ADAPTING TO CLIMATE CHANGE
CONSERVATION AUTHORITIES ON THE FRONT LINE

Conservation Ontario presentation to the Expert Panel on Climate Change Adaptation
February 2009 - Speaking Notes

*Conservation Ontario is the network of **36 Conservation Authorities**, local watershed management agencies that deliver services and programs that protect and manage water and other natural resources in partnership with government, landowners and other organizations. Conservation Authorities promote an **integrated watershed approach** balancing human, environmental and economic needs. Conservation Authorities are organized on a **watershed** basis.*

Slide 1 – Cover
Conservation authorities, municipalities and the Province of Ontario are strong partners in ensuring the health of our natural ecosystems. Climate change will have enormous implications for these systems and CA's have already begun the process of adaptation.

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Presentation Outline
Our presentation will provide a brief Conservation Authorities Overview, followed by a summary of some of the major challenges that Climate Change represents to CA objectives

A few examples from larger and smaller CA's to illustrate some of the responses

An Update on progress under the Clean Water Act Update and how that will support Climate Change adaptation

Integrated Watershed Management Concepts

Conservation Ontario's vision of the future of Watershed Management and their contributions to communities adapting to climate change

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Conservation Authorities
According to 2006 statistics, 68% are currently municipal councillors; increases to 75% if previous term of Council is included (496 municipally appointed members on CA Boards).
Costs are shared, we all know the Provincial share was reduced by 70% in 1997/98; has rebounded somewhat with Source Protection.
Municipal share of just under $100,000,000 represents 39%, still excellent leverage (province does not insist on sharing revenues, it could on land, hydro.
Costs to Ontarians at 55% for taxes paid to all 3 levels of government (assume share of Federal) is $11.46 per person or $36.67 per household.
CA costs to municipalities about $26 per household per year, based on 3.2 people per household.

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Map of Ontario's Conservation Authorities

Conservation Authorities, like municipalities require population and assessment, and of course municipalities!. That is why they are geographically confined as shown on the map. There is periodic interest shown in areas like Muskoka, Manitoulin Island and the North Shore but lack of Provincial financial support is a disincentive.

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Conservation Authorities are Unique

Watershed management is almost universally recognized as the most effective framework for managing water and related land resources. Pollution Probe has recently published a Vision and Strategy for A New Approach to Water Management in Canada. Developed over a two year time frame, a wide range of government and non-government sponsors and partners, water experts and stakeholders took part in a series of workshops which have culminated in this Vision. Europe is embracing watershed management as a means to restore heavily industrialized river valleys and ensure sustainable practices. Ontario has been a leader in watershed management for more than 60 years, yet there is so much more opportunity. eg. Revitalization of the former municipal/provincial partnership relegated to more municipal responsibility in 1996. (Reference the website, www.pollutionprobe.org/Publications/Water.htm, A New Approach to Water Management in Canada)

Watershed Management is science based and has been for six decades. Comprehensive basin reports were undertaken in the 1940's listing recommendations from reforestation to wetland protection, to pollution prevention to acquisition of key natural heritage properties. Ambitious engineering works including dams, dykes and channels were also completed. Planning for prevention has overtaken remediation as the preferred method, yet changing precipitation patterns are challenging our working assumptions and design standards.

Finally, no one does it alone, there are many agents with mandates for different aspects of water management, many competing interests to satisfy, and myriad motivating factors. But there is only one landscape on which to act, so we must work in partnership for the best outcomes for all.

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Conservation Authority Priorities

Conservation Authority legislated mandate stems from Section 20 of the Conservation Authorities Act – broad, enabling multi-pronged approach depending on local priorities (and provincial)

Conservation Authorities own 140,000 ha of lands, 75% forested, 40% wetlands, hazard and recreation lands

Flood Plain Management, Flood Forecasting and warning, dams, reservoirs and channels, regulations have saved hundreds of millions annually – quantifying benefit
More than 400,000 elementary students participate in programs on CA lands or in CA facilities with CA programming; more than 5 million visitors annually for recreation. Public health benefits of activity in the out of doors, plus economic benefits are tremendous and under valued.

