

# *Water Act*

## *Public Consultation Report*

Prepared by the Environmental Advisory Council

May 2016



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Wordle Analysis - Wordle is a non-scientific online tool for creating 'word clouds' from passages of text. The more frequently a word appears in the text, the larger it shows up in the word cloud. An example, based on text taken from the concerns and recommendations received at the conclusion of the consultation process is provided below.



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March 15, 2016

Honorable Robert J. Mitchell  
Minister, Communities, Land and Environment  
Government of Prince Edward Island  
PO Box 2000  
Charlottetown, PE C1A 7N8

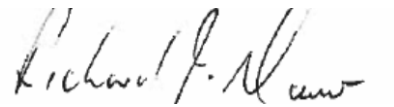
Dear Minister Mitchell:

The development of a *Water Act* was a recommendation of the Standing Committee on Agriculture, Environment, Energy and Forestry.

In July 2015, you appointed a five-member panel drawn from the Environmental Advisory Council to facilitate a series of public consultations on the scope and substance of a *Water Act* for Prince Edward Island, and to then submit a written report of its findings.

This document has been prepared in fulfillment of that responsibility.

Respectfully submitted,



Richard Davies  
Environmental Advisory Council, Chair



Dean Stewart  
Vice Chair



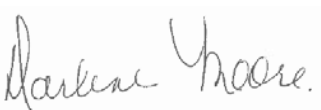
Irene Dawson



Art Smith



Ron Maynard



Darlene Moore  
Alternate

**Message from the Environmental Advisory Council - *Water Act* Consultation Panel**

I would like to begin by thanking all the members of the Environmental Advisory Council for the dedication and effort they applied to the task at hand. Each contributed their knowledge and experience to the discussions and deliberations in a unique way. Also, on behalf of the Council I wish to thank the hard work of our Secretariat, Sylvia Moore and Dr. Tony Sturz, Ph.D.

Water, and how we use, manage and protect it, is fundamental to our wellbeing and welfare. Water supports key provincial industries including agriculture, tourism, aquaculture and fisheries. Our watersheds capture and hold our water, and maintain the aquatic and riparian ecosystems that sustain and clean our water. Our groundwater aquifer is our only source of drinking water. All these resources must be protected and carefully managed.

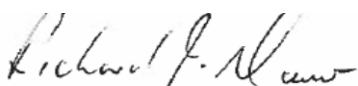
The proposed *Water Act* is destined to create new legislation in areas such as groundwater allocation, protection of riparian and aquatic habitats, discharges into fresh and marine water environments, and mandated targets for water quality.

Any *Water Act* must be able to consolidate policies, procedures, and programs used by government to ensure the long-term sustainability of its water resources. Establishing valid criteria for protecting Prince Edward Island's water supply is vital if we are to achieve this goal. Any decisions regarding water use and management must be based on sound science and, where uncertainty exists, on the exercise of caution. Finally, responsibility for water management must be shared by everyone, through active participation and stewardship.

As part of the process for developing the proposed Act, a white paper was released and a series of public consultations carried out. Islanders were asked to provide their views on what needs to be done to protect and guide water resource management, both now, and for future generations. Interested parties were encouraged to provide written comments and/or presentations on any aspect of the proposed reforms and supporting legislation.

The comments, ideas and solutions shared during the consultation period have been brought together to develop this document. We hope that you find the ideas and recommendations shared here to be an accurate and authentic reflection of the many hundreds of comments offered during the consultation process.

Sincerely,



Richard Davies  
Chair

## Executive summary

This document is a reflection of the input provided by Island residents, who participated in the *Water Act* White Paper Consultation held from July 2015 through January 2016. It includes opinions, ideas, comments and suggestions put forward about how we, as a province, can manage and conserve our water resources and associated ecosystems.

The consultation was designed to give people multiple opportunities and methods to participate to ensure that all interested parties had the chance provide input. Participants were encouraged to be open in their comments, express what they felt was working and where improvements could be made. The intention of this consultation phase was to encourage people to talk about those issues which they felt were important to the management and conservation of our Island water resources.

**Six key themes** emerged through this process. They were

- water governance and legislation;
- water quality;
- watershed management;
- environmental flows and ecosystem health;
- water quantity and conservation; and
- new approaches to water resource protection.

