Cost sharing and allowance allocation in a nutrient trading system for the Lake Rotorua catchment

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Motu Economic and Public Policy Research

Tax Policy Conference 2009

www.motu.org.nz

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Foundation for Research Science and Technology

Environment Bay of Plenty

Ministry of Agriculture and Forestry

Ministry for the Environment

Collaborators

NIWA

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Chapman Tripp

Outline

1. What is a nutrient trading market?
2. What are the costs of nutrient control?
3. Principles for cost sharing
4. Translating principles into allowance allocation options
    a. Between emitters and non-emitters
    b. Among emitters
5. Proposal for cost sharing / allocation
6. Cost sharing as the system evolves

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

What is nutrient trading?

- Set total ‘allowances’ equal to environmental target
- All nutrient sources report their nutrient losses and surrender allowances to match them each year
  - *Nutrient losses are modelled using a model such as OVERSEER*
- Sources with insufficient allowances must buy more on the market
- Sources with excess allowances – possibly because of mitigation actions – can sell
- Can control N and P

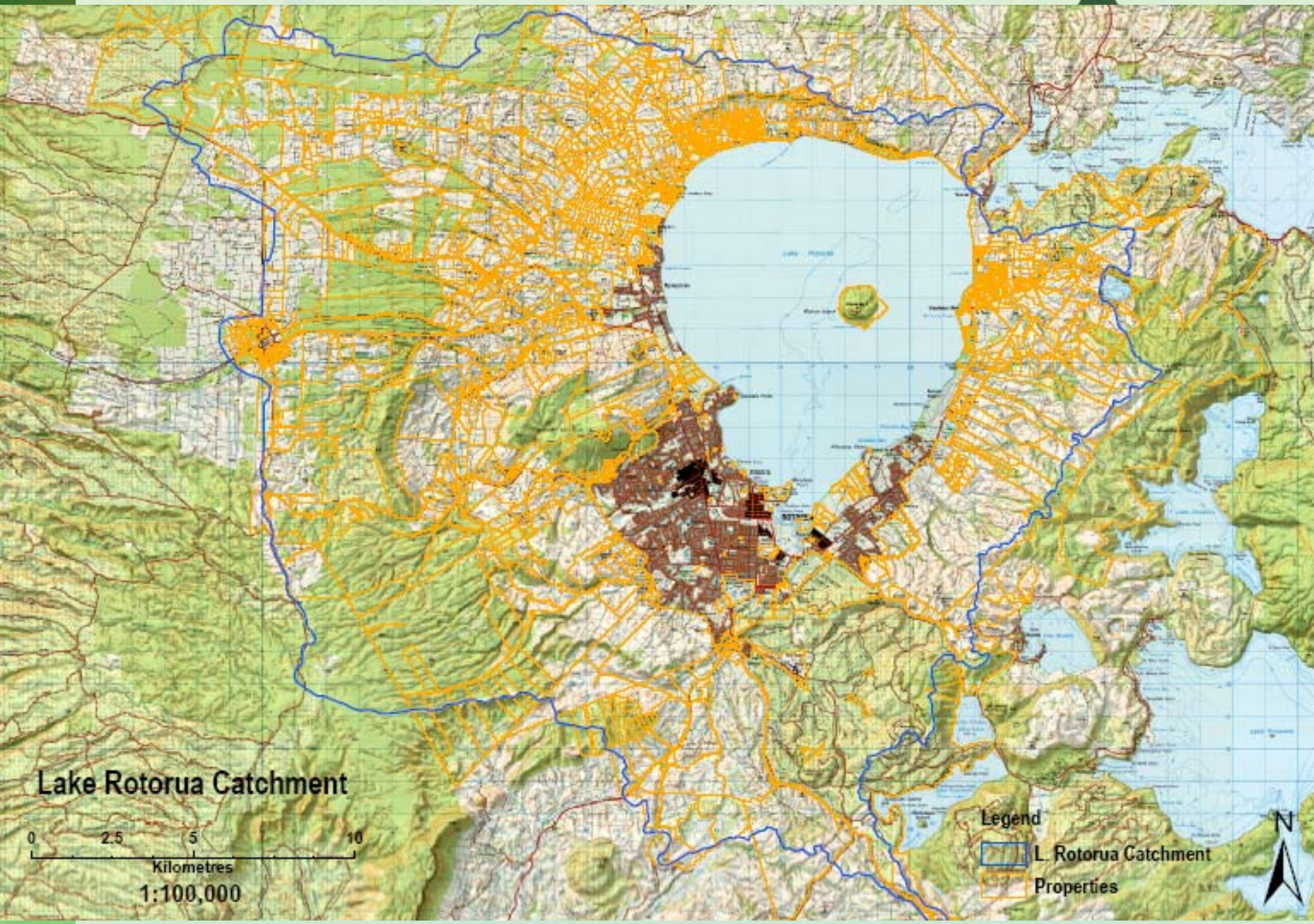
Nutrient trading allows those with high reduction costs to pay those who can reduce nutrients more easily – the environmental goal can be achieved at lower cost.

