# PHOSPHORUS TRADING & WATER QUALITY

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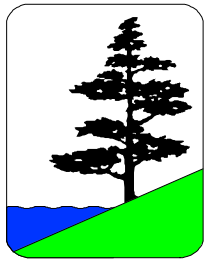
## The Total Phosphorus Management Program (TPM)

Environmental Law Institute
Washington, DC
July 11-12, 2005



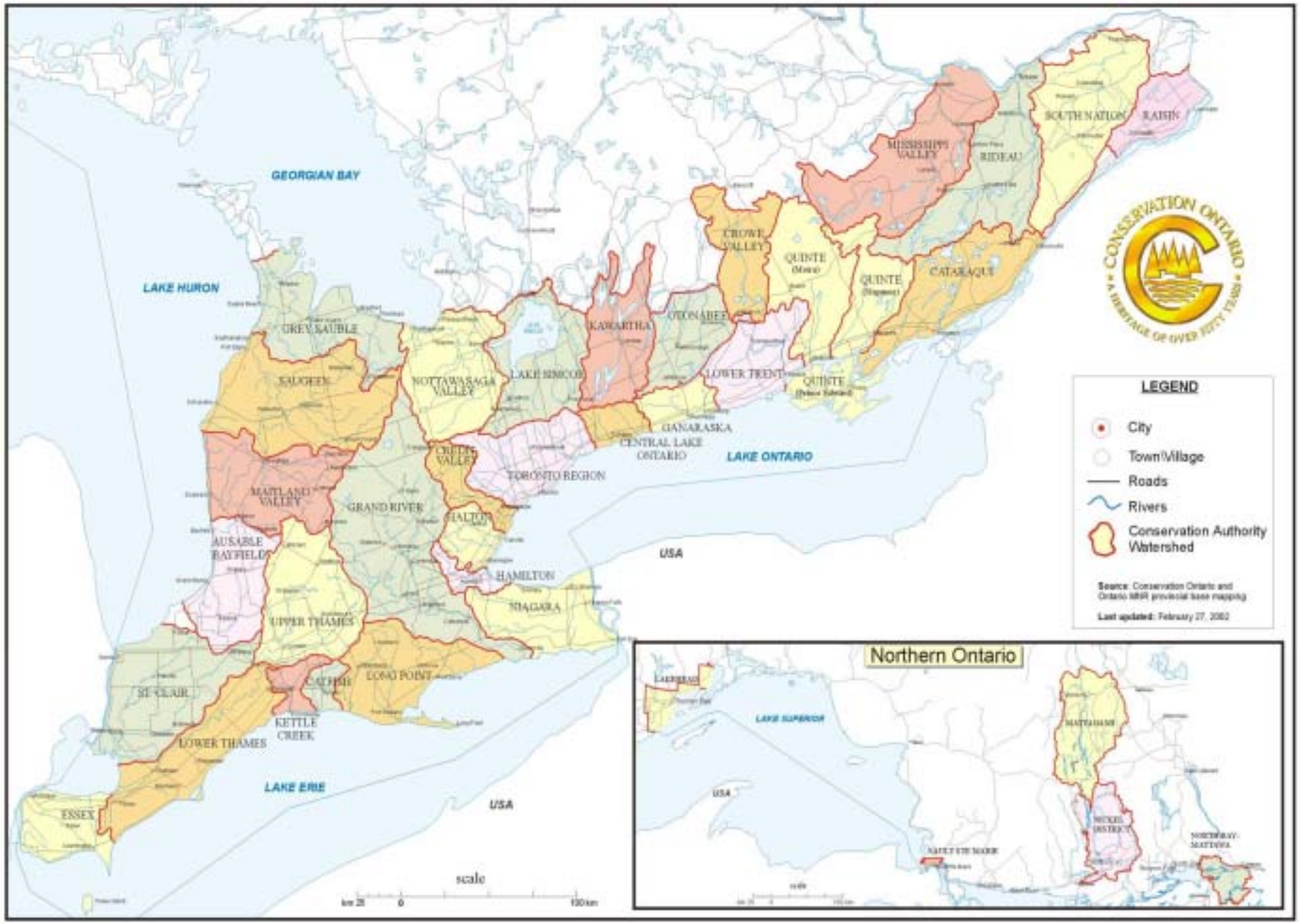
SOUTH NATION
CONSERVATION
DE LA NATION SUD


ONTARIO
CANADA
N
LEGEND / LÉGENDE
International boundary / Frontière internationale
Provincial boundary / Limite provinciale

# SOUTH NATION RIVER WATERSHED

- 4,000 sq. km.
- 180 km long
- 80 m elev. drop
- 15 municipalities
- 90,000 pop'n
- 60% agriculture
  - dairy, cash crop
- flows:
  - Apr : 198 cms
  - Sept: 6.7 cms