### **Water Act public engagement process**

**Phase 1 - White Paper Release** – A round of public and one-on-one consultations, will be hosted by the Environmental Advisory Council, and completed by the end of 2015 early 2016. A report summarizing the Council's findings to follow.

**Phase 2** - In phase two, Islanders will be encouraged to review and comment on the draft *Water Act*. Round two of public consultations will be held mid-late 2016

**Phase 3** - Input from phase two will be used in preparing the final draft of the *Water Act*. *Water Act* completion is set for spring 2017.



## Conclusions

We heard that the preference of participants was that any legislative, regulatory and/or policy framework should be drafted in such a way as to support efforts to

- conserve, protect and restore the health of aquatic and riparian ecosystems;
- safeguard and enhance drinking water;
- regulate water use in a manner that respects ecosystems as well as human needs;
- ensure water security through use efficiency and conservation practices;
- encourage and enforce land use management practices that protect water quality, the integrity and health of watersheds, associated watercourses, and the groundwater resource;
- allow for continuous adaptation to water management rules, as science advances, or natural conditions change; and
- standardize, streamline and make transparent government decision-making.

## Introduction

Government is proposing the creation of a *Water Act* for Prince Edward Island to consolidate, under one piece of legislation, the policies, regulations, and programs currently used by the Government of Prince Edward Island to manage our water. It will also be used to develop and implement new methods and management practices to ensure the sustainability of water resources and associated aquatic and riparian ecosystems.

To get a fuller appreciation of the thoughts and feeling of Islanders, the Government of Prince Edward Island supported a comprehensive series of public consultations to provide all residents of the province with the opportunity to share their thoughts and feelings on how government, businesses, communities and individuals can protect and manage our water resources. The consultation process was open to everyone, and was led by a panel drawn from the Environmental Advisory Council.

This document is intended to be a reflection of the voices of the hundreds of Island residents who participated in the *Water Act* white paper consultation from July 2015 through January 2016. It includes opinions, ideas, comments, and suggestions put forward about how we, as a province, can protect, manage and conserve our water resources.

Any omissions or misrepresentations of ideas that were provided are unintentional. It should be noted that in some instances, the perceptions of participants were out of step with consensus science or not fully aware of the details of government programs, services, or supports currently in place.

### ***Public engagement***

***Phase 1 - White Paper Release*** – A round of public and one-on-one consultations, will be hosted by the Environmental Advisory Council, and completed by the end of 2015 early 2016. A report summarizing the Council's findings to follow.

***Phase 2*** - In phase two, Islanders will be encouraged to review and comment on the draft *Water Act*. Round two of public consultations will be held mid-late 2016

***Phase 3*** - Input from phase two will be used in preparing the final draft of the *Water Act*. *Water Act* completion is set for spring 2017.

### ***About the Water Act consultation panel***

The Environmental Advisory Council consultation panel was comprised of a rotating panel of five members drawn from the Environmental Advisory Council [Richard Davies, Darlene Moore

(alternate), Dean Stewart, Irene Dawson, Art Smith and Ron Maynard]. Jean Paul Arsenault facilitated the consultations.

The Environmental Advisory Council is appointed by the Lieutenant Governor in Council to advise the Minister responsible for the environment on environmental matters. Secretarial services and technical advice for the Council were provided by staff of the Department of Communities, Land and Environment.

### ***Terms of reference for the Water Act consultation***

1. The objective of the *Water Act* consultation panel was to draw together the comments, concerns, ideas, solutions and recommendations presented at public consultations, so they could be used as a resource for legislative drafters, planners and policy developers.
2. The Environmental Advisory Council will summarize the input received from the public in support of developing draft legislation for a *Water Act*.
3. The Environmental Advisory Council will assess the scale and scope of the consultation in terms of its adequacy for government use in the development of a *Water Act*.

### ***Public consultations***

The public consultations were launched on July 10, 2015 and closed on January 15, 2016. All sectors of the province were invited to share their thoughts, feelings and ideas. The consultation was designed to ensure people had multiple opportunities to have their say. Participants were encouraged to be honest and open in their comments, both about what was working and where improvements could be made.

Public community meetings were hosted throughout the province. Over the course of the consultation period, oral presentations were received from organizations, interest groups and individuals. Written submissions were also received from stakeholder groups and interested individuals.

The full schedule of in-person community consultation sessions is provided in Appendix 1.

