



# Preventing Emergencies through Watershed Protection

Paula Dawe- Watershed Management Specialist

Dept of Environment & Conservation


Phone: 709-637-2542

Email: [pauladawe@gov.nf.ca](mailto:pauladawe@gov.nf.ca)

Web: [http://www.env.gov.nl.ca/env/Env/water\\_resources.asp](http://www.env.gov.nl.ca/env/Env/water_resources.asp)

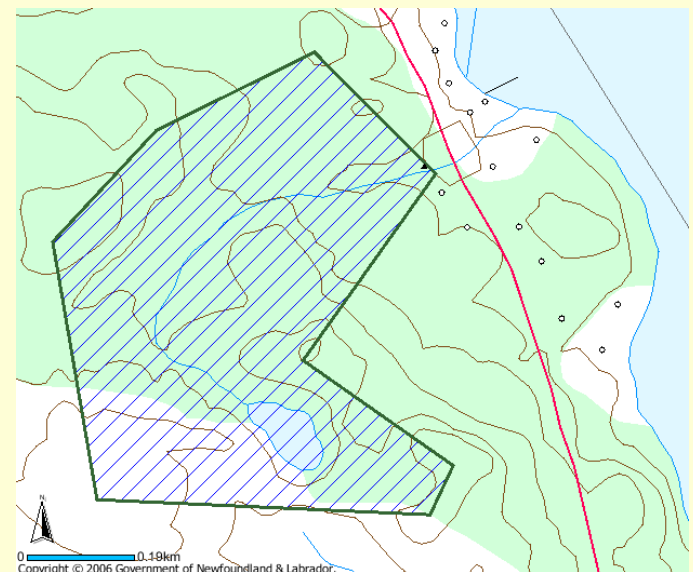
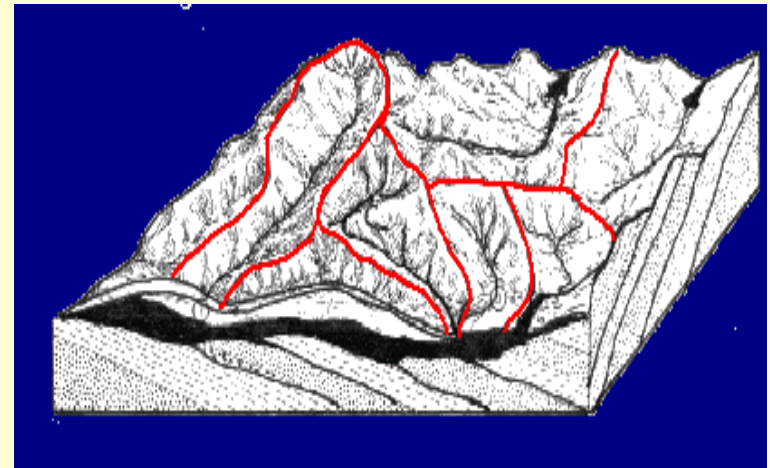


# Mandate of Water Resources Management Division

- To provide clean and safe drinking water to the public by implementing various sections of the *Water Resources Act* and Multi-Barrier Strategic Action Plan for drinking water safety
  - Section 39 of *Water Resources Act* -  
**Protection of Public Water Supplies**
- 

# What is a Watershed?


- A land area that captures precipitation, filters and stores water, and regulates its release at a common outlet
- Each watershed is unique
- Effective natural management units





# Economic Comparisons


Quantifiable costs of drinking water contamination:

- Cost of treatment/ remediation
  - Cost of finding/ establishing new supplies or providing emergency replacement water
  - paying for consulting services and staff time
  - litigating against responsible parties
  - conducting public information campaigns when incidents arouse public and media interest in source water pollution
  - cost of abandonment of a drinking water supply due to contamination
  - loss of property value or tax revenue
- 



# Economic Comparisons


Costs that are not easily quantified include:

- health related costs from exposure to contaminated water
  - lost production of individuals and businesses
  - interruption of fire protection
  - loss of economic development opportunities
  - lack of community confidence in treated drinking water
- 



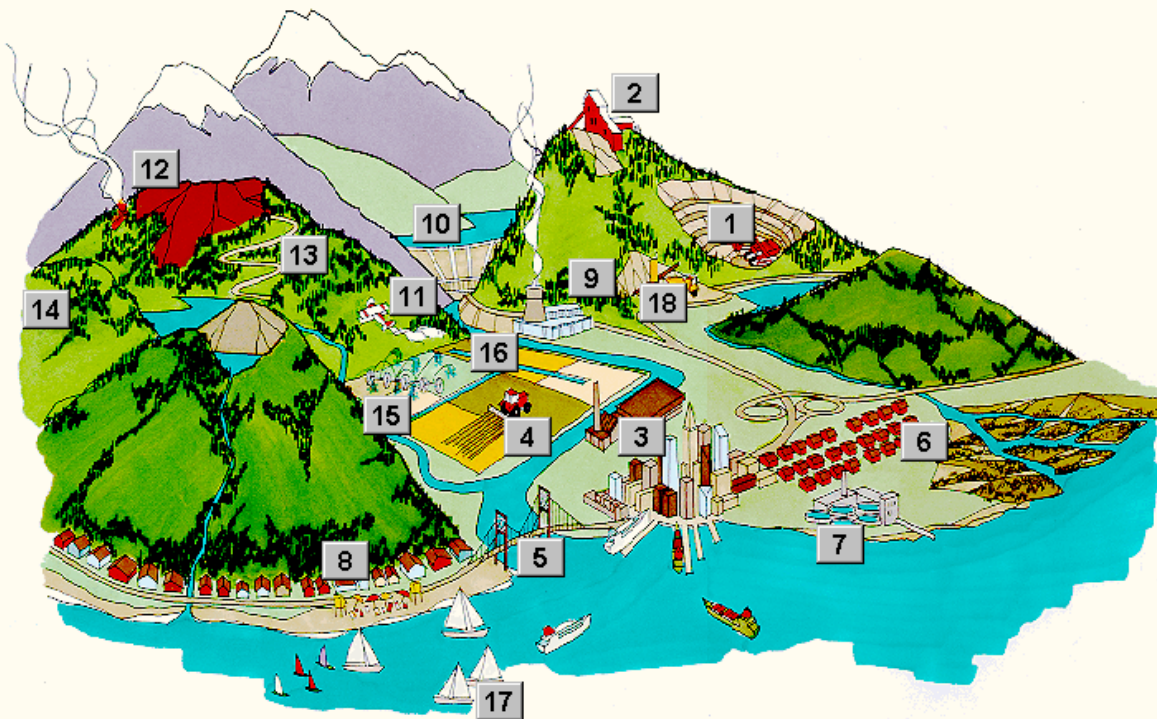
# Economic Comparisons

Costs associated with water supply protection efforts include:

- Opportunity costs- loss of resource harvest and development
  - Environmental protection costs
  - Enforcement costs
  
  - Ratio of benefits of avoiding contamination to the costs of source protection programs ranged from 5:1 to 200:1 (USEPA)
- 

# Impact of Development Activity

All land use activities have an impact on water resources



- 1- Surface mining
- 2- Underground mining
- 3- Urban/ manufacturing
- 4- Agriculture
- 5- Transportation
- 6- Housing
- 7- Wastewater disposal
- 8- Cabins
- 9- Industrial
- 10- Hydro
- 11- Aviation
- 12- Forest Fire
- 13- Road Construction
- 14- Forestry
- 15- Irrigation/ drainage
- 16- Pesticides/ fertilizer
- 17- Boating
- 18- Quarries



