WORLD WATER CONGRESS XVI
Cancun 29 May – 2 June 2017

Translating Science into Policy: Setting nutrient limits for agricultural land use

Dr Bryan Jenkins

TRANSLATING SCIENCE INTO POLICY

- Cumulative impacts of diffuse pollution
- Nutrients from agricultural land use intensification
- Sustainability limits reached or surpassed
- Use of New Zealand case studies to identify policy issues
- More effective policies from other jurisdictions identified

SCIENCE OF LAND USE INTENSIFICTATION

- Algal and macrophyte growth and nitrate toxicity in rivers
- Eutrophication and algal blooms in lakes
- Contamination of groundwater used for drinking

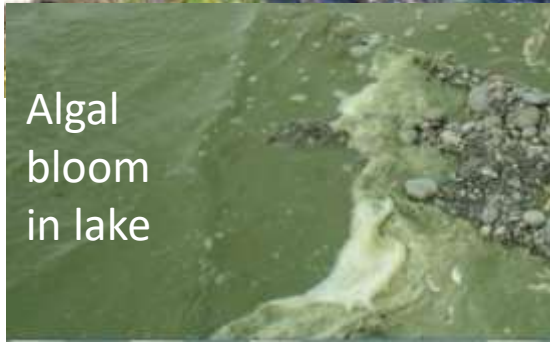
MAIN POLICY INSTRUMENT IN NEW ZEALAND

- Resource Management Act: effects-based legislation
  - enabling resource use while managing effects of activities within environmental limits
- Requires mitigation not elimination of adverse effects
  - cumulative outcome is for increasing degradation of the environment

POLICY FAILURES	ALTERNATIVE POLICIES
Impact assessment at quality limits - Central Plains irrigation scheme	**Demonstration of sustainability** - Arizona ‘Active Management Areas’ - Sydney ‘neutral or beneficial effect’
Cap-and-Trade markets to reduce load - Lake Taupo nitrogen discharge allowances	**Mitigation cost recovery strategies** - Murray Darling Basin salinity management
Allocation of scarce capacity - Grandfathering for Hurunui catchment - Modelling changes for Wainono Lagoon	**Reallocation incorporating equity** - South African water legislation

CENTRAL PLAINS IRRIGATION

- Irrigation scheme proposed in catchment where nitrate standards already exceeded
- Project consented because of economic benefits and effects considered “minor”
- High standard of nitrate management required to mitigate adverse effects



CUMULATIVE EFFECTS ANALYSIS

- **Current load to lake from existing land use**

  - 2,650 tN/y

- **Equilibrium load (allowing for groundwater time lag)**

  - 4,100 tN/y

- **Addition of Central Plains (and other consented areas)**

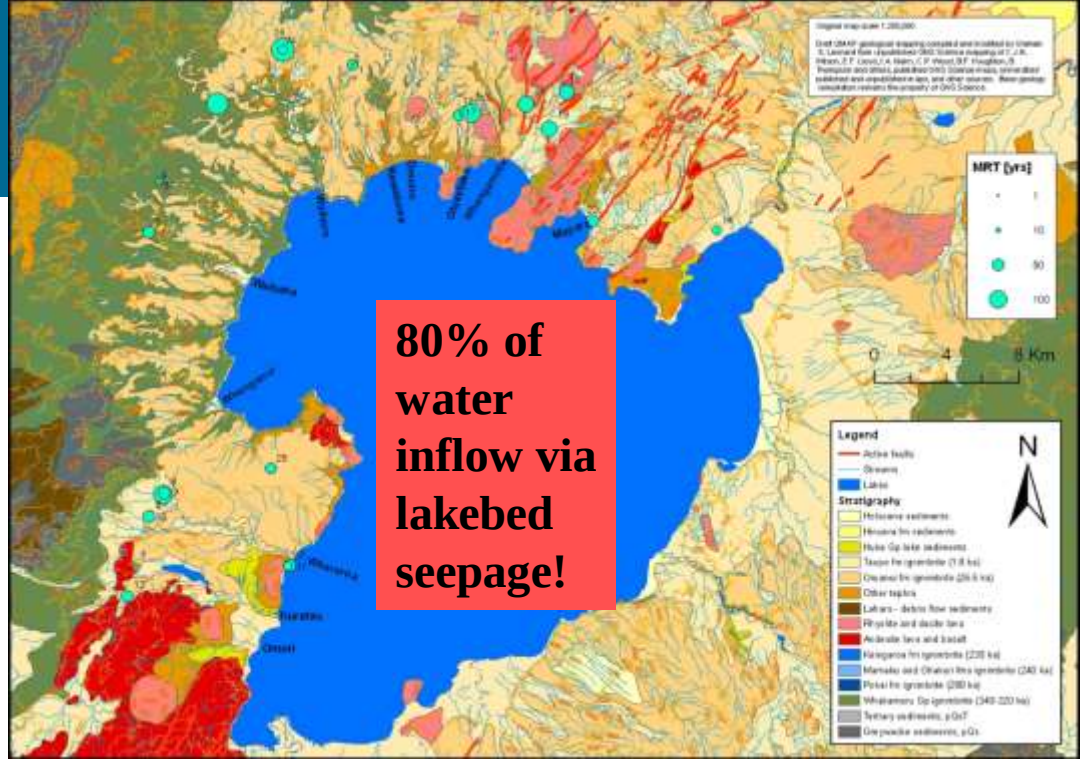
  - 5,600 tN/y

DEMONSTRATION OF SUSTAINABILITY RATHER THAN EFFECTS MITIGATION

- **Arizona Groundwater "Active Management Areas"**
  - demonstrate water of sufficient quantity and quality available for 100 years
  - demonstrate consistency with AMA management plan
- **Neutral or Beneficial Effect: Sydney Water Authority**
  - if water quality does not meet acceptability criteria
  - then consent refused unless development has neutral or beneficial effect

