

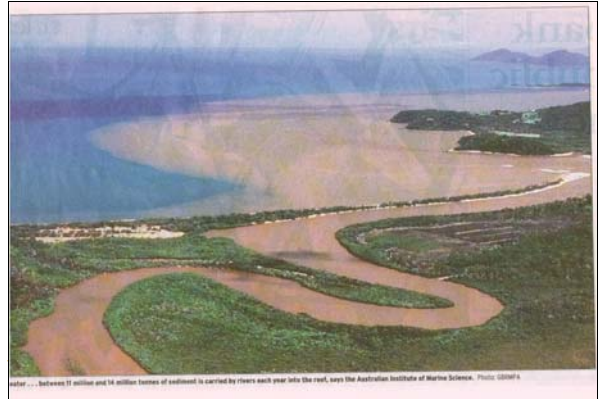
## Recent experiences in nutrient trading in Australia & internationally

New horizons in market-based instruments  
Symposium, 11 November 2005



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## Water quality problems are abundant!!



## Main drivers for nutrient trading

- Deteriorating water quality & failure of traditional approaches to manage cumulative impacts
  - willingness to risk new approaches
  - success with tradeable rights for natural resources & success of air emission trading schemes
- Concern over cost to governments as;
  - Increasing cost of 'end-of-pipe' solutions for public utilities
  - Increasing significance of diffuse source loads and concern over budgetary cost if pursue through traditional support programs
- Environment agencies having little control over diffuse sources
  - Trading seen as way to engage diffuse sources

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## Extent of nutrient trading

- Interest & investigations in many countries
- Active trading schemes limited to:
  - US - several
  - Canada – South Nation
  - Netherlands – Manure production quota scheme
  - Australia
    - South Creek Nutrient Trading Scheme
    - NSW Green offsets - SCA development offsets (proposed)
    - Recent investigations by SA (Port Waterways) & Qld (Moreton Bay)

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## State of play

- As was the case with air emission trading schemes, nutrient trading is evolving
- Instructive to have a brief look at US & Australian experiences
- Then some observations and comment on likely next steps in Australia

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## US *nutrient trading* *schemes under the* *TDML program*

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## Drivers for nutrient trading in US

- Clean Water Act requires States to license large point source discharges
  - Early point-point 'effluent trading', typically between WWTPs
  - Now increased focus on engaging diffuse sources
- More recently, CWA requires States to develop TMDL strategies for 'impaired' waterways
- TMDL = total maximum daily load of pollutants that can enter a waterway and still comply with water quality standards
  - Can be expressed as daily, seasonal or annual loads

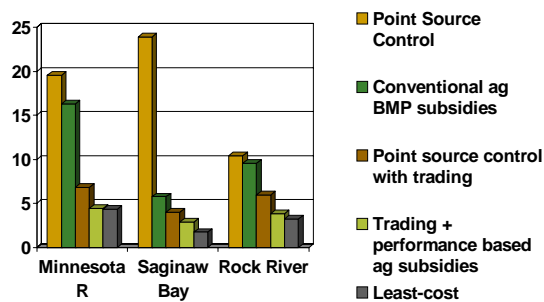
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## TMDL to further drive nutrient trading

- TMDL requirements do not provide means for action, but significant penalties for States that do not develop effective strategies
  - Water trading seen as way to minimise compliance costs
- US EPA WQ trading policy (draft in 1996; final 2003); WQT Guidebook (2004); & support for State initiatives
- Studies, supported by increasingly sophisticated modelling, predict substantial gains from trade

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## Cost-effectiveness of US nutrient trading schemes (\$/lb Phosphorus)



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## Experiences with actual trading discouraging

- TMDL typically allocated to:
  - individual point sources & supported through EPA licensing
  - diffuse source sectors & supported by BMP programs, etc
- By 1999, some 25 trials had been initiated, ballooning to around 70 by 2004
  - but only a handful of schemes have recorded trades & the number of trades in turn has been few
  - several schemes require offset payments to a State fund that sponsors diffuse controls (akin to a hypothecated tax)