# Potential for Water Quality Emergencies: Examples from Newfoundland & Labrador and Lessons Learned



Forestry





Access road through  
Botwood PWSA

Clear cut in  
Botwood PWSA



Forestry track  
through bog in  
Campbellton PWSA





Forest harvesting in Gander  
PWSA: 1.7 km upstream of  
culvert







Silviculture: scarifier turning up soil for replanting



Mobile fuel tank



Saw mill in Baie Verte PWSA

# Agriculture



Botwood PWSA: animal feed  
and vegetable crops

Chicken farm and  
composting  
trenches in  
Botwood PWSA



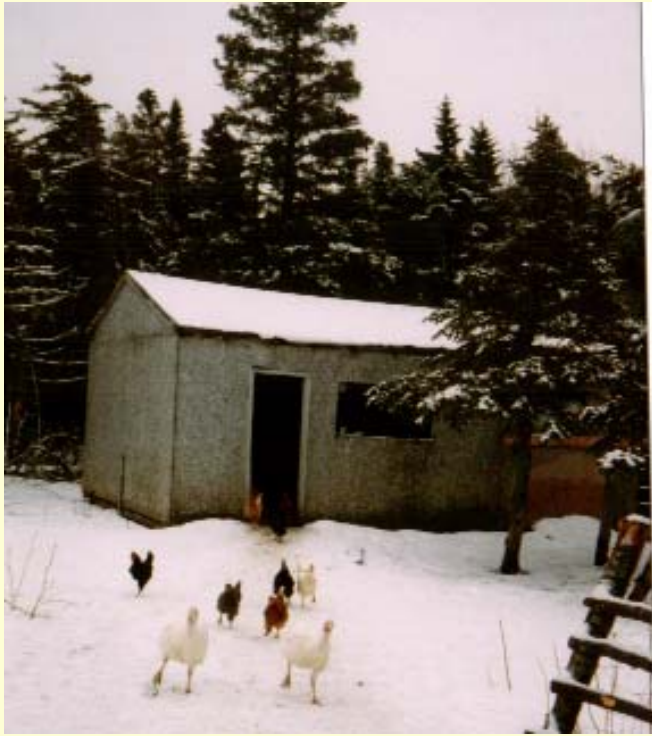




Pesticide tank and  
spray boom in  
Botwood PWSA



Manure application



Livestock in Daniel's  
Harbour PWSA

Community  
pasture in  
Lourdes





# Quarries, Mines, Mineral Exploration



Quarry in  
Botwood  
PWSA



Stone quarry in  
Campbellton PWSA



## Drilling for core samples

Pilley's Island: acid generating rock/mud brought up during mineral exploration killed vegetation







Excavated  
trenches for  
mineral  
exploration in  
Stoneville PWSA

Baie Verte  
asbestos mine



# Transportation & Communication Corridors



Botwood highway and utility corridor running next to intake

Constructing bridge in Botwood PWSA



Creosote draining out of pole in Beachside





# Recreation

Campers on  
Sandy Lake



ATVs fording  
South Branch  
River



26/07/2005

Cabins and ATV trail  
along shore of  
Frenchman's Pond in  
Cox's Cove PWSA



Cabin  
outhouse  
in Steady  
Brook  
PWSA





Beaver  
Floatplanes

Snowmobiling  
in Western NL



# Wildlife



Giardia hosts: beaver,  
coyotes, dogs, cats, cattle,  
rats, mice, humans







Stephenville  
Waste  
Disposal Site

# Other



Dump



Water  
supply

Ocean



Cemetery

Saltwater  
intrusion in  
Ramea PWSA





## Other- Natural Disasters

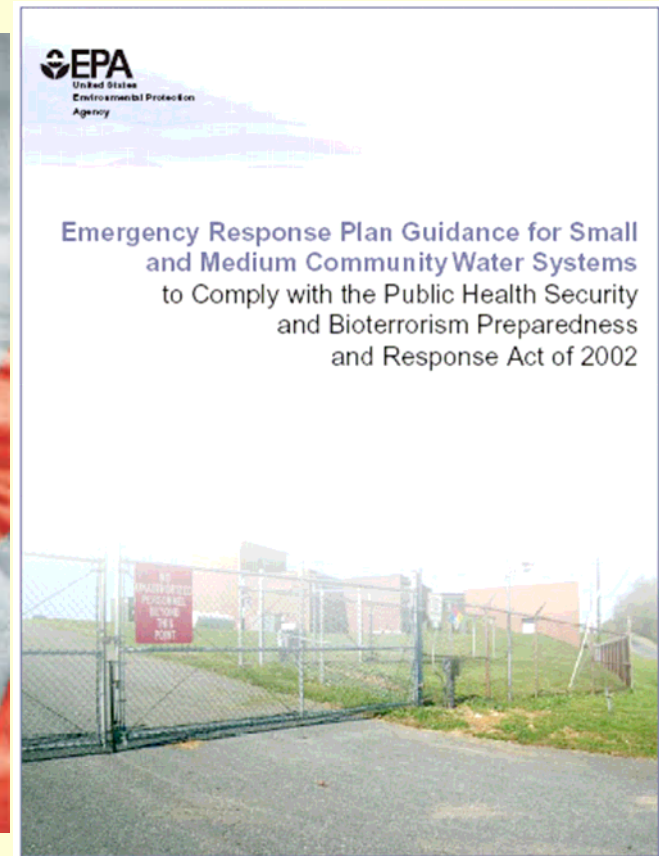
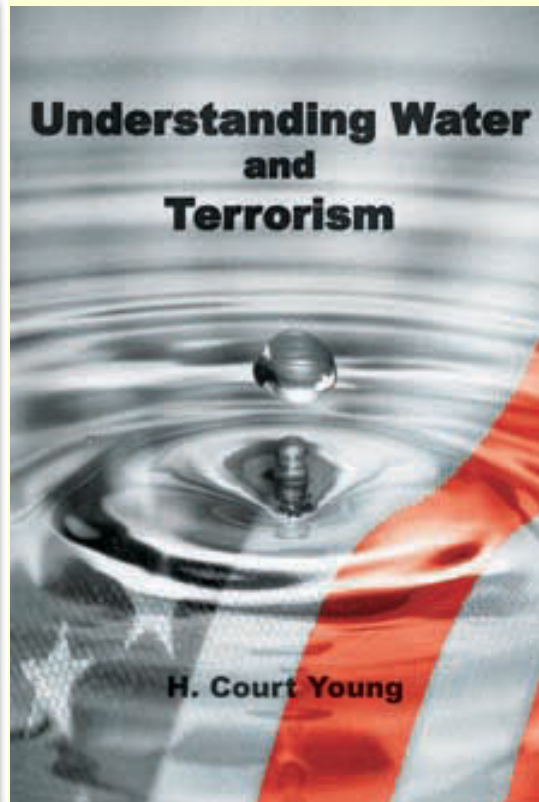
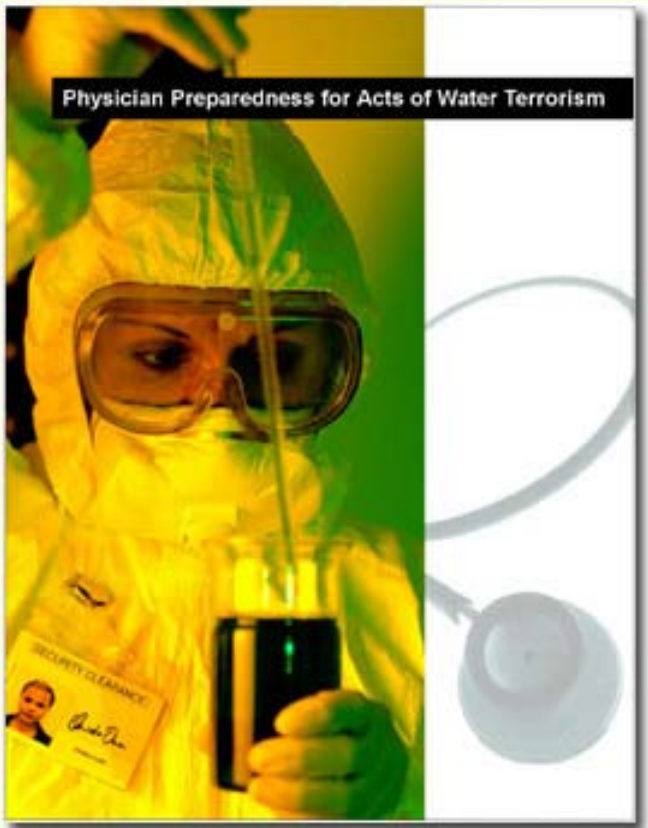