All public consultation sessions had a lead facilitator, Environment Advisory Council representatives and a recorder. Written submissions and presentations are available in full on the *Water Act* website <http://www.gov.pe.ca/wateract>. Audio files were also made to accompany the presentations and have been made and posted on the government's *Water Act* website. Notes from the proceedings were included in the overall collection of data used to inform the development of this report. Participants were also invited to share their solutions, and facilitated question and answer periods ensured that everyone had the opportunity to contribute.

### ***One-on-one consultations***

The offer of one-on-one consultation sessions was extended to government and non-governmental organizations and interest groups. The opportunity to present the same information at the public sessions was provided to all invitees, some of whom presented at both forums.

One-on-one meetings had a lead facilitator, Environmental Advisory Council representatives and recorder. Invitees provided a 20 minute presentation. Audio recordings of the session were made for archival purposes and posted at <http://www.gov.pe.ca/wateract>.

Visual presentations (e.g., PowerPoint), audio files and/or written summaries are posted on the *Water Act* website. Notes were also taken and used in the development of this report. As with the community consultations, participants were also invited to share their solutions, and time for a question and answer period was provided.

### ***Online consultation***

The consultation website was the central hub for information for the consultation process, including registration information for the public consultation sessions, one-on-one sessions, comments, opinions, solutions and 'road stories' that together captured the broad spectrum of participants' feelings, concerns, and viewpoints.

The website continues to be the source for information about the *Water Act* white paper process. The archived comments and submissions received during the consultation are all available on the website at [www.gov.pe.ca/wateract](http://www.gov.pe.ca/wateract).

### ***Other ways to participate***

In order to be as inclusive as possible, Islanders could also submit their ideas through

- e-mail,
- Facebook,
- Twitter,
- regular mail,
- phone line, and
- public consultations.

### ***Statistical summary of participation***

- Public consultation sessions: 46
- One-on-one consultation sessions: 14
- Online comments: 61

- Written submissions from stakeholders: 14
- Concerns/recommendations: 434

### ***Data analysis***

Every comment, submission, response and letter was read. Some of the submissions were made by representative organizations, or associations, on behalf of many individuals, while others reflected individual concerns. The Environmental Advisory Council recognizes this reality in their review of submissions, but no attempt was made to adjust the data based on the size or membership of an organization. Instead, responses were grouped under six dominant themes and categorized according to the specific concerns that were voiced.

### ***Openness and transparency***

Submissions provided during the *Water Act* white paper consultation are publically available on the consultation website as part of the reporting process. No matter how people participated—online, in person, through the website, or by other means—all submissions were included in the deliberations of this report.

## **For consideration**

### ***Is water a resource, a commodity or something else?***

During the consultations, many presenters proposed that water should neither be defined as a resource nor a commodity, because both terms are believed to suggest the commoditization of water. The contemporary relevance of the topic is paramount since global financial interests have already attached importance to the concept of freshwater as a ‘strategic commodity’, or simply the ‘next fortune’. In this respect, water has already become a commodity in the minds of some.

Defining water as ‘natural capital’ is equally problematic if the term is used to reference some type of economic, social or financial prosperity through the use of water to produce, manufacture or acquire other types of capital.

In whatever way we choose to define water, it remains fundamental to providing the basic conditions for life and, from our perspective, sets the ecological limits for human social and economic progress. However, many have found it distasteful to place a monetary value on the benefits of water. This is especially so when such benefits are only referenced in relation to economic or human wellbeing, and indifferent to creating and maintaining healthy ecosystems.

The Environmental Advisory Council recognizes this dilemma and encourages all to work together to find a new model that unites a respect for water and the ecosystems it supports,

with options for fair, efficient delivery to all users, be they from the agricultural, industrial, rural or urban sectors.

Understanding the value of water and incorporating those values into decision-making, not only means that decisions can be made that are better for the well-being of society, but also for the betterment of the environment. By valuing water above and beyond its economic worth, we can move away from traditional approaches that have put a zero value on nature, and led some to exploit and misuse it.

### ***Human, procedural, and environmental rights***

Every person has the right to live in an environment appropriate to their health and well-being. However, with this right comes a reciprocal duty to individually, and together with others, protect and improve that environment for the benefit of present and future generations,<sup>1</sup> sometimes also referred to as intergenerational equity<sup>2</sup>.