Prototype developed with stakeholder group input

Why Introduce a Market?

Lake Rotorua has a number of features which would make a nutrient trading system effective

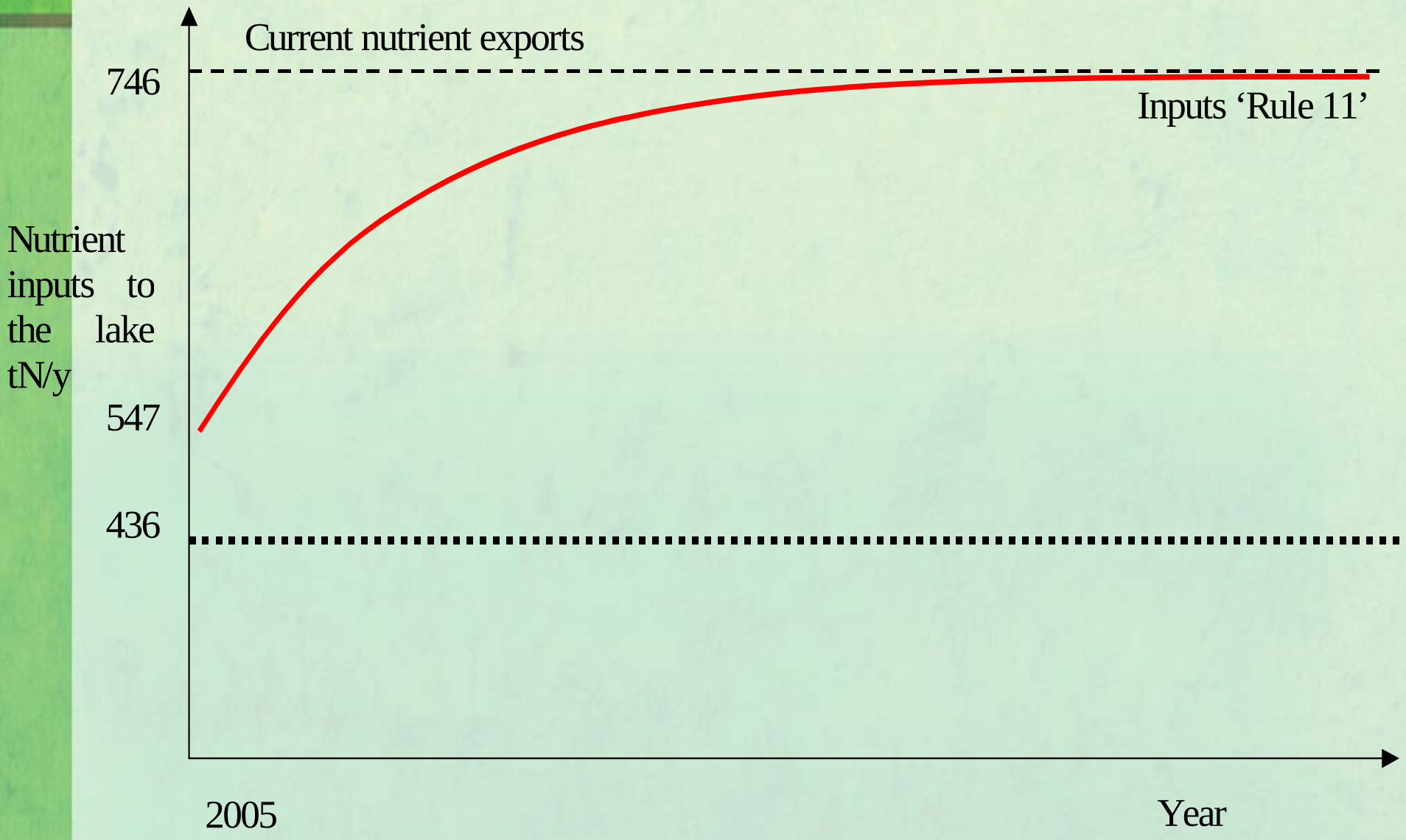
- Many heterogeneous agents (>1000 rural properties)