27/09/2006



12/05/2003

# Other- Water Terrorism





# Preventing Emergencies through Watershed Protection

● “An ounce of prevention is worth a  
pound of cure”

- Ben Franklin

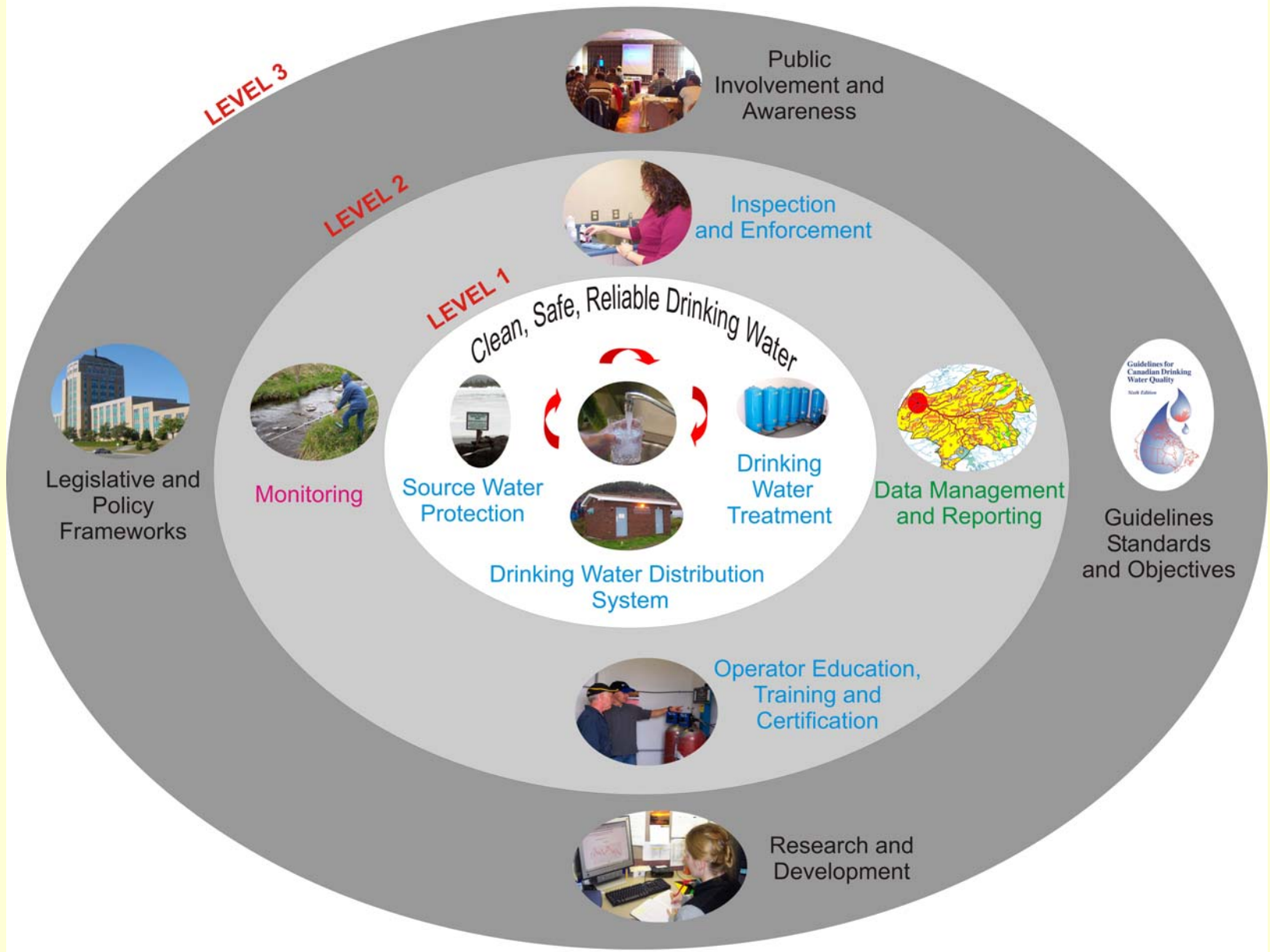
Grand Bruit water source



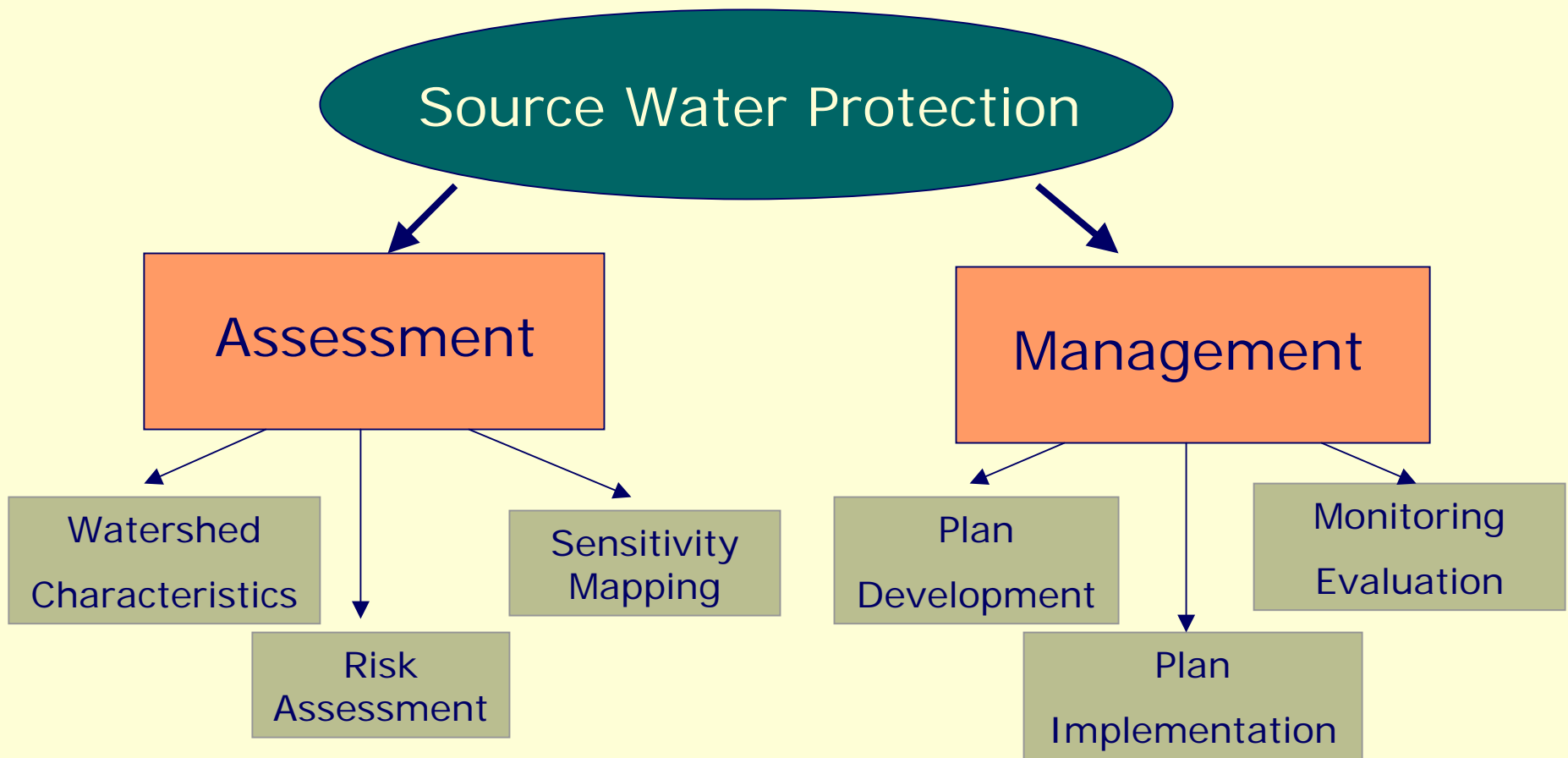
Source Water  
Protection is the first,  
most important and  
most cost effective  
step in safeguarding  
public water  
supplies.



