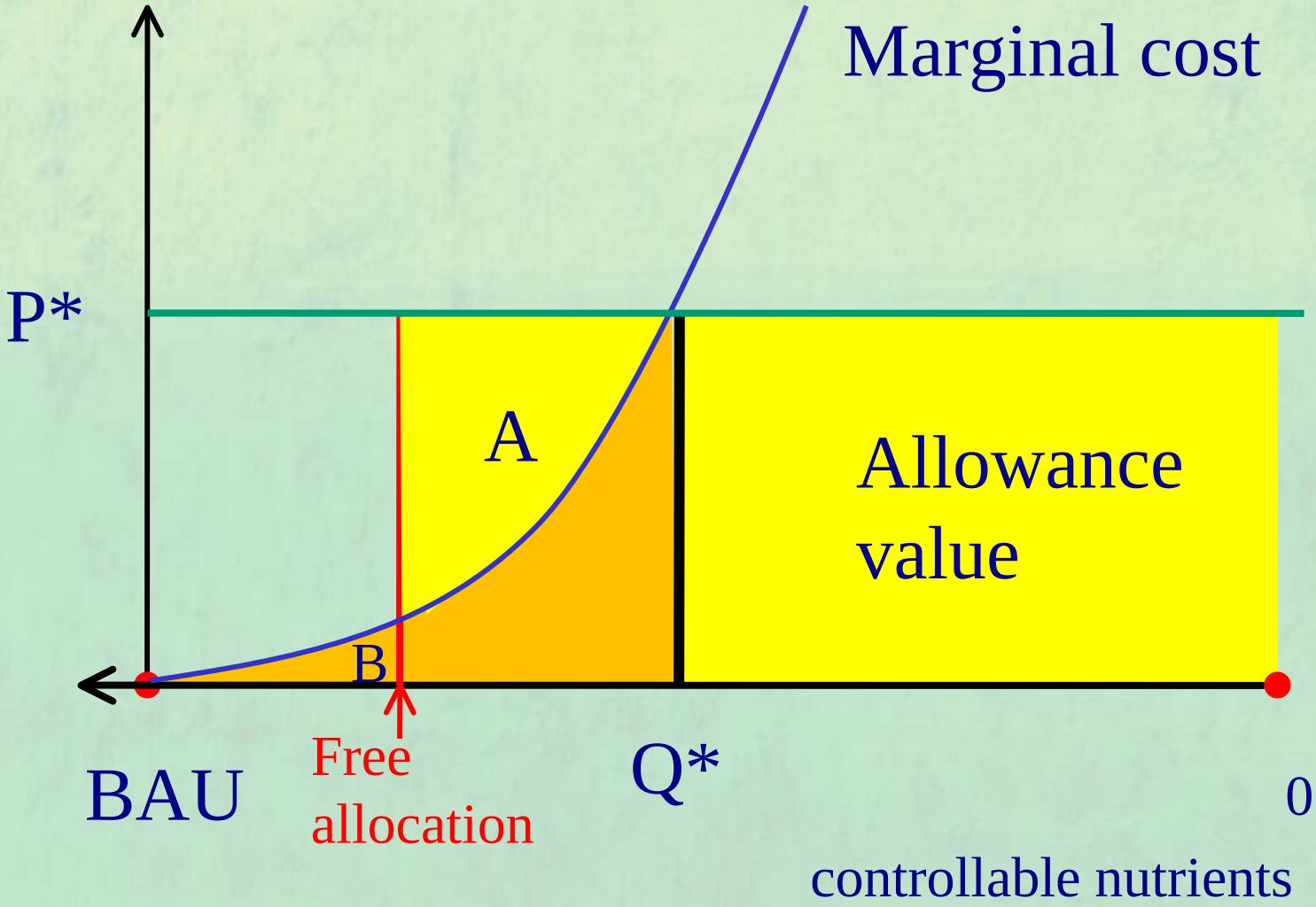
Trading ensures that these are at an efficient level for each source and the total costs are minimised.