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## Barriers to more widespread trading

- Limited demand as weak, vague & largely unenforced discharge restrictions on point sources
  - TMDL process has been slow
- The greater cost-effectiveness of on-site abatement compared to those forecast
- Difficulties negotiating diffuse offsets due to:
  - Red-tape
  - Culture of beneficiary pays
  - Regulatory 'gaming' - farmers are not keen for government to confirm low-cost abatement opportunities & heighten the likelihood of regulation

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## NSW South Creek Nutrient Trading Scheme

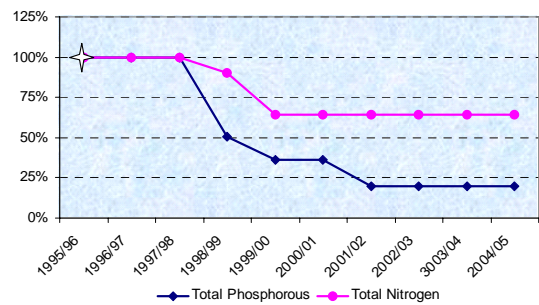
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## South Creek Nutrient Trading Scheme

- South Creek is a tributary of the Hawkesbury-Nepean in Western Sydney – a key population growth area
- Initial introduction of a '*bubble licensing scheme*' focusing on 3 WWTPS
- Bubble Licence introduced in 1996 set aggregate phosphorous and nitrogen load discharge limits across 3 wastewater plants run by Sydney Water & mandated:
  - 83% reduction in total P
  - 50% reduction in total N

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## Load limits under the South Creek Bubble License



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## Performance of Bubble license

- Under Bubble upgrades to only 2 plants
  - ... saving \$45m relative to tradition regulatory approach
- Discharges have been kept within licence limits
  - but due to substantial urban growth in area further upgrades would be required to maintain compliance with Bubble load limits
  - marginal abatement costs at plants now very high
  - diffuse source loads such as agriculture & stormwater now dominate & thought capable of providing low cost abatement

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## Costs of reducing phosphorus loads

- Effluent management at dairies \$9/kg/year
- Runoff detention at market gardens \$12/kg/year
- Manage stock access at dairies \$14/kg/year
- Modified fertiliser use at mkt gardens \$17/kg/year
- Grassed drains, diversion banks & filter strips at market gardens \$35/kg/year
- **Upgrading sewage treatment plants \$10,000/kg/year**

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## Piloting diffuse source offsets

- Sydney Water can now purchase offset credits as a means to comply with licence discharge limits
  - Government has signalled that urban developers will in future need to offset discharges
- Trading ratios established to account for differences in water quality impacts, uncertainty around estimating diffuse source nutrient generation rates, & a risk margin
- Sydney Water & Landcom working with EPA to trial offsets
  - have committed \$100,000 & \$50,000 under a 2 year trial
  - 9 offsets have been contracted to date - include wetlands, fencing off creek banks and reductions in fertiliser & water use

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## Pollution Offsets for the Sydney Drinking Water Catchment

- Consultation on draft Statutory Environment Plan in 2004
- Requirement for significant developments to have a 'neutral or beneficial' impact by offsetting any additional sediment or nutrient pollution
- All normal planning requirements must be met
  - Best management practice must be adopted & pollution minimised first on-site
  - Only unavoidable, residual impacts may be compensated for using offsets
- Trading ratios developed of between 1.5 – 3 : 1
- Duty of care proposed for offsets

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## Physical, financial or combination offsets

- Offset guideline developed & available on-line
- Offsets may be:
  - performed by the developer
  - contracted by the developer (under SCA supervision)
  - paid for by the developer in accordance with a contributions schedule to an 'Offset Bank', initially administered by SCA
- Aggregation of contributions allows larger and more cost-effective pollution abatement programs to be implemented
- Enforcement via the development consent process & licensing