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Summary of Climate Change Impacts

Climate change affects our core business:

- more frequent severe weather events, such as higher intensity/duration rainfall
- longer ice free period on lakes, increased lake effect snow
- more rapid snow melts
- more frequent and prolonged droughts
- longer growing season (may increase demand for more irrigation)

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Summary of Climate Change Impacts cont…

Climate change affects our core business:

- increased flooding and erosion
- reduced flow, levels in rivers, lakes, streams and groundwater
- diminished cold water fisheries, wetland and marsh habitats
- poorer water quality; greater costs required to treat water
- greater competition for water supplies

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Summary of Climate Change Impacts cont…

Societal impacts that we will need to adapt to include:

- increased property damage, risk to life from flooding & erosion
- damage to public infrastructure as design parameters are exceeded
- pressure for irrigation, coupled with more frequent water restrictions

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Summary of Climate Change Impacts cont…

Implications for *aquatic ecosystems* - increased temperatures resulting in stress and conversion of cold water to warm water species;

Implications for *terrestrial ecosystems* - ecosystem composition and function will increasingly depend upon the abilities of species to live outside of their climate envelopes; net effect will be die-offs due to pests and disease stress on drought intolerant species resulting in competitive advantage for species which are more drought tolerant required migration rates are far beyond what trees are likely to achieve. They cannot “adapt” to global warming ecosystem disruption potentially huge, leading to earlier-successional “weedy” ecosystems

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Responses to Climate Change Impacts

The 1990’s were characterized by warm, dry summers, less winter snow and ice cover and reduced spring runoff. 1999 was a record year in terms of drought and the provincial government came to realization that while it had made great preparations with respect to flooding, it had no drought contingency planning in place.

The Ontario Government through the Environmental Monitoring and Research Branch (EMRB) of MOE entered into negotiations with Conservation Ontario for the reestablishment of the Provincial Groundwater Monitoring Network (PGWMN), abandoned some 20 years previously. Under this program, MOE would provide capital funding to establish 400 monitoring wells with state of the art instrumentation, while CA’s would be responsible for operations including sampling, analysis and well maintenance. Initial cost to MOE was $6 Million.

CA's and MOE have recently renegotiated this agreement with MOE taking responsibility for capital, lab testing and data analysis and management, with CA's responsible for sample collection and well maintenance Annual costs to each party in the order of several hundred thousand dollars.

We are now getting a handle on our groundwater resources (are they being depleted, contaminated, used sustainably, adequate recharge areas) or have we managed in just a few generations to diminish them to the point of being incapable of meeting our future needs.) **Groundwater starts to recharge when the maple sap flows!**

Progress on **a low water response framework** for surface water had a temporary setback as 2000 was a very wet year, (people in Exeter and London will attest); however by 2001 it was again obvious that a plan was needed to manage scarce surface water supplies and increasing user demand and conflicts. The Low Water Response Framework creates a Low Water Response Team of stakeholders and government and agency types, and contemplates a series of levels whereby initial voluntary conservation measures (level 1 and 2) are succeeded by permit restrictions (level III) and in effect, water rationing. A level III has never been declared in Ontario although conditions existed in 2007 which warranted such a declaration. As a result, a review of two cases (Grand and Nottawasaga) is underway to help define criteria and protocols for level III. (Expect it to be politically very sticky).

The Walkerton Inquiry, established in June 2000 by the Ontario Government, was a public inquiry into the E.Coli contamination of the water supply in Walkerton, Ontario in May 2000. The Honourable Dennis R. O'Connor, Commissioner was charged with preparing a public report of findings and recommendations to ensure the safety of the water supply system in Ontario. Part I of the Walkerton Inquiry focused on the exact circumstances surrounding the Walkerton contamination event while Part II of the Inquiry focused on public policy development for the protection of Ontario's drinking water supply.
Oxford County had provided leadership in undertaking groundwater studies since its supply was largely dependent on shallow, ground water aquifers, vulnerable to contamination. This expanded through 2002 and 2003 to a more comprehensive municipally based program substantially funded by the Ontario Government. In a sense, Source Protection Planning was already underway before O'Connor reported on Part II.