Three forms of 'rights' were discussed during the consultations; namely, human rights, procedural rights, and environmental rights.

Human rights obligations - such as clean water as a basic human right - can help to make environmental policies fairer, more effective, and more respectful. Procedural rights are able to enhance public awareness and participation; foster transparency; and increase accountability in decision making. Finally, environmental rights are able to protect, restore, and conserve the natural environment for the benefit of present and future generations.

Many of the stakeholder groups supported the view that these rights need to form the basic foundation upon which any *Water Act* is built.

## **Findings**

The predominant tone of the presentations was one of concern for the quality and quantity of our water resources. Many participants at the consultations believed that a deterioration in the quality of drinking water, together with a gradual decline in the health and diversity of our aquatic and riparian ecosystems has been a direct result of the way in which we have managed our watersheds and ecosystems over the past 50 years.

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<sup>1</sup> Aarhus Convention (1968) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters done at Aarhus, Denmark, on 25 June 1998  
<http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf>

<sup>2</sup> Intergenerational equity is a concept that says that humans 'hold the natural and cultural environment of the Earth in common both with other members of the present generation and with other generations, past and future' (Weiss, 1990, p. 8). It means that we inherit the Earth from previous generations and have an obligation to pass it on in reasonable condition to future generations.

Participants proposed many solutions during the consultation process and these have been presented in summary form at end of each of the six thematic sections. These recommendations provide opportunities for government, industry, communities and individuals to work together, both in the short and long term to address the problems surrounding water management.

### **Feedback**

Presentations to the Environmental Advisory Council consultation panel raised general concerns about

- uneven summer rainfall which is believed to translate into economic hardship in the agricultural sector under current land management practices and crop rotations;
- climate change predictions that point to a change in overall rain and snowfall distribution, increased summer and winter temperatures and reduced river flow;
- diversion activities (such as high capacity wells) that reduce the water supply for downstream users;
- competing demands for water caused by rapid economic and/or housing developments; and
- adverse affects on water quality and aquatic life caused by various land development and farming practices that result in
  - siltation of rivers and streams;
  - loss of fish habitat, spawning areas and fish stocks;
  - loss of wetlands;
  - anoxic events in estuaries leading to shellfish closure; and
  - man-made contaminants including, nitrates, pesticides and other petroleum products, entering our drinking water and polluting our river systems.

These concerns serve to highlight the scope and complexity of any legislation involving water, and explain in part why many provinces in Canada have taken so much time to draft an overarching piece of legislation of this type. That being said, Prince Edward Island already has several pieces of legislation in place to address water and water resource management.

While the Environmental Advisory Council understands the legitimate concerns of those who feel the consultation process to be rushed, it also recognizes the harmful consequences of inaction. Government has proposed a flexible three-phase work plan with timelines that can

accommodate further investigation if required. The emphasis has been on 'getting the process right' and government has said repeatedly that these timelines can be expanded to accommodate further investigation and consultation if the need is evident.

The Environmental Advisory Council acknowledges, at the outset, that the main purpose of any Act is to provide government with the legislative authority to govern. The regulations and policies that flow from this legislative authority should be flexible and responsive, and should be crafted to meet present and emerging issues as and when they arise. In this respect the Act is only the starting place for a process that will allow the issues surrounding water management in Prince Edward Island to be addressed.

The Council notes that the response to the public consultation process has been outstanding, with input from a broad cross-section of individuals, technical experts, stakeholder groups, communities of interest, and municipalities. The effort and energy put into the preparation of these submissions was very evident. The content of the presentations was thoughtful, and the passion and engagement very apparent. In the view of the Environmental Advisory Council, Phase 1 of the three phase undertaking has been properly completed with adequate time taken and invaluable inputs provided.

### ***Navigating in a sea of information***

All submissions have been carefully reviewed and forwarded to government so as to be available to guide current and future policy and programme development. A 'navigational tool' has been compiled for readers (Appendix 2) to aid in identifying key themes, concerns and recommendations that were expressed. **Entries have been edited for reasons of space. Readers of this report are strongly encouraged to review the source documents collected during the consultation process for a complete record of the proceedings.**

All the presentations and concerns/recommendations have been posted in full on the *Water Act* website and will be retained as source information to be used during the drafting phase of the *Water Act* and in the development of subsequent regulations and policies.