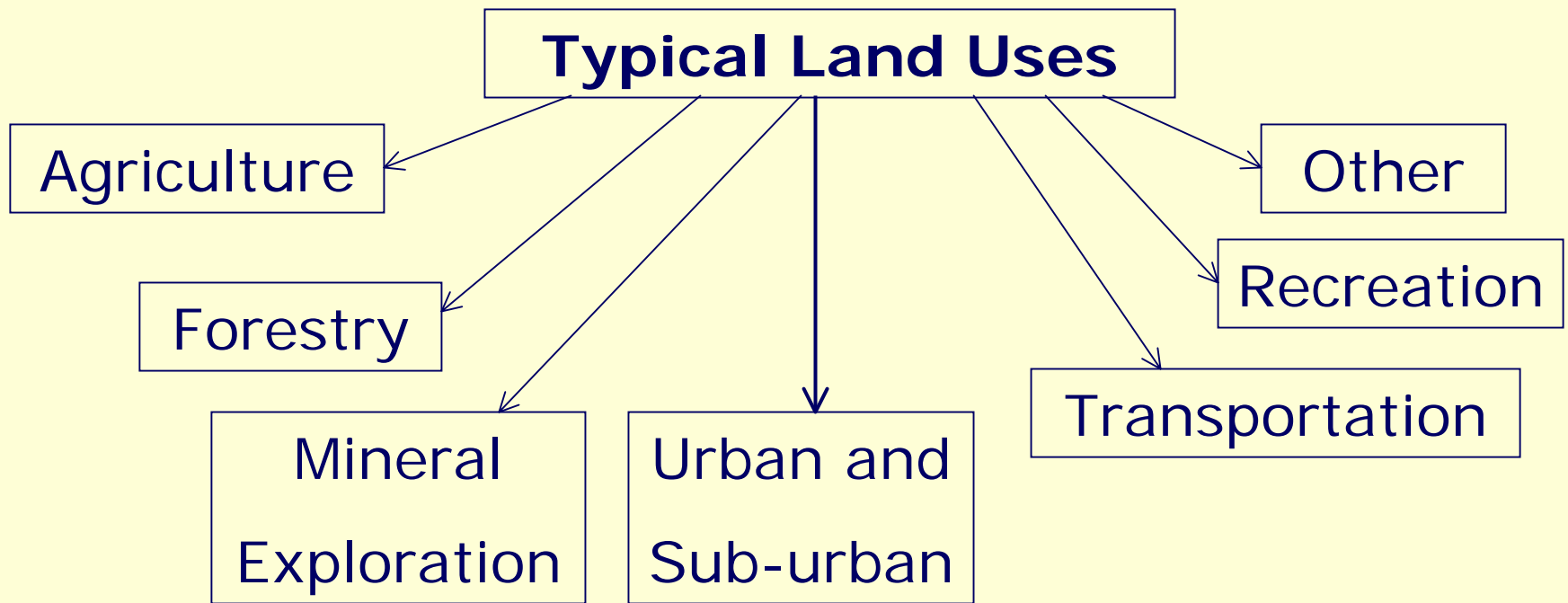
# The Components of the Multi-Barrier Strategic Action Plan (MBSAP)