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## Observations on nutrient trading experiences

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## Range of market structures

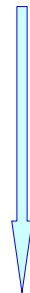
- Market structures commonly thought of as either point-point or point-diffuse
- But array of factors pertinent to market structure:
  - point versus diffuse sources
  - licensed versus unlicensed sources
  - existing versus new sources
  - few versus many participants
  - opportunistic versus statutory targets
  - permit versus offset trading
  - intermediaries (brokers / offset banks)
  - case-by-case or rules based trading / approvals

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## Range of tradeable rights instruments

- Fee offsets
- Development offsets (opportunistic)
- Licensing offsets
- Bubble scheme (with / without offsets)
- Mandatory development offsets
- Point source permit trading
- Point source permit trading with offsets
- Point & diffuse source permit trading scheme

Increasing  
complexity,  
less  
opportunistic



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## But scale is generally small

- In contrast to US air emission trading schemes
- Rarely more than a few WWTPs
- Commonly 1 WWTP with several diffuse source offsets
- Majority are of a pilot or demonstration nature, often with Federal funding
- Emerging schemes in response to TMDL program likely to be more significant

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## Increasing focus on diffuse sources

- Shift to point-diffuse trading due to significance of diffuse loads and lower cost abatement
- But no initiatives have introduced statutory limits on existing diffuse sources – ie, diffuse sources such as agriculture only participate voluntarily
- Notably the Lake Dillon scheme has introduced statutory limits on new diffuse sources

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## Environmental equivalence

- Refers to the difference between the impacts of nutrient discharges from different sources on an environmental amenity
  - Say due to location, type of discharge, timing, etc
- Use of trading ratios to promote equivalence of trades
- Trading ratios often increased to account for scientific uncertainty and compliance risks
- Ratio between diffuse and point sources typically 2:1, but often higher
- Move in US to 'rule-based' equivalence rather than establishing on a case-by-case basis

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## Use of intermediaries

- Trading mechanisms are increasingly shifting from bilateral to more complex mechanisms – eg: use of offset banks & brokers
- Governments often establish Boards for this purpose, usually with community and industry representation
  - act as clearing houses for offset credits
  - in some instances review & approve offsets
  - helped in engaging rural participation
- Increasing interest in potential market overlaps, where multiple credits (nutrients, wetland mitigation, carbon) may be generated by a single action

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## Important to craft schemes for local context & plan evolution - key considerations are:

- potential for early gains from point sources
- knowledge base, especially to handle issues of environmental equivalence & shift to rules-based trading
- regulatory skills & culture to develop & administer more complex structures
- integration of sources regulated under different statutes &/or by different agencies / levels of government
- stakeholder & political support for setting statutory limits on diffuse sources

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## Main barriers to more schemes

- Potential markets too 'thin' or trade benefits too small if restrict to point sources
- Requirements to extend to diffuse sources
  - information & tools costly to define, monitor & enforce tradeable rights for diffuse sources given spatial and temporal issues
  - difficulty / risks in establishing environmental equivalence
  - cost sharing / equity → politics of statutory limits being imposed over diffuse agricultural sources of pollution
- Cultural / skills:
  - regulated sources have 'compliance' mentality & skills base for end-of-pipe solutions
  - rural diffuse sources culture of 'beneficiary-pays'; low costs / benefits; lack of skills & capital

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## Next steps in Australia

- Establish water quality goals, targets & load budgets
- Identify opportunities for point source trading
  - pre-requisite is a shift to load-based licensing
- Promote opportunities for diffuse offsets
  - research to establish environmental equivalence
  - regulatory change to facilitate offsets for licensing compliance
  - regulatory change to mainstream in development processes
  - develop skills in identifying & developing offsets, & supporting trading infrastructure
- Investigate potential for coupled environmental products into multiple environmental markets

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*Thank you*

*Drew Collins*



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