Altogether, **434** concerns/ recommendations were received during the public and one-on-one consultations. These were grouped into **six key themes**; namely

1. water governance and legislation,
2. water quality,
3. watershed management,
4. environmental flows and ecosystem health,
5. water quantity and conservation, and
6. new approaches to water resource protection.



The Environmental Advisory Council recognizes that the general recommendations provided may, on occasion, intersect and overlap with respect to the six key themes due to the interconnectedness of the subject matter. **The subsequent recommendations provided for each of the six key themes are presented in no particular order.**

## Summary of key themes and recommendations heard from the public

### 1. Water governance and legislation

Water is a limited global resource. What we have now is all we have. Water is fundamental for life and health. The Government of Prince Edward Island has a guardianship role to ensure that the quality, allocation, conservation and protection of surface and groundwater are vested in the interests of a common good that includes and accommodates human well-being and the well-being of the natural world.

During the consultation process, many presenters expressed the view that:

- water is not owned by anyone but rather its use should be determined as common to all;
- access to safe drinking water is a human right that entitles everyone without exception to have sufficient, safe, acceptable, physically accessible and affordable water for domestic and personal use, now and for future generations;
- the quantity of safe water available for domestic and personal use must be balanced by the necessary protection of the water resource and the ecosystems that rely on and support water health and security;
- whoever is responsible for damage to the environment should bear the costs associated with that damage (the 'polluter pays' principle); and
- all access to and use of water, apart from domestic and personal use, must be proven to be sustainable, and must not compromise water quality or quantity, or the ecosystems that support water health and security.

Government decisions on the allocation of water resources are currently made using a mixture of regulations and policy that have evolved over several decades. Groundwater and surface water are closely linked and need to be managed together.

Allocating water through policy decisions means that the rules for water allocation can change without the need to follow a formal decision-making process. The introduction of statutory water allocation limits would provide greater security to users by ensuring that water

entitlements are not amended without due process. These limits would also be applied where a risk is identified to the water resource, other water users, or the environment.

Creating a sustainable allocation limit would involve balancing all competing demands over time. This would require a transparent process that is built around stakeholder consultation and prescribed through regulation. It would also give government a clear process to support decisions related to licensing, allocation, and risk assignment.

Many presenters suggested that protecting water at the source is the first critical step in a multiple-barrier approach that includes treatment for contaminant removal, monitoring to ensure that national health standards are met, and adequate infrastructure maintenance.

In framing its legislation, regulations and policies, government was encouraged to ensure that it:

**1. Enhances transparency by:**

- providing clarity in the decision-making process;
- streamlining and simplifying regulations; and
- involving communities in determining how their water resources will be allocated.

**2. Promotes sustainable water use by:**

- applying consistent, risk-based assessment processes for water management decisions, including water allocation;
- ensuring that water extraction limits account for seasonal conditions and climate change;
- ensuring that, where uncertainties exist in factors that affect the application of a regulation, subsequent decisions will be governed by the 'precautionary principle'<sup>3</sup>; and
- protecting water resources and water-dependant ecosystems.

## General recommendations from participants

A new *Water Act* should

- bring the following pieces of legislation together within one, all-inclusive act; namely,
  - *Environmental Protection Act* (relevant components only),
  - *Water Well Regulations*,

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<sup>3</sup> Where a threat of serious or irreversible damage to the environment is possible, but not known with full scientific certainty, that lack of certainty will not be used as a reason for postponing the use of cost-effective measures to prevent possible environmental harm.

- Drinking Water and Wastewater Facility Operating Regulations,
  - Sewage Disposal Systems Regulations and
  - Watercourse and Wetland Protection Regulations.
- integrate water policy initiatives found in the 'Report of the Task Force on Land Use Policy'<sup>4</sup> to:
    - support municipalities in developing and implementing shared servicing of regional water supplies and wastewater treatment;
    - ensure water conservation is adopted in the Code for Plumbing Services Regulations; and
    - ensure that municipal utilities establish effective water conservation programs.
  - consolidate and define the process for approval/rejection and regulation of high-capacity wells and surface sources of water supply;
  - ensure water extraction rates are consistent with protecting the long-term availability of groundwater, the maintenance of the environmental stream flow that protects and secures aquatic, riparian and estuarine ecosystems, and the integrity of peatlands and wetlands;
  - clarify the rules and regulations regarding the seasonal management of water resources;
  - ensure transparency on the status of our water resources and the decision-making processes that affect that status; and
  - provide a set of uniform guiding principles for all government decisions involving water resources, including, but not limited to
    - defining access to water to be a human right;
    - defining a set of nature based rights for all living creatures (and their supporting ecosystems);
    - developing clear rules for water extraction;
    - adopting and enforcing standards for water quality;
    - penalizing polluters for the discharge of pollutants onto the land base, and contaminants directly or indirectly into the aquifer, or water bodies (also known as the 'polluter pays principle'); and
    - prohibiting the practice of hydraulic fracturing ('fracking').

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<sup>4</sup> Report of the Task Force on Land Use Policy (2014) [http://www.gov.pe.ca/photos/original/fema\\_TFreport14.pdf](http://www.gov.pe.ca/photos/original/fema_TFreport14.pdf)

## 2. Water quality

Environmental pollutants pose serious health risks. Water contaminants<sup>5</sup> such as nitrates, bacteria, sediment, petroleum products and pesticides can be introduced into the environment as a result of land use and land management practices. Nitrogen is added to soil in the form of man-made nitrates (fertilizers) or manure to improve soil fertility. Apart from agricultural production, man-made sources of nitrates may also come from wastewater treatment and discharges from industrial processes. Pesticides are applied in agriculture, horticulture, and floriculture; on domestic lawns and gardens; on roads; on sidewalks and airport runways; and in amenity areas such as golf courses, parks, and playing fields.

Nitrate levels in the drinking water supply were an issue for many presenters.<sup>6</sup> Depending on soil type, the natural nitrate concentration in groundwater under aerobic conditions can be as little as a few milligrams per litre of water. The current Canadian guidelines for nitrates in drinking water are a maximum acceptable concentration of 45 mg/L (equivalent to 10 mg/L nitrate-nitrogen)<sup>7</sup>. Concern was raised by Islanders that the maximum acceptable concentration is already exceeded in some watersheds in Prince Edward Island.

The presence of organic pollutants (particularly pesticides) in groundwater and ecosystems was also highlighted by presenters. While current regulatory systems are in place to minimize health risks, not much is known about the risks posed by exposure to low levels of harmful agrichemicals over the long term, particularly where different chemistries are combined.

Questions regarding the sustainable use of pesticides have led to a more considered and responsible use of these chemistries. Even so, problems for water quality in Prince Edward Island are still caused by diffuse pollution from a variety of sources as a consequence of storm water runoff from farmland, clay roads, construction sites, roadways and similar paved areas.

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<sup>5</sup> A **contaminant**, in Prince Edward Island's *Environment Protection Act*, is defined as any "solid, liquid, gas, waste, odour, vibration, radiation, sound, or a combination of them (i) which is foreign to or **in excess of the natural constituents** of the environment into which it is being introduced, (ii) which will or may adversely affect, either directly or indirectly, the natural, physical, chemical, or biological quality of the environment, (iii) which is or may be injurious to the health or safety of a person or be damaging to property or to plant or animal life, (iv) which interferes with or is likely to interfere with the comfort, well-being, livelihood, or enjoyment of life of a person, or (v) which is declared by regulation to be a contaminant."

<sup>6</sup> Nitrate levels in water are expressed as either NO<sub>3</sub> (nitrate) or NO<sub>3</sub>-N (nitrate-nitrogen). Nitrate levels above 45 mg/L NO<sub>3</sub> or 10mg/L NO<sub>3</sub>-N may cause significant health problems in humans.

<sup>7</sup> Health Canada (2013) Guidelines for Canadian Drinking Water Quality Guideline Technical Document Nitrate and Nitrite.

[http://www.hc-sc.gc.ca/ewh-semt/alt\\_formats/pdf/pubs/water-eau/nitrate\\_nitrite/nitrate\\_nitrite\\_2014-eng.pdf](http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/nitrate_nitrite/nitrate_nitrite_2014-eng.pdf)

In response, farmers are increasingly adopting water protection practices such as growing buffer strips of vegetation around waterways and wetlands. Similarly, contractors and developers work to protect watercourses from any suspended soil solids in run-off water that is created as a consequence of their work. Unfortunately, in some parts of Prince Edward Island, legislated prevention methods have not been successful, and pollutants have become far too prevalent, affecting the availability of uncontaminated water.

A common theme voiced during the consultations was that water quality targets must be based on established science and supported by legislated, permitted standards. It was often suggested by presenters that the occurrence of chemicals that undermine water quality targets must be stopped by combining the use of effective monitoring techniques with legislation that is fully enforced.

Much of the advice on nitrates and nitrate contamination was highlighted in the 2008 Report of the Commission of Nitrates in Groundwater.<sup>8</sup> During public discussions it was brought to the attention of the Environmental Advisory Council that many key recommendations addressing nitrate contamination of surface and groundwater were yet to be fully acted upon.

### General recommendations from participants

A new *Water Act* should

- implement all remaining recommendations of the *Report of the Commission in Nitrates in Groundwater*, especially enforcing the rules regarding fields under regulated crop production – a mandatory three-crop rotation without exception (Report of the Commission in Nitrates in Groundwater - Recommendation 7.1);
- establish a nutrient management/accounting programme with required limits for nutrient loading in ‘at risk’ watersheds and wetlands (Report of the Commission in Nitrates in Groundwater - Recommendation 7.2);
- identify and implement remedial actions in watersheds with high nitrate levels including reduction in fertilizer inputs; management of soil organic matter; reduction in land under potato production; strict controls over subdivision development; and the encouragement of wetland restoration (the Report of the Commission in Nitrates in Groundwater - Recommendation 8.1).

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<sup>8</sup> Prince Edward Island: Report of the Commission of Nitrates in Groundwater. (2008)  
<http://www.gov.pe.ca/photos/original/cofNitrates.pdf>

- safeguard and enhance drinking water through adherence to national health-based standards for drinking water that protect against both naturally-occurring and man-made contaminants that may be found in drinking water;
- ensure that source water from streams, rivers, lakes or underground aquifers, used to provide drinking water for human consumption, is protected from contamination (also known as well-field protection);
- penalize polluters for the discharge of pollutants onto the land base, and contaminants<sup>9</sup> directly or indirectly into the aquifer or water bodies (also known as the ‘polluter pays principle’); and
- provide government environment officers, water managers and stakeholders with the fiscal, legislative and enforcement tools necessary to monitor, identify, assess and penalize polluters who release contaminants into surface waters from
  - agricultural activities,
  - municipal, and industrial waste water discharge,
  - domestic septic systems,
  - urban storm water discharge,
  - highway maintenance and construction and
  - forestry operations.

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<sup>9</sup> Contaminants include, but are not restricted to, any substance or substances that damage the original state of the water resource. Damage to the water resource includes impairment of its physical, chemical, or biological properties, ecological functions, or quantitative status.

For the purposes of this section “original state” means the state of the water resource and all its associated ecological functions as it would have existed had the damage not occurred as determined on the basis of the best available information.

### 3. Watershed management

#### *Land*

Before the occurrence of agricultural and urban development, most rainfall was absorbed into the ground and contributed to groundwater recharge. Alternatively, it was recycled into the atmosphere by vegetation through evapotranspiration. However, the elimination of natural forests and tree cover on farmland and in and around urban areas has led to increased storm water runoff and decreased surface water quality. Similarly, conventional tillage operations and loss of open ditching, due to in-filling, has meant a reduction in the amount of rainwater captured in the local water table through passive filtration.

Many presenters spoke to the fact that storm water runoff - created when rain falls on roads, driveways, parking lots, rooftops, and other paved surfaces - moves a variety of pollutants into our watercourses and down into the aquifer. Water that is fed toward natural waterways, and/or constructed storm water systems, during intense rain events (including snowmelt), increases the likelihood of flooding, soil erosion, stream bank erosion, silt deposition and the washout of petrochemical contaminants into watershed systems.

It was suggested that communities can help improve watershed health, water and soil quality and lower maintenance and construction costs of water diversion systems by maintaining or increasing their trees numbers<sup>10</sup>. Appropriate ditching and proper construction/maintenance of clay and paved roads, and minimizing the area of impervious surfaces (such as parking lots) would also serve to reduce soil erosion and run-off.

Environment Canada calculates that 30 per cent forest cover may only support and maintain marginally healthy watersheds and aquatic systems.<sup>11</sup