# Source Water Protection



# Assessment- Land Use



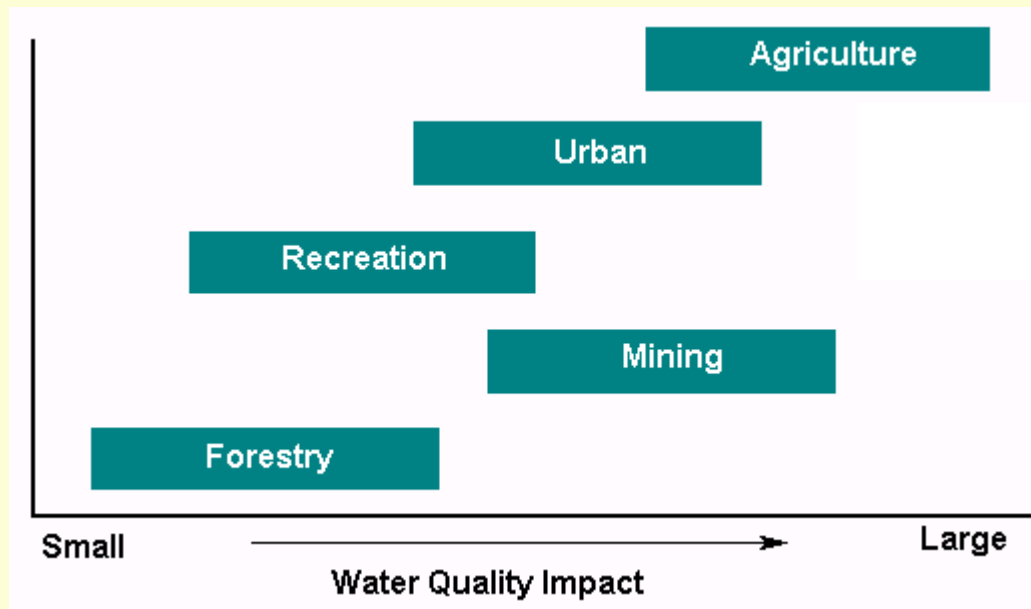
# Assessment- Land Use Impact

## Point Sources

- municipal water discharges
- industrial discharges

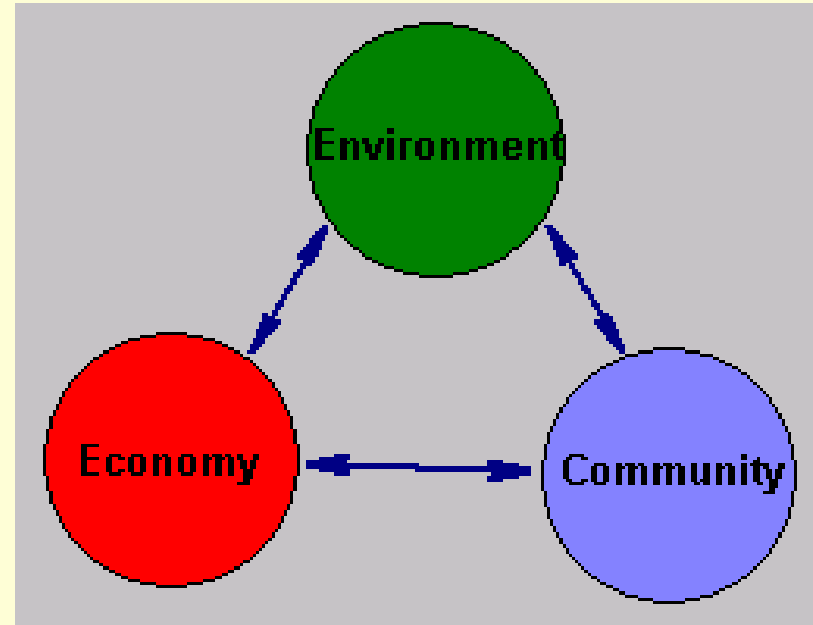
## Non-point Sources

- urban runoff
- agricultural runoff
- forestry runoff

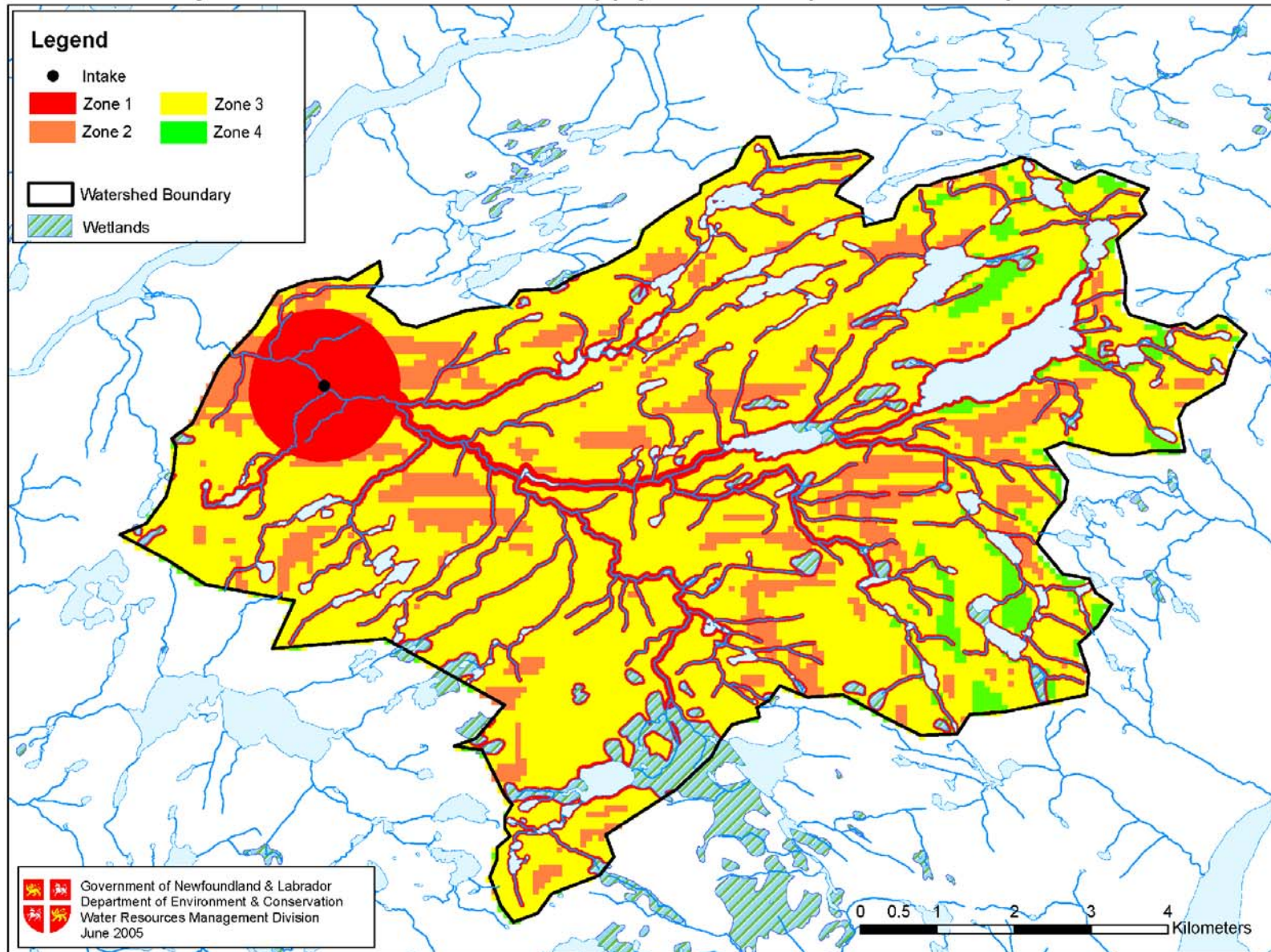


# Management- Planning Strategies

- Management strategies should involve a combination of protection, mitigation and rehabilitation measures
- Illustrate how the watershed should look and function



# Steady Brook Protected Water Supply Area - Proposed Development Zones



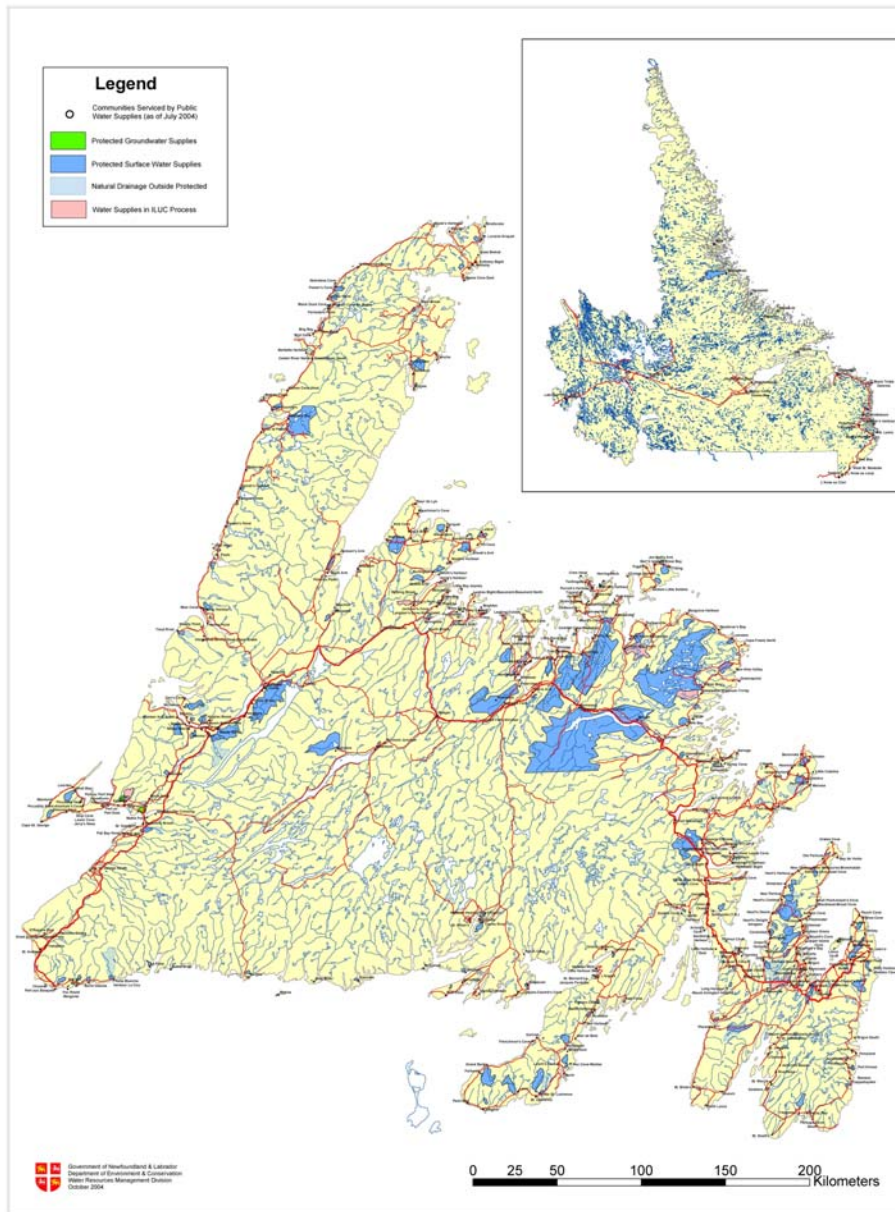




# Approaches to Watershed Protection

- Unrestricted Land / Water Use
    - Full Scale Water Treatment
    - Toronto, ON
  - Prohibited Land / Water Use
    - Limited Water Treatment
    - Victoria, BC
  - Integrated Resource Management
    - Regulated Land / Water Use – Some Water Treatment
    - Newfoundland and Labrador
- 