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Grand River Conservation Authority (GRCA) Reservoirs

- seven water control structures
- stores 175 million cubic meters (175 billion liters) of water
- flood control
- water supply
- low flow augmentation

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Grand River Conservation Authority
Radar Map View

Slide 14
Grand River Conservation Authority: Why Use Radar?

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Credit Valley Conservation Responses to Climate Change
Flooding and erosion

- emergency preparedness
- real time monitoring and response for flood warning and forecasting
- spill response strategies
- plan input and review re stormwater and Low Impact Development (LID)
- erosion and sediment control workshops

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Credit Valley Conservation Responses to Climate Change
Water Quality and Quantity

- water quality and quantity studies (subwatershed studies, water budget, water quality strategy)
- control of stormwater at source (Low Impact development)
- point source and non-point source pollution retrofit of 14 creeks and Credit River
- Peel farm rural water quality retrofits
- Settlement and servicing masterplans for communities

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Credit Valley Conservation Responses to Climate Change
Ecosystem Enhancement

- mapping biodiversity and preservation plans
- species of conservation concern protection plan
- natural heritage system creation in Mississauga and Brampton and preservation in new development
- removing invasives
- goal of planting 500,000 trees per year
- restoration and creation of wetlands
- aquatic restoration
- manage 6,000 acres for conservation purposes
- land acquisition
- working with all landowners to environmentally retrofit
- Ontario shoreline retrofit
- Plan to protect Credit River cold water fishery

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Credit Valley Conservation Responses to Climate Change
Public Environmental Education and Outreach

- -conservation youth corps
- -sustainable futures workshops
- -working with watershed partners especially teachers and NGOs and decision makers
- -climate change workshops
- -LID workshops, etc

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Credit Valley Conservation Responses to Climate Change

Municipal Plan Input and Review

- -commenting agency under the Planning Act
- -administer Conservation Authorities Act

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Credit Valley Conservation Reponses to Climate Change

Environmental Monitoring:

- monitoring of more than 150 terrestrial and aquatic sites for:
  - fisheries
  - benthics
  - terrestrial health
  - geomorphology
  - water quality
  - water quantity,
  - weather (climate change monitoring specifically), etc

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Mississippi Valley Conservation Responses to Climate Change

- water management responses - modeling and planning
- fish and fisheries - adapting to climate change
- economics, consequences and adaptation - survey

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Toronto & Region Conservation Authority Responses to Climate Change

- Symposium on Climate Change and Watershed Management, 1999
  - Broaden awareness of adaptive management techniques

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Toronto & Region Conservation Authority Responses to Climate Change

- Joint TRCA, Canadian Climate Change Impacts and Adaptation Research Network workshop, 2005

  - Integration of Climate Change Impacts and Adaptation into Municipal Policy and Programs

  - Adaptation Strategies for:
    - ✓ Health impacts of heat
    - ✓ Extreme weather events
      - Basement flooding
      - Well contamination
      - Ice storms
      - Essential services

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Toronto & Region Conservation Authority Responses to Climate Change

- New Strategic Direction due to range of connected issues:
  - Climate change
  - Energy supply
  - Urban growth and infrastructure
  - Health care
  - Air and water quality
  - Quality of life

    - Biodiversity
- Requires coordinated and integrated effort from business, governments and the public at large

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Toronto & Region Conservation Authority Responses to Climate Change
Objectives
- Healthy rivers and shorelines
- Regional biodiversity
- Sustainable communities
- Business Excellence

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Toronto & Region Conservation Authority Responses to Climate Change
Examples
- Living City Campus at Kortright
    - Archetype sustainable house
    - World Green Building Council Secreteriat
- Pearson Eco-Business Zone
    - 12,000 ha, alter the landscape to green and economically vibrant sector using a systems approach
    - Examines local and regional flows of materials, energy, synergies, byproducts

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Toronto & Region Conservation Authority Responses to Climate Change
Examples continued
- Innovation in stormwater management
- Weather monitoring
- Climate Change Action Plan
- Community Transformation Programs
- Education (175,000 students annually)
- Outreach Education and Stewardship

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Maitland Valley Conservation Authority Responses to Climate Change
- Analyze ways in which institutional arrangements for water management facilitate or constrain adaptive capacity
- Agriculture and recreation most affected
- Challenge is alteration of existing attitudes and practices
- Need better understanding of social, economic and cultural barriers to water conservation

Research carried out in conjunction with Water Management Group at the University of Guelph, funded by the Climate Change Action Fund.