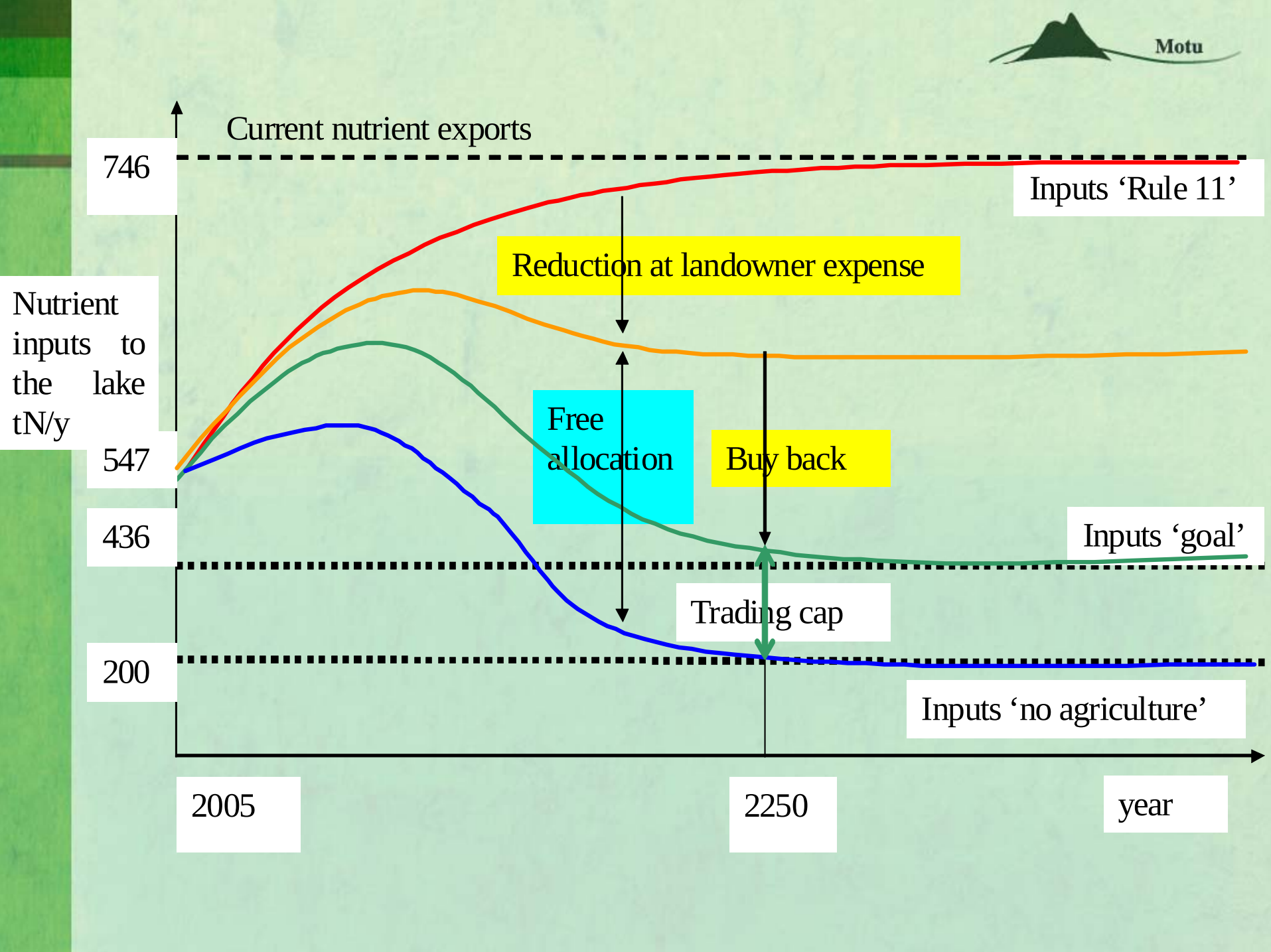
How allowances are allocated determines final cost sharing.

Those who can sell, gain.

Those who need to buy bear extra costs.