## Protected Public Water Supplies of Newfoundland & Labrador



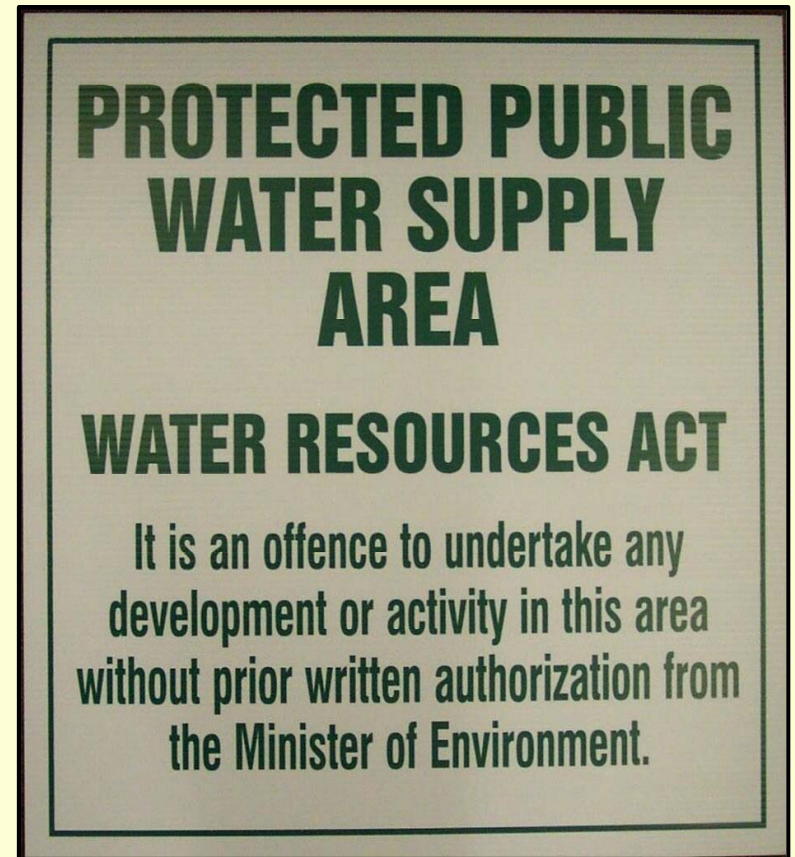
# Source Water Protection in NL

- 279 protected water supplies in the province
  - 90% of population get water from protected sources
- 34 communities have groundwater protection zones around wells
- 12 Watershed Management Committees



# Source Water Protection in NL


- Watershed designated under Section 39 of the *Water Resources Act*
- Development activities subject to approval
- Average of 95 permits issued per year (approximately 10-20% of applications rejected)
- Apply concept of integrated water resources management









# Process for Source Protection in NL

- Municipal authority submits an “Application for Protection of a Water Supply”
  - Watershed boundary for the water supply source is delineated and mapped
  - Information sent to the Interdepartmental Land Use Committee (ILUC) for review and comments
  - Specific concerns are considered and addressed
  - Source is protected
- 




# Permits for Development in Protected Water Supply Areas

- Any development in a protected area requires a “Permit for a Development in a PWSA”
  - Examples of developments – domestic and commercial forest harvesting, agriculture, mineral exploration and recreation activities
  - Application submitted to Department for review
  - Each application assessed on individual basis
  - Activity approved to proceed or denied
  - Activities approved have conditions established as a part of the permit
- 




# Will the proposed development activity have a negative impact on drinking water quality?

- How close is it to the intake?
  - How large is the watershed and proposed development?
  - Is it a sensitive area from a water quality perspective?
  - Can adequate safeguards be put in place?
    - EPGs, BMPs, Permit terms and conditions
  - If there is a serious event, will it affect the Town's drinking water quality?
  - Is this a precedent setting decision?
- 





# Permits for Development in Protected Water Supply Areas

- Issued by the Minister of Environment and Conservation under Section 39 of *Water Resources Act*
  - Town as Owner of the Public Water Supply is contacted prior to issuance of permit, given an opportunity for input, and identify if within Municipal Boundary
  - OR Watershed Management Committee is contacted, asked to review the project and provide a recommendation
  - Final decision rests with Minister of Environment and Conservation
- 



File No: 550-01-02-05-005

GOVERNMENT OF  
NEWFOUNDLAND AND LABRADOR

Department of Environment and Labour  
**CERTIFICATE OF APPROVAL**

Pursuant to the *Environment Act*, SN 1995 c E-13.1, Section(s) 10

Date: February 5, 2001

Approval No: C.A. 01-021

Proponent:

Attention:

Re: Aggregate Extraction - Peter's River Basin Protected Water Supply Area

---

Approval is hereby given for: Extraction of up to 30,000 cubic metres of aggregate material and blending sand over a 4.1 hectare site located near Peter's River, near the Botwood Airstrip (Mines File No.: 7115738) in the Peter's River Basin Protected Water Supply Area (used by the Towns of Botwood and Peterview) with reference to application and Development Plan dated January 15, 2001.

This approval does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies.

This approval is subject to the terms and conditions indicated in Appendix A (attached). A completion report, Appendix B (attached), must be submitted upon completion of the work. Unless noted otherwise, this approval is valid only until December 31, 2001.

It should be noted that prior approval of any significant changes in the operation or size of the proposed development activity must be obtained from the Department of Environment and Labour. New approval must be obtained in the event of changes in ownership or management of the project.

Failure to comply with the terms and conditions will render this approval null and void, place the proponent and their agent(s) in violation of the *Environment Act* and make the proponent responsible for taking any remedial measures as may be prescribed by this Department.



MINISTER

# Watershed Management Committees

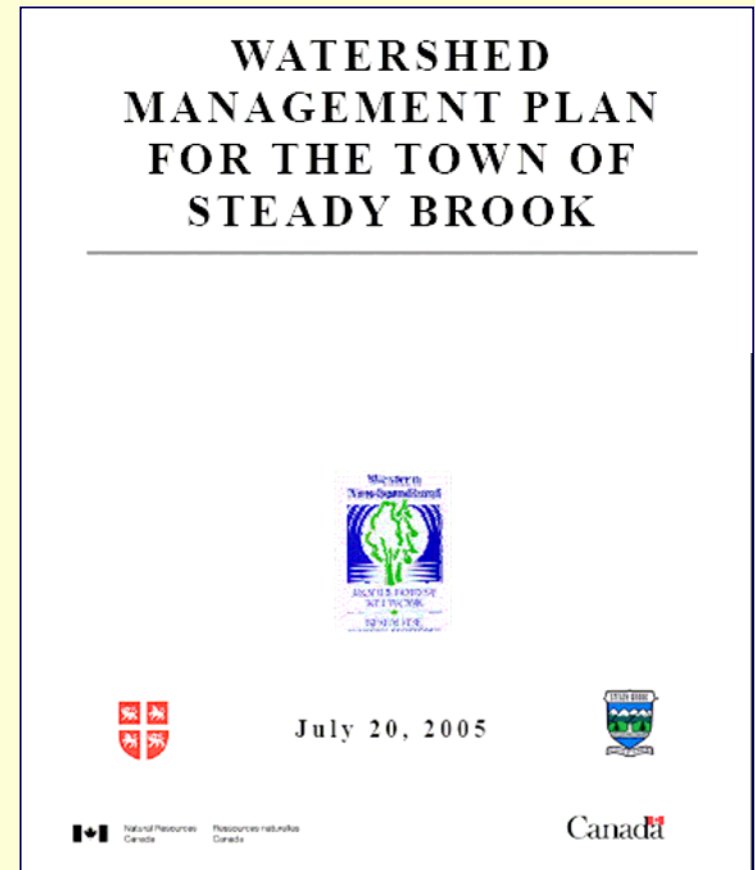
- Committee established by the Minister
- Minister writes key stakeholders and asks for representatives to be appointed
- Terms of Reference are agreed upon between Committee and Department outlining:
  - responsibilities
  - membership
  - how meetings are run