# Conservation Authorities of Ontario



# Watershed Water Quality

- phosphorus degradation
  - annual mean 5 times > Provincial W.Q.O. (.3 mg/l)
- >90% P from non-point sources (SNC 1990 Report)
- 18 wastewater lagoons:  most discharge 1x per year
- several new or expanding facilities (including landfills)
- each discharging more P

# Policy Background For TPM

- *Pilot* application of Provincial Water Quality Guidelines
  - Policy 2 States:
    - when water quality does not meet Provincial standards for a certain parameter, no further degradation of water quality allowed
  - previously, Province allowed P discharges if there was a hardship to meet standards (e.g. high costs)
- Province decides if stream meets Policy 2 criteria

# Capping Phosphorus Loads

- Since 1998:  new or expanded wastewater dischargers must achieve no net increase to P loading in the *watershed*
  - 3,000 people = approx. 600 kg P

- Options are:
  - treat to 0 kg of P discharge from *new/expanded* plant
  - buy P credits to offset loads

# Method of Capping Decided by Discharger, not Province

- Dischargers prepare environmental assessments prior to expansion or new construction
- EA's must now show options to control P:
  - New tertiary treatment plant: $15 million +
    - Retrofits of existing seasonal discharge lagoons unlikely
  - Implement a TPM strategy ($370/kg)
  - Other: treatment wetlands, etc.
- Capping Applies to P only:
  - wastewater discharge must still meet Provincial treatment standards for all other parameters

# Generating P Credits

- Through BMP's:
  - Septic
  - Manure storage
  - Milkhouse washwater
  - Barnyard runoff control
  - Livestock access
  - Buffer strips

# P Calculations

- Previous studies established formulae
  - Example:  milkhouse washwater:
    - P controlled per year = # cows X 1.26 kg/yr
- Problem:  formulae derived from 5-15 year old research
  - effects of reduced P detergents?
  - treatment trench vs. diversion to manure storage?
- 2002 review of 80 primary research papers
  - Peer reviewed by University of Ottawa, Maryland, other scientists
- New formula:
  - 0.69 kg TP/cow/yr (excluding manure)
  - 2.76 kg TP/cow/yr (with manure)

# TPM Program

- Closed system
  - credits are only bought by SNC and can only be sold to specific dischargers that are expanding
- How is market established in closed system?
  - Dischargers must buy from someone
  - What if no one has P to sell?
    - People won't sell to someone they don't know, bureaucrats, etc.

# Did A Market Exist?

- Historical Clean Water Program
  - Since 1993, South Nation delivered 420 BMP projects worth over $5.4 million (> $1.6 million in grants)
  - Approx 350 are P reduction projects
- Allowed cost/kg of P to be calculated
- Verified amount of P that can be removed (> 9,166 kg annually)
- Gave Province comfort level on P targets
- Allowed TPM to proceed more quickly
- Without previous experience:
  - Funding can manipulate market
  - Higher grant rates
  - Higher maximum grants
  - SNC:  caps on grants, maximums due to demand for funding

# Initial Agricultural Concerns

- offset ratio for P reduction too low (was 2:1)
- funding level per kg P too low (was $150/kg)
- what was the responsibility of landowners who accepted funding?
- what was the responsibility of municipality / industry if P reductions not achieved?
- perception that urban people allowed to pollute water
- General wariness by farm community

# Making TPM Work: Establish Working Group First

- Needed to address agriculture's concerns
  - working group of farm organizations, farmers, government, SNC established to review issues
- Results:
  - signed agreement of roles and responsibilities
  - 4:1 offset
  - higher cost per kg. of P
  - evaluation and monitoring strategy
  - open reporting to municipalities/agriculture

# Trading Ratios

- Currently set at 4:1
  - 4 kg removed from NPS for every kg discharged from point source
  - Originally set at 2:1
- No scientific basis for ratio
- Negotiated agreement with farm/municipal/government/watershed organizations

# Making TPM Work: Clean Water Committee

- CWC key to establish market, credibility with stakeholders
- Multi-stakeholder:  business, industry, environment, farm, political interests all represented
- Committee fully responsible for:
  - grant structure
  - Funding approvals
  - Committee structure and membership
  - promotion and evaluation
  - research and monitoring
  - fund raising
- Reports to SNC Board of Directors

# Making TPM Work: Farmers Deliver Program

- Committee pays local farmers to conduct all site visits
  - Farmers are recognized as leaders in community
- Farmers make recommendations to Committee on which projects to accept
- 2004 costs:  $6,626 for 85 project site visits
- Increased credibility/uptake in program
- No down side to this approach