The purpose of this research was to analyze ways in which institutional arrangements for water management facilitate or constrain capacity to adapt to climate change at the watershed scale in the Maitland River basin. This report presents findings concerning the nature and extent of adaptive capacity in the Maitland River watershed through the

use of local examples, and presents several recommendations for building capacity at the watershed scale.

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Maitland Valley Conservation Authority Responses to Climate Change
Adaptation to climate change in the Maitland River watershed will occur most successfully using a cooperative, multi-stakeholder approach that recognizes considerations such as resources available to stakeholders, the constraints imposed by institutional arrangements, and the complexity of water management as a whole.
In other words, IWM!

Local and watershed organizations in the Maitland River watershed have demonstrated considerable expertise in implementing these programs, but the provincial and federal governments also have important roles to play by providing financial support.

Improvements to incentive-based programs could include focusing on adaptations that increase agricultural productivity, building relationships between extension staff and farmers, funding long-term programs that recognize the time needed to design and implement changes to farming systems, and harmonizing federal and provincial funding programs.

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Source Protection
Conservation Ontario, on behalf of all Conservation Authorities and jointly with the Saugeen Valley and also Grand River Conservation Authorities, had standing for Part II of the Walkerton Inquiry. Conservation Ontario received $25,000.00 from the inquiry for its participation and significant 'in kind' contributions from its members. CO made submissions supporting a comprehensive approach to managing water on a watershed basis, considering both surface and groundwater as integral parts of the system that needed to be managed together eg.(MOE had responsibility for Groundwater quantity and quality, MNR had surface water quantity mandate)
Protection of both quantity and quality of water in the environment was the central theme, and it was supported by many other submissions. It recognized that drinking water can't be managed in isolation from other water management issues and objectives, including the needs of the aquatic ecosystems.
CO Recommendations:

- clarified roles and responsibilities of the federal, provincial and municipal governments, conservation authorities and other agencies with respect to water management
- an integrated provincial water policy framework for Ontario that recognizes the principle of watershed management and deals with all aspects of water
- recognition of source water protection as a component of watershed management and as the first step in a multiple barrier approach to protecting drinking water
- strengthening of the conservation authority model to advance watershed management and requirement for local agencies to prepare watershed management plans
- watershed planning performance standards and mechanisms to ensure accountability

- approval and licensing systems, where appropriate (e.g. permits to take water, certificates of approval for water and wastewater projects), to be guided by watershed management plans
- research into water issues and development of decision support tools for local application
- adequate monitoring programs to understand watershed systems and track watershed health
  improvements to and maintenance of data management systems that are publicly accessible
- effective implementation of watershed management and source protection through land use planning, regulation, land and water stewardship, and land securement
- identification and quantification of the roles of existing wetlands, forests and riparian areas as well as protection, enhancement and restoration of those that provide water quality and quantity benefits
- recognition of public participation and partner collaboration as integral components of watershed management
- mechanisms for adequate and stable source(s) of funding including cost recovery from water users (i.e. user pay principle), and from effluent dischargers (i.e. polluter pay principle) as well as funding from provincial and/or federal governments for broader public/environmental benefits (i.e. non-use benefits).

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Source Protection Authority

Clean Water Act prescribes that the Conservation Authority is the Source Protection Authority under the CWA. Some minor amendments to boundaries have been necessary to incorporate municipal territory not under CA jurisdiction, with additional representation as required. (LSRCA and TCC)

Grouping into regions enabled sharing of expertise, but it does result in some large geographic variations. 19 are easier to manage than 36 (or 400+)

SPA/CA has a lot of responsibility but the SPC drives the process, so the balance will be worked out. The CA's will make sure it works.