# Watershed Management Plans

- For source water protection
- For the sustainable development of natural resources and protection of the public health or environment
- Offers a stronger framework for addressing multiple stressors and cumulative impacts
- Contributes to community stewardship
- Contributes to a healthy economy and environment





# Buffer Zones

## **Water Body**

## **Minimum Buffer Zone**

Intake Pond

150 metres

River Intake

150 metres for 1 km upstream  
and 150 metres downstream

Main River Channel

75 metres

Major Ponds, Lakes  
and Tributaries

50 metres

Other Water Bodies

30 metres



# Buffer Zones

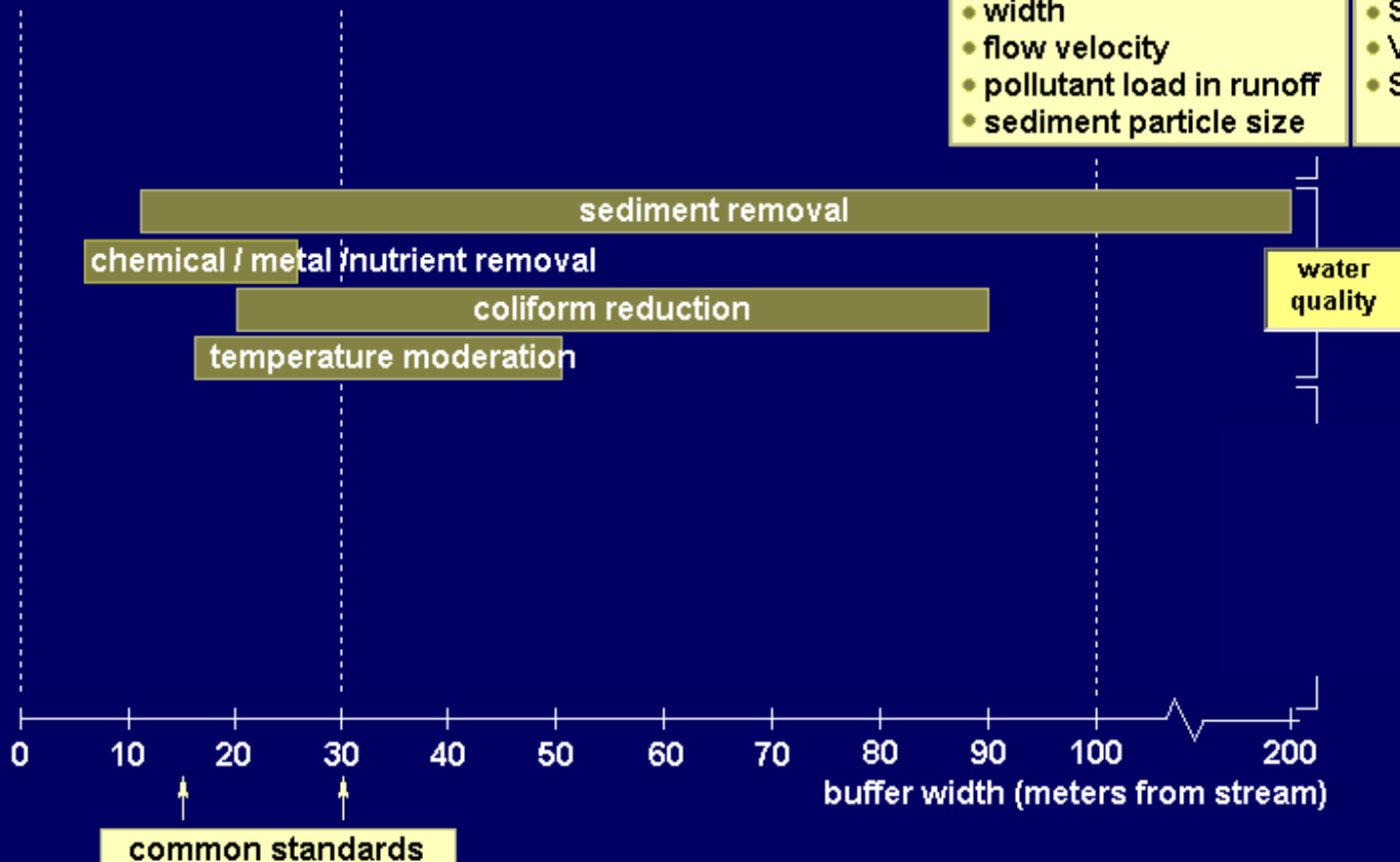
## Potential removal rates from well-designed buffers

• sediment	75%
• total nitrogen	40%
• total phosphorus	50%
• trace metals	60 to 70%
• hydrocarbons	75%

## Factors influencing removal rates

• width	• Slope
• flow velocity	• Vegetation
• pollutant load in runoff	• Soil composition
• sediment particle size	


## Functions by width







# Additional Safety Measures

- Terms and Conditions specified in Permit based upon: EPGs, BMPs, Watershed Management Plans, similar projects elsewhere
  - Policy for Land and Water Related Developments in Protected Public Water Supply Areas
  - Policy for Treated Utility Poles in PWSA
  - Guidelines for Forestry Operations Within PWSA
  - Environmental Guidelines for Construction and Mineral Exploration Companies
  - Guidelines on use of Water Bombers in PWSA
  - <http://www.env.gov.nl.ca/Env/env/waterres/Policies/PolicyList.asp>
- 



# Additional Safety Measures

- Fuel Use and Storage Controls
  - Spill Kits
  - Equipment Maintenance
  - Sediment Control
  - Waste Disposal
  - Inspections
  - Water Quality Monitoring
  - Polluter Pays – Alternate Water Supply
  - Notification of Protection
  - Public Education and Awareness Raising
  - Watershed Remediation/ Rehabilitation
  - Enforcement
- 

# Protection Measures:

## Examples from Newfoundland & Labrador



Buffer on  
Corner Brook  
Stream system



Stream buffer left in place  
along utility pole corridor,  
Steady Brook PWSA



Untreated utility pole used  
in Steady Brook PWSA



# Notification



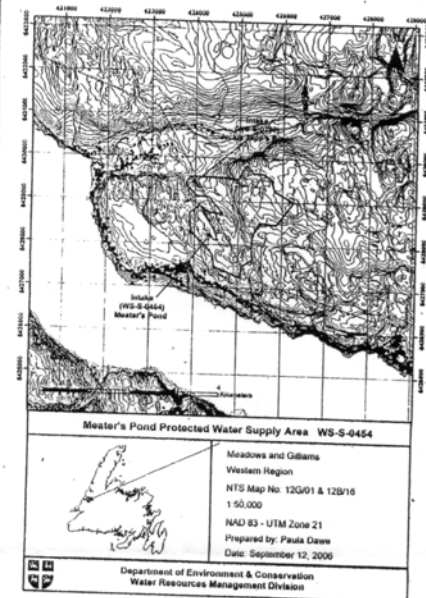
Jackson's Arm-  
Lush's Pond

Notification in  
Western Star on  
Nov 15, 2006

## TOWN OF MEADOWS PUBLIC NOTICE FOR AMENDMENT OF PUBLIC WATER SUPPLY AREA

Notice is hereby given to all concerned that the area shown on the map is protected under **Section 39** of the *Water Resources Act*, SNL 2002 cW-4.01, as a source of public water supply for the Town of Meadows and Town of Gillams.