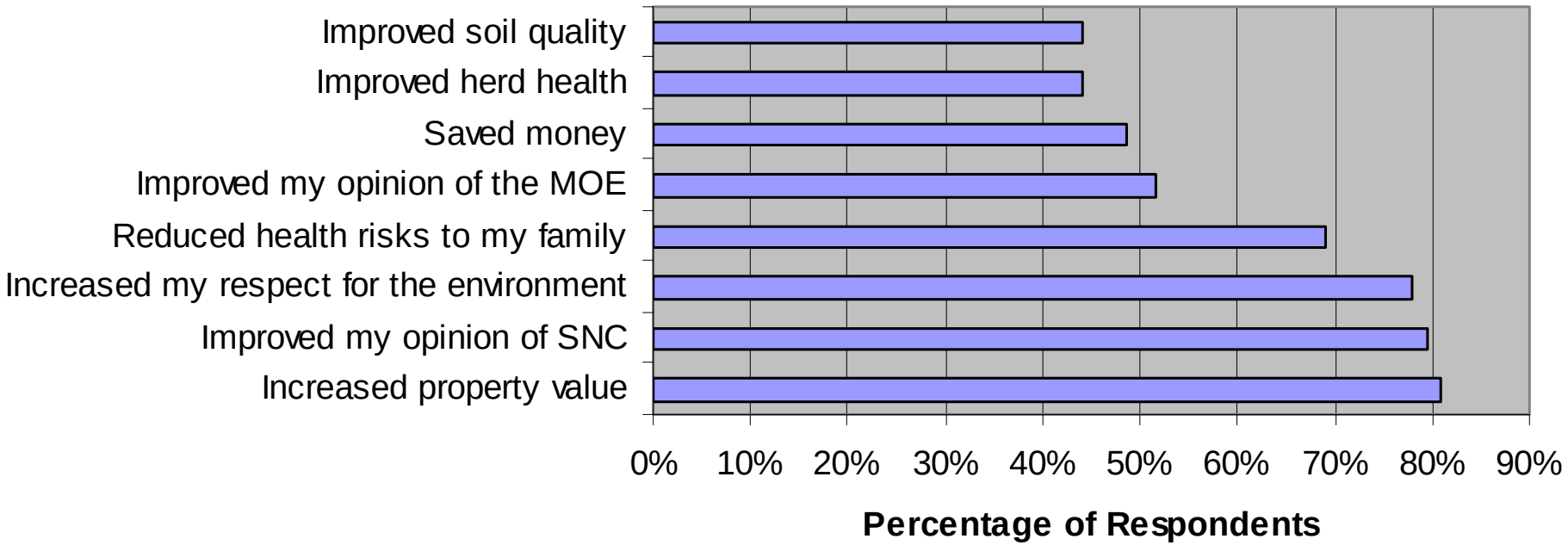
# Making TPM Work: Monitoring

- 13 stations sampled for surface water quality on a monthly basis (April – Nov.)
- Historical data: >40 years at some stations, provides baseline information to track phosphorus trends over time
- *Cannot measure immediate results*
- Formulae provides measurement

# Making TPM Work: Evaluation

- SNC and the TPM Partners / landowners completed Program Evaluation
  - Partners committed to evaluation at years 5 and 10
- Evaluation included:
  - stakeholder survey
  - data analysis for water quality
  - recommendations for Program improvements
  - accomplishments
  - what worked well
  - challenges
  - opportunities for improvement
  - conclusions, recommendations

## Improvements Noticed (Unprompted)



# Making TPM Work: Reporting

- SNC provides annual reports to participating point source dischargers
- P credits are allocated based on targets for each discharger
  - Achieving P reduction targets varies from 1 to 5 years
- List of projects that make up the “bank” of P credits is provided, individual projects and landowners are not specifically identified
  - this format adopted to address initial stakeholder concerns regarding landowner liability for performance of P reducing projects

# Trading Process Summary

**1. SNC Negotiates TPM Agreement with Discharger**
- Agreement becomes part of C of A

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**2. Discharger pays SNC $/kg**
- SNC flows money into Clean Water Program

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**3. Clean Water Committee allocates $ to eligible projects**
- Farmer Field Reps do all site inspections, reporting to Committee

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**4. Landowners complete approved projects**

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**5. SNC verifies project is complete**
- Invoices and photos of completed project
- Field Reps randomly inspect 10% of completed projects

# Trading Process - continued

**6. SNC calculates P reduction from completed projects**

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**7. SNC combines P reductions from all eligible projects and allocates credits to the dischargers**

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**8. SNC reports annually to dischargers on $ contributed and P credits allocated**
- Reports cc'd to MOE to meet requirements of C of A
- SNC presents report to dischargers

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**9. Annual Clean Water Program Report completed and circulated to watershed stakeholders**

# Final Points

- Wide-scale adoption of trading program takes 4 - 5 years
- Can't afford, economically, to lag behind
  - advantages to:
    - governments:  lower grants for infrastructure
    - taxpayer, industry, businesses:  lower taxes
    - agriculture: support
    - environment:  controls several contaminants, not just P

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