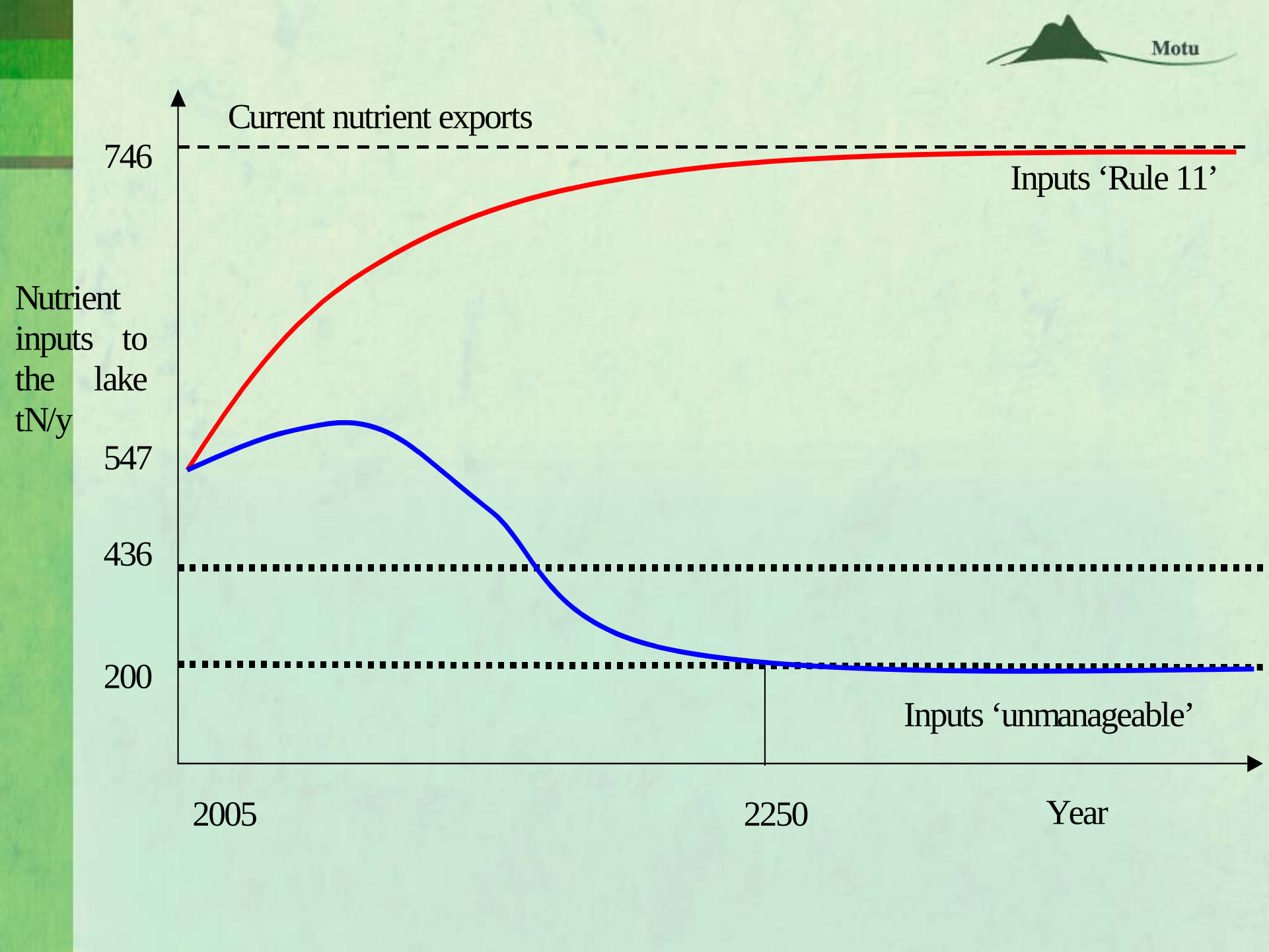

Lake Rotorua Catchment
0
2.5
5
10
Kilometres
1:100,000
Legend
L. Rotorua Catchment
Properties
N