As of the date this Notice is printed in The Western Star, it is an offence to undertake any development or activity in this area without prior written authorization from the Minister of Environment and Conservation.



# Spill Kits



Oil spill  
clean up kits

Downed  
transformer  
and oil spill in  
Black Tickle-  
Domino  
PWSA





# Sedimentation Control

**Manure storage**



**Detention ponds & structures**



**Fencing**



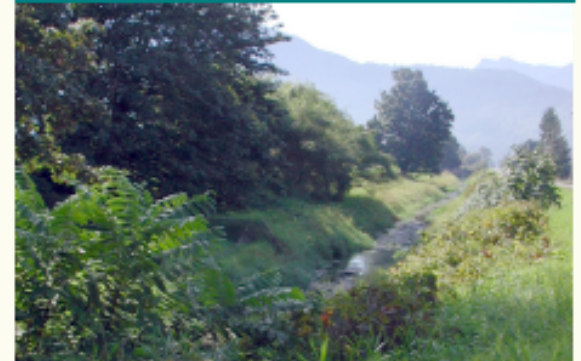
**Stream bank protection**



**Constructed Wetlands**



**Vegetated Buffer zones**





# Sampling, Inspections, Maintenance



Water quality  
sampling



Inspection of mineral  
exploration activity in  
Lourdes PWSA



Equipment  
maintenance



# Remediation



Mineral  
Exploration in  
Lourdes PWSA.

After contouring, channel  
lining, transplant of alders,  
and ground cover with  
organics and slash.







## Lourdes PWSA mineral exploration







After transplant of vegetation,  
organic cover and drainage  
channel bank stabilization.

After contouring, drainage  
cut to vegetation.



Vegetation barrier across  
main access trail.

# Awareness Raising



## Costs and Benefits of Drinking Water Source Protection

### HOW TO PREPARE A WATERSHED MANAGEMENT PLAN



*Integrated Management of Our Natural Resources is Essential to Sustain the Local Economy and Environmental Health*

### *Snowmobiling in Protected Public Water Supply Areas*



#### *What is a Water Supply Area or Watershed?*

An area of land bounded by topographic features that captures precipitation, filters, stores and drains water to a common outlet such as a lake, stream or ocean



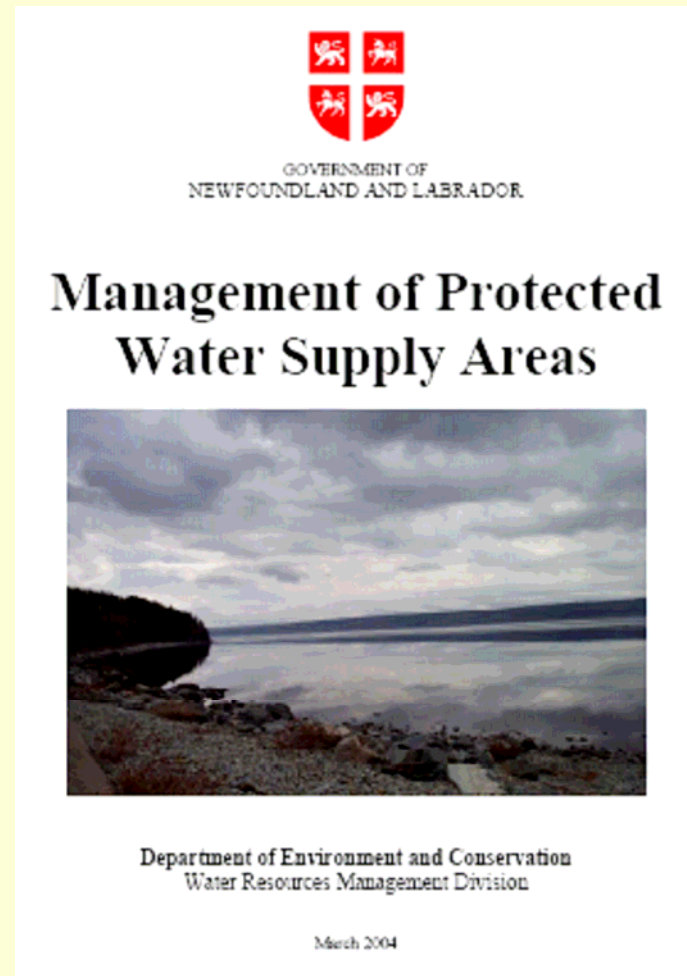
#### *What is a Protected Public Water Supply Area (PPWSA)?*

A watershed that has been designated as a protected area under section 39 of the *Water Resources Act* SNL 2002 CW-4.01 by the Minister of Environment and Conservation, and which acts as a source of public water supply for a community.



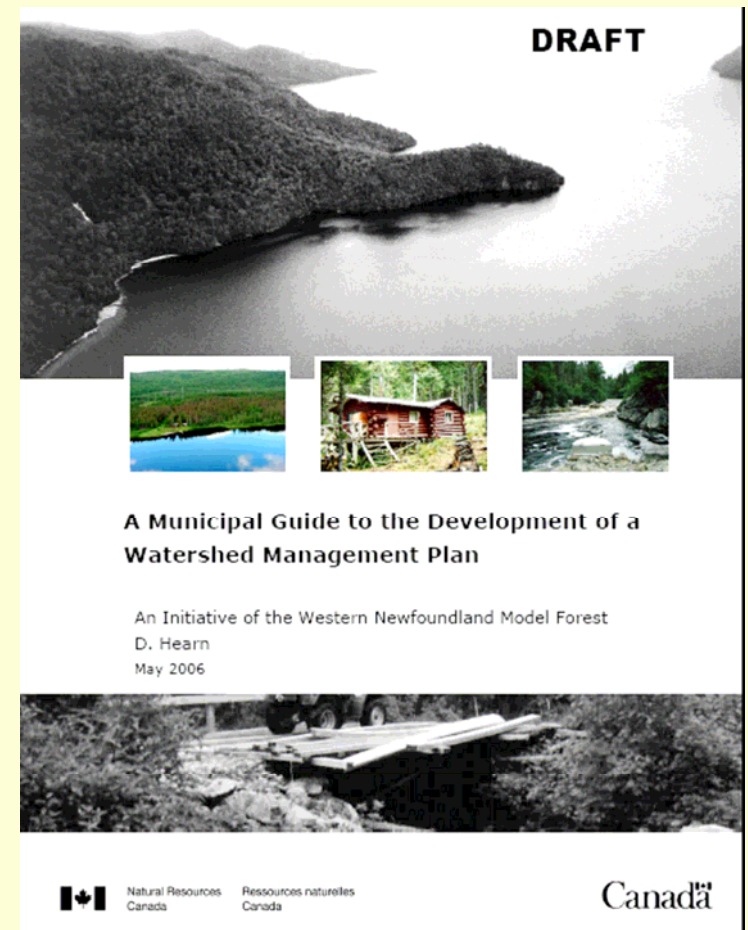
# How to get my Town's Water Supply Protected

- Check to see if it has already been protected:
  - <http://www.hoa.gov.nl.ca/hoa/sr/>
- Download application from:
  - <http://www.env.gov.nl.ca/Env/env/waterres/Forms/WRMD-Forms.asp>



# How to get a Watershed Management Committee or Plan for my Town

- Watershed Management Committee- town writes Minister requesting establishment of Committee
- Development of a Watershed Management Plan (WMP)- competing resource use
- WMP Template to guide towns in developing their own plan



# The End