Landowners can gain without allocation at BAU emissions

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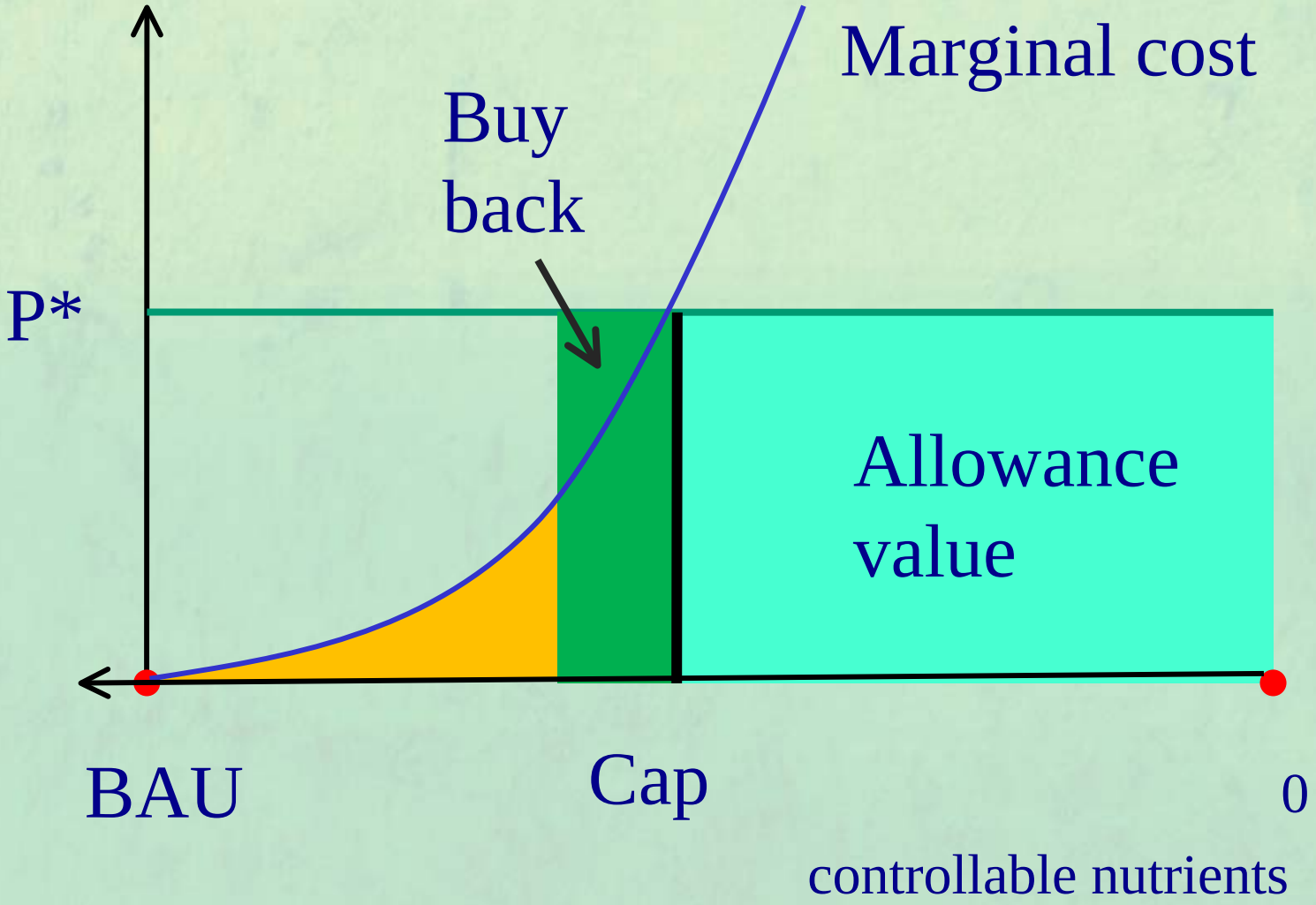
Current nutrient exports
746
Inputs ‘Rule 11’
Reduction at landowner expense
Nutrient inputs to the lake tN/y
547
Free allocation
Buy back
436
Inputs ‘goal’
Trading cap
200
Inputs ‘no agriculture’
2005
2250
year

Translating principles into allowance allocation options



Changes over time

- New scientific information
- Changes in social priorities
- Unanticipated issues

The system needs to be able to evolve to account for these without its basic structure being threatened

For efficient nutrient loss, we need to provide as much investment certainty as possible

Emissions Trading
What is the NZ cap?

- The NZ government has a certain allocation of Assigned Amount Units under our Kyoto obligations.

- These can be supplemented through carbon sequestration.

- If NZ wants to emit more than this, it must buy additional units from the international market.

Measuring emissions

- New Zealand generates a ‘National Inventory’ each year which measures all greenhouse gas emissions and sequestration based on international rules.

- New Zealand must surrender enough assigned amount units to match net emissions as measured in this inventory.

Devolution of obligations and emission units

- A domestic emissions trading system issues emission units to the private sector by sale or gift.
- It makes private actors responsible for
  - Reporting information that can be used to model greenhouse gas emissions from their chain of production
  - Surrendering emission units that match the inferred emissions
  - Claiming emission units to match sequestration

In an all-sources, all-gases system, the total units surrendered will match the national inventory and New Zealand compliance will be assured.

Agricultural Emissions Trading

One option for point of obligation is at farm

- Issue tradable emission units to farmers by sale or gift.
- Make farmers responsible to
  - Report information to model greenhouse gas emissions from their activities
  - Surrender emission units that match the modelled emissions

Reporting and verification

Both nutrient trading and agricultural emissions trading involve emissions that cannot be directly measured

- *Need to determine emissions/nutrient loss through models*
- *for pastoral agriculture both can be done through OVERSEER*

Challenge is to define a model with verifiable data inputs that are not too costly to collect but enable a range of mitigation options

The issue of acceptability of regulation on basis of uncertain, inaccurate science is key

There may be fewer scientifically credible mitigation options for GHG reductions than nutrients – is agricultural emissions trading worth the cost yet?

Managing price risk

- This is a problem until international markets become more stable.
  - Sufficient countries need to establish their own stable rules for trading emission units.
  - The number of countries engaging in international trade becomes more stable and only shifts in relatively predictable ways.
- Currently there are multiple ‘international markets’.
- The prices in some (e.g. the EUETS) are higher than New Zealand may want to bear, at least while we are establishing our trading system.

Two options to reduce domestic price risk

1 Limit international sales

- Price will be lower of two things
  - Price in NZ-only market
  - Price at which we can buy international units

2 Provide a ‘safety valve’

- Government offers unlimited emission units for sale at a fixed price
- Government meets international commitments by buying on international market
- Fiscal risk involved

Things to remember

- An environmental market achieves the environmental goal its cap defines
- Markets work only if compliance is strictly enforced –i.e. property rights protected.
- Cap and trade systems can massively lower the costs of achieving environmental goals.
- Allocation of free units is primarily about politics and equity not efficiency