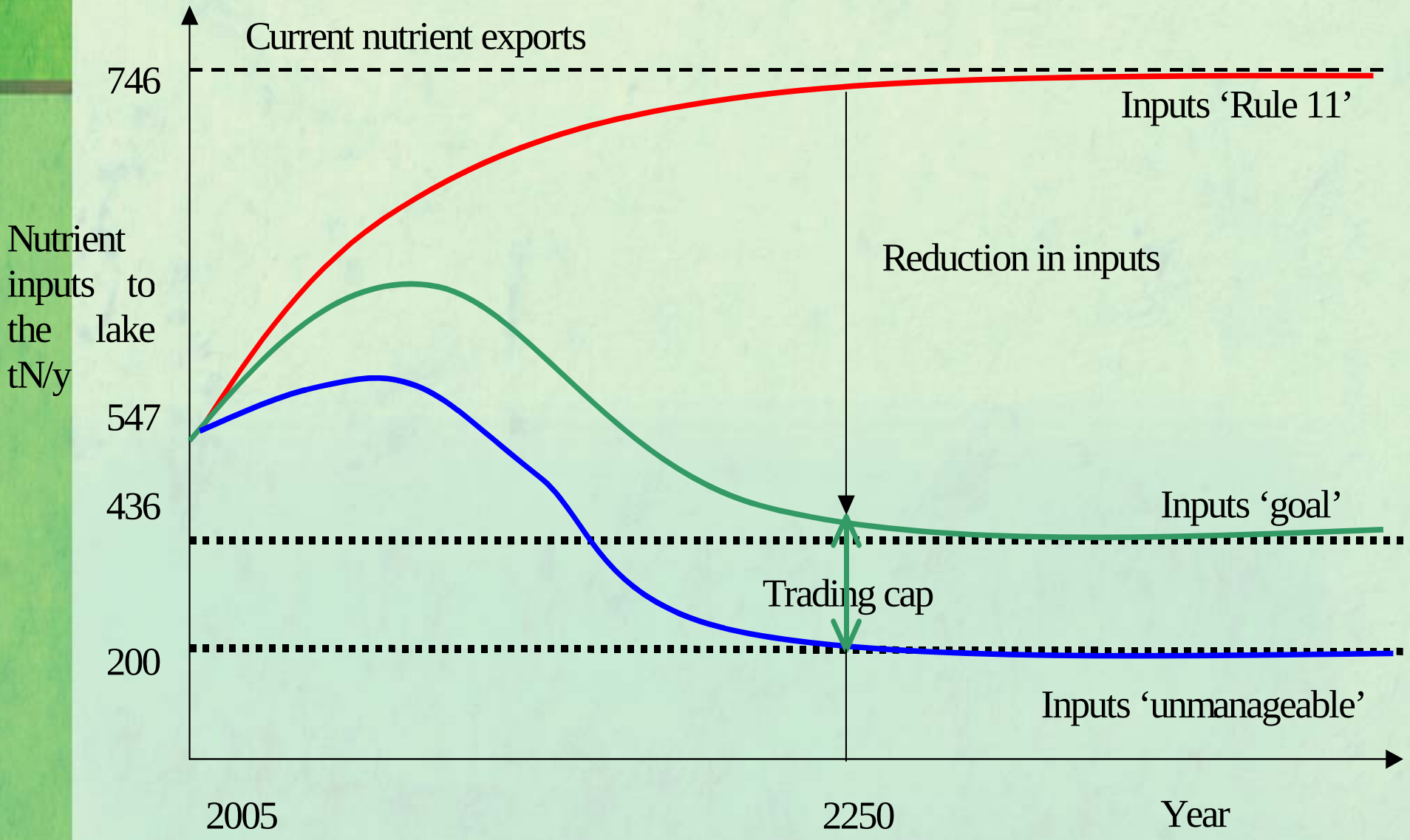
Why Introduce a Market?

Lake Rotorua has a number of features which would make a nutrient trading system effective

- Many heterogeneous agents (>1000 rural properties)
- Many potential abatement options
- Scientific nutrient loss and transport models developed for the catchment
- Water quality targets already set


Current nutrient exports
746
Inputs ‘Rule 11’
Nutrient inputs to the lake tN/y
547
436
2005
Year


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


Motu
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

Costs of controlling nutrients

The existing plan is expected to cost $10m per year and will reduce N by 59 tonnes and P by 16 tonnes.

Annualised costs per kg N in the plan vary from $0.40 - $46.

There are no reliable estimates of the costs of reduction from land use but they are significantly lower than $46 per kg per year.

More flexibility will lower costs.

Cost of controlling nutrients

The existing plan is being funded through rates, and by central government.

Many costs of a trading system would be capitalised in land values

Some costs will be passed on to workers and local suppliers

The emissions trading system will lower the additional costs from nutrient control.

Principles for cost sharing

1 Those who benefit should pay

Within catchment

- those who enjoy the lake directly
- those who get economic benefit from the lake

Out of catchment

- ‘Clean green image’ – exporters
- Those who might enjoy the lake – option value
- Those who like the lake being clean – existence value
- Other catchments – Rotoiti and the Kaituna River

2 Historical polluters should pay

Much of our current problem relates to emissions over the last 50 years

They are reaching the lake only now because of Rotorua's unusual geology

This is a 'polluter pays' principle

The Maori concept of 'utu' suggests that those who advised farmers to intensify should bear responsibility

3 Current polluters should pay

Most current nutrient exports are from pasture – 71%

52% of this is from dairy

Established exotic forestry has the lowest loss per hectare

Horticulture and dairy have very high losses per hectare

4 Landowners have implicit property rights to emit

The value of operating a dairy farm (and therefore the value of polluting) is capitalised into the value of the land.

Removing the right to pollute freely will severely impact land values.

This includes land that is not currently developed but that has potential – e.g. high quality forestry and some Maori land.

5 Other principles

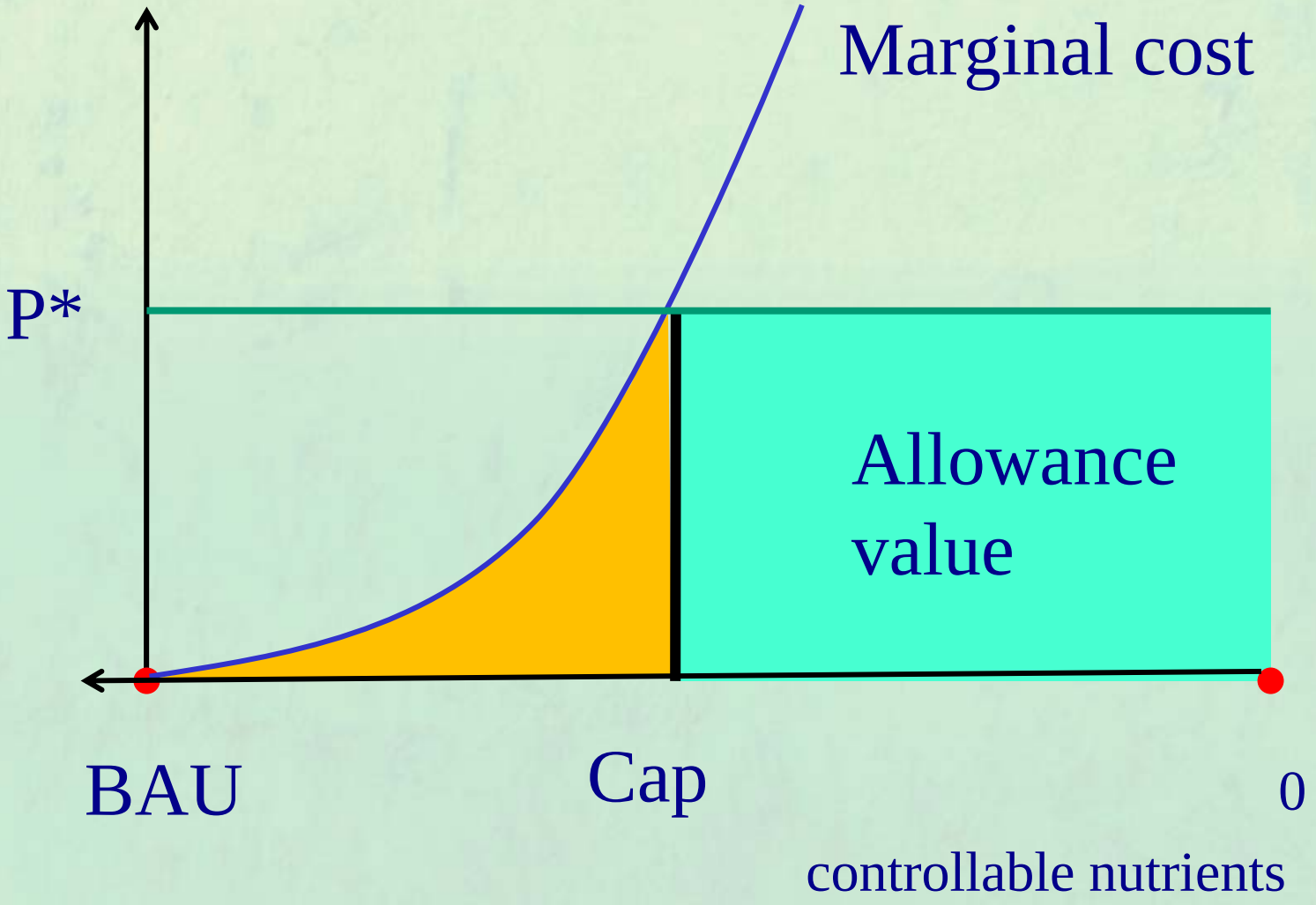
Do not penalise those who have already tried to control nutrient loss

Protect the poor and vulnerable.

The tangata whenua are distinctive in their roles and responsibilities in very iwi/hapu specific ways.

‘Similar’ properties should be treated similarly

Translating principles into allowance allocation options



Allowance allocation determines cost sharing

Landowners pay mitigation costs.

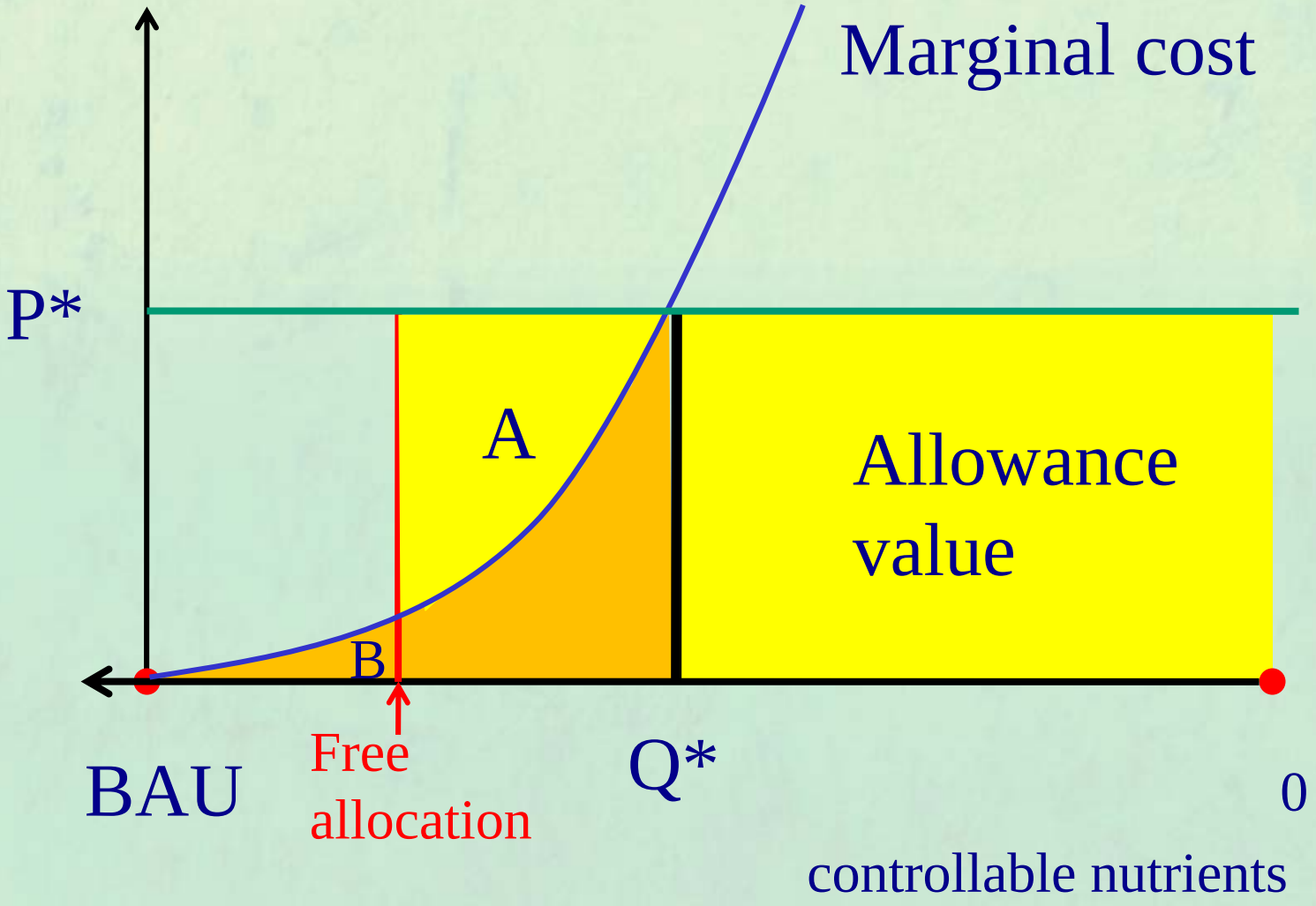
Trading ensures that these are at an efficient level for each source and the total costs are minimised.

How allowances are allocated determines final cost sharing.

Those who can sell, gain.

Those who need to buy bear extra costs.

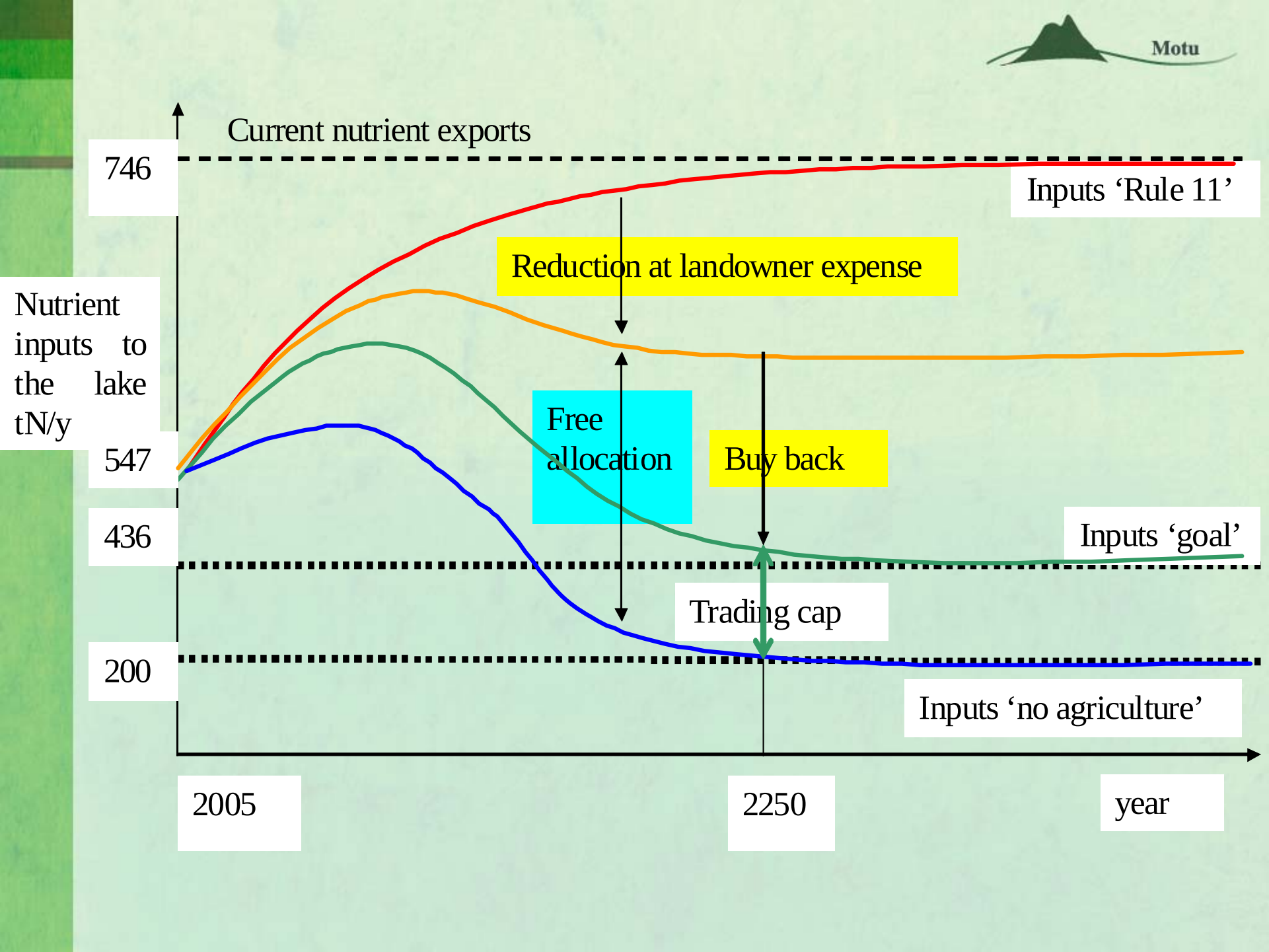
Landowners can gain without allocation at BAU emissions



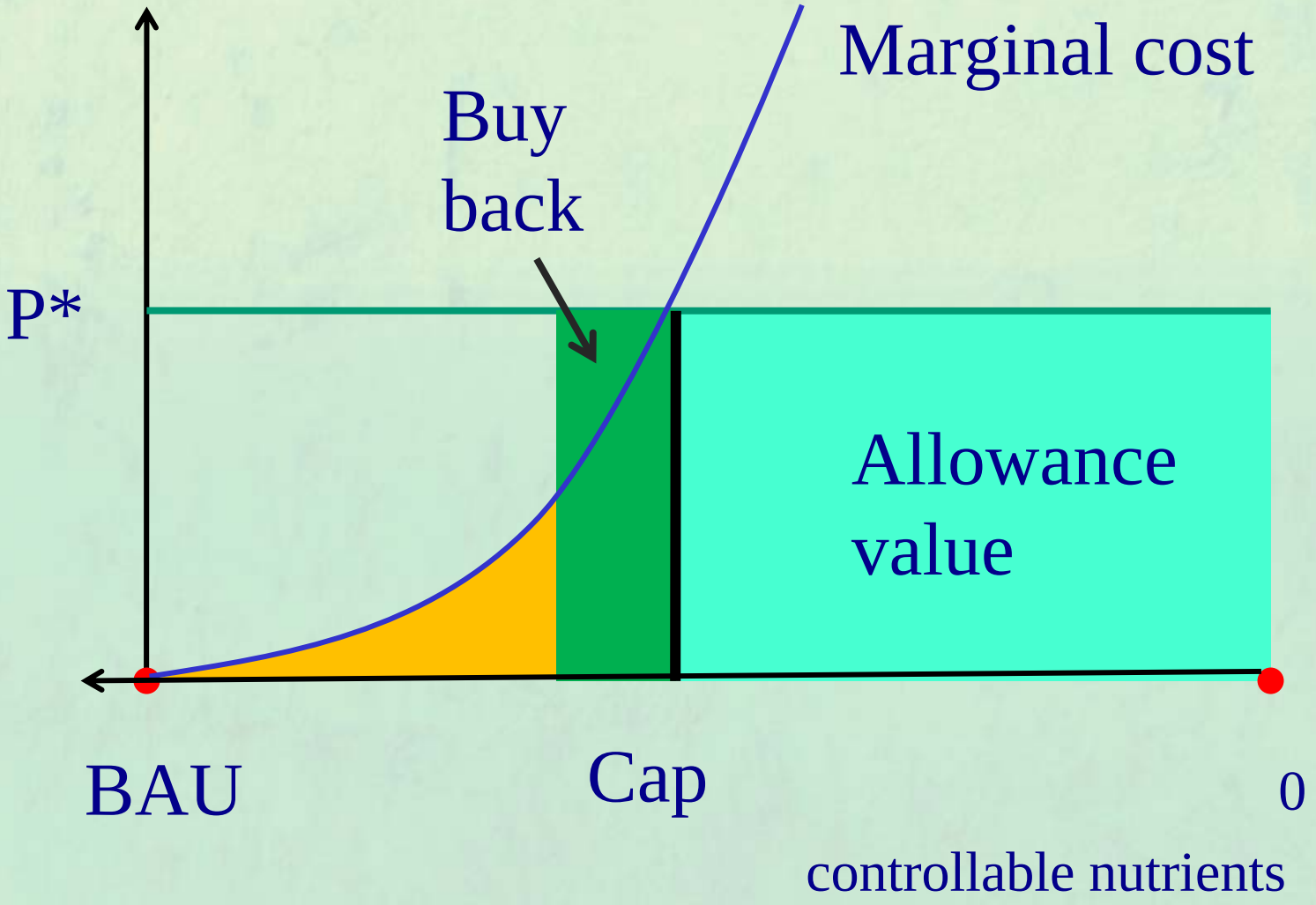
Cost sharing between emitters and non-emitters

Under the polluter pays principle, current emitters should pay part of the cost of reducing nutrient loss

Under principles relating to benefit, historical responsibility and implicit property rights, current emitters should not bear all costs of reducing nutrient loss.


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

Translating principles into allowance allocation options



Cost sharing

- X % District council buy-back
- Y % Regional council buy-back
- Z % National government buy-back
- Remainder – proportional cut across all allowance holders

Cost sharing among emitters

Four main arguments:

Equity

- Compensate for loss in asset value
  - o Capitalisation of direct mitigation costs, lost opportunities and need for efficient level of allowances
- Don’t penalise those who have mitigated

  - ➢ Allocate on basis of potential nutrient loss not just historic nutrient loss

Cost sharing among emitters

Efficiency

- Avoid strategic behaviour
  - Allocate on fixed or historic basis
- Minimise adjustment costs
  - Allocate on basis of current emissions

Proposal: Who receives allowances?

- Initially allocate to current sources based on recent emissions to minimise economic dislocation
- After a few years, transition to allocation on the basis on potential nutrient loss

But if we allocate enough to cover current exports, this will not achieve the environmental goals

Who bears costs of reductions?

- National taxpayers and local ratepayers bear some – historical beneficiaries of pollution and beneficiaries of clean lake
  - Central, regional and local government ‘buy-back’ some allowances from nutrient sources
- Nutrient sources bear some – polluter pays
  - Reduce allowances proportionately relative to initial allocation

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

Changing trading caps

Rules for changes should be announced in advance

- *How much warning of change?*

Who pays for reductions / benefits from expansions?

We suggest

- *Use same principles for cost bearing when changes are made as when initial allocation was done; i.e. X% district council, Y% regional council, Z% central government, remainder by proportional change in all existing allowances*

Changing nutrient loss model

Why change?

- *New information on levels of nutrient loss*
- *New options for nutrient reduction that are not in model*

Who bears costs of change?

- *Landowners should not need to purchase more (or benefit) from continuing same practices. No retrospective penalties / rewards*
- *If total modelled emissions in the catchment rise, use rules for adjusting cap*

Why spread costs of changes in science?

- Impacts could be focused on small numbers of players who cannot avoid the risk
- We want to encourage innovation and reduce resistance to new science
- No efficiency gains and possibly some losses from focused costs
- Equity losses from focused costs


www.motu.org.nz/nutrient_trading
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