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Map of Source Protection Regions

Fourteen in Southern Ontario, five in the north

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Source Protection Committee Role

- Direct the source protection planning process
- Assign responsibilities (municipal, CA, working groups, etc)
- Lead consultation process
- Prepare and submit:
  - Terms of Reference
  - Watershed Assessment Report
  - Source Protection Plan

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Municipalities Role in Source Protection

Municipalities are key partners in Source Protection

- Select SPC representatives
- Designate drinking water systems for inclusion
- Undertake components of assessment report and plan
- Participate on working groups
- Review and comment on terms of reference, watershed assessment report and source protection plan

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Source Protection Planning Steps

Current plans anticipate that completed Drinking Water Source Protection Plans will begin emerging in 2012. This may seem like a long, arduous and expensive outcome from the May 2000 Walkerton tragedy. Will it all have been worth the expense and effort?

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Integrated Watershed Management

An integrated provincial water policy framework for Ontario that recognizes the principle of watershed management and deals with all aspects of water clarified roles and responsibilities of the federal, provincial and municipal governments, conservation authorities and other agencies with respect to water management advancing watershed management through the preparation of watershed management plans by local agencies recognition of public participation and partner collaboration as integral components of watershed management recognition of source water protection as a component of integrated watershed management

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Integrated Watershed Management

Conservation Authorities see value in the Drinking Water Source Protection Program that goes well beyond its primary objective. We are focusing on water quality, and in the absence of Source Protection Plans, we are depending on other barriers to ensure safety. Increasingly, however we need to concern ourselves with water quantity. Human demands go beyond drinking water – irrigation, navigation, recreation, health of aquatic ecosystems necessary to sustain these uses. Increasing conflicts are inevitable. The low water response system has not served its purpose to manage demand and several level three circumstances were in existence this past summer. The province will be very reluctant to say no to someone, or to have to choose between vegetables, golf, sod or fishing. But the current situation is not sustainable and will continue to deteriorate if we don't begin to take water seriously and manage it in a comprehensive and integrated fashion.

We need processes to engage science with stakeholders, and the application of the Clean Water Act will do a huge service in educating stakeholders and the public to the needs and limitations of the physical and biological system, the economy and society as a whole.

Conservation Authorities see the Clean Water Act as a stepping stone for moving toward Integrated Water Resources Management. The critical components of IWM are:

- Watershed action plans that describe what is needed to ensure a safe and secure water supply and healthy aquatic ecosystem

- Stakeholder driven with strong science and monitoring

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Integrated Watershed Management

- Research into water issues and development of decision support tools for local application

- Adequate monitoring programs to understand watershed systems and track watershed health

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Integrated Watershed Management

- Improvements to and maintenance of data management systems that are publicly accessible

- Effective implementation of watershed management and source protection through land use planning, regulation, stewardship, and land securement

- Regulation includes approval and licensing systems, where appropriate (e.g. permits to take water, certificates of approval for water and wastewater projects), to be guided by watershed management plans

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Integrated Watershed Management

- Identification and quantification of the roles of existing wetlands, forests and riparian areas as well as protection, enhancement and restoration of those that provide water quality and quantity benefits

- Mechanisms for adequate and stable source(s) of funding including cost recovery from water users (i.e. user pay principle), and from effluent dischargers (i.e. polluter pay principle) as well as funding from provincial and/or federal governments for broader public/environmental benefits (i.e. non-use benefits).

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Sustainable Communities

It is clear that Canada can only make an impact on GHG through addressing transportation and home heating energy sources, improving efficiency and switching to renewable energy forms. Urban Ontarians must be engaged. Urban water resources management also has energy implications, municipal water supply and wastewater treatment are high energy users. Strategies to engage the public can involve education, participation in monitoring programs.

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Questions

For more information:
Don Pearson, General Manager, Conservation Ontario
Tel: 905-895-0716 Ext 231; dpearson@conservationontario.ca