LAKE TAUPO NITROGEN CAP AND TRADE

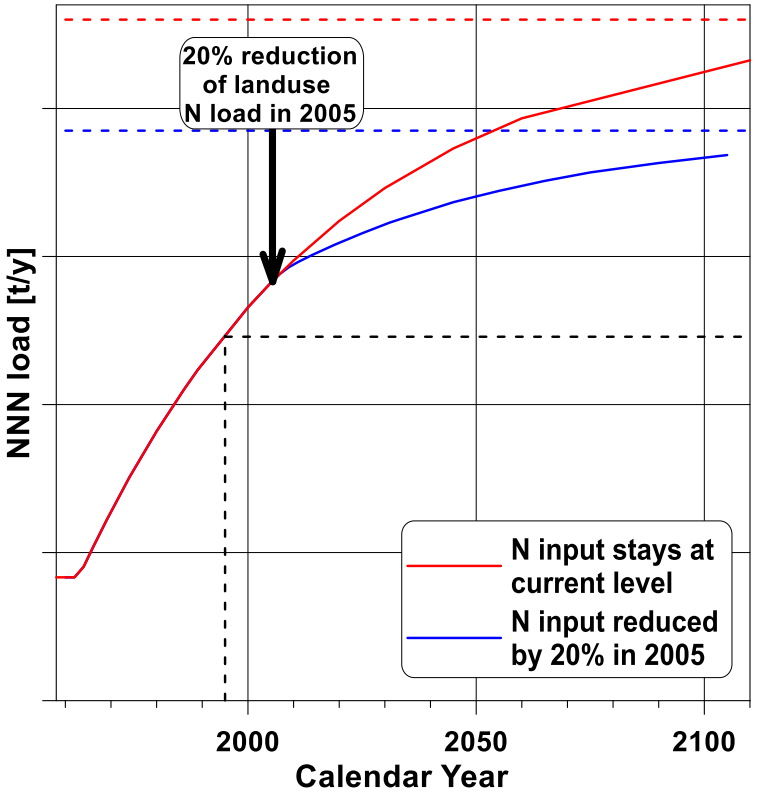
- NZ's largest lake: sensitive to nitrogen
- Groundwater source from land use intensification
- Load increase from 650 to 1350 tN/y
- Goal to return of 2001 levels



- Cap and trade approach with nitrogen discharge allowances
- Trust established with $81.5m of taxpayer funds to stand in the market if needed

OUTCOME OF CAP AND TRADE

- 20% reduction in NDAs achieved
- 90% of reduction by taxpayer funds
- However cap set too low:
  underestimate of load still to come
- Policy failure
  - water quality target will not be achieved
  - taxpayer not polluter paying the cost



MITIGATION COST RECOVERY
Murray-Darling Basin Salinity

- New actions putting in salt and delayed actions increasing salt offset by actions to reduce salt
- Two salinity registers
  - new actions / delayed actions

- Annual salinity accounts of debits and credits associated with increases and decreases in salinity
- Cost of achieving credits recovered from those creating debits
- Reduction in salinity from 1050 EC units (1988) to 710 EC units (2015)

EQUITY IN ALLOCATION OF NUTRIENT CAPACITY
Hurunui Catchment

- **Nutrients at sustainability limits**
  - Constraint on nutrient release
  - Limit of 10% increase in current load (grandfathering)
- **Equity concerns**
  - sheep/beef with low loss rates highly constrained
  - dairy farmers with high loss rates given greater capacity
  - new entrants only if existing users reduce

EQUITY IN ALLOCATION OF NUTRIENT CAPACITY
Wainono Lagoon

- Goal to reduce trophic level index
  from 6.5 (hypertrophic)
- Farmers accepted need for nitrogen reduction
  but rejected “grandfathering” for allocation
- Negotiated agreement to create headroom for
  new entrants and flexibility for low emitters
  by capping high emitters
- Updates to model to estimate nitrogen loss rates
  varied allocation calculations and reignited debate

REALLOCATION UNDER SCARCITY – South African Water Act

- **Water quality or quantity at sustainability limits**
  - reallocation on the basis of merit not existing use rights
  - inefficient use and high rate of discharge constrain resource productivity and increase environmental impacts
- **Reallocation for (a) equitable allocation, (b) beneficial use, (c) efficient management, (d) protect water quality**
  - factors considered: lawful uses, investments made, past discrimination, socio-economic effects, catchment strategies, effects on resource/users, water quality, strategic importance, future resources, international obligations

CONCLUSIONS: SCIENCE AT SUSTAINABILITY LIMITS

- **Policy for Development Assessment processes**
  - compliance with regional sustainability strategy
    rather than assessment to ensure effects are minor
- **Policy for economic instruments**
  - mitigation cost recovery charges for polluter pays
    rather than cap-and-trade in discharge allowances
- **Policy for equity in allocation**
  - merit-based reallocation among existing and future users
    rather than first-come/first-served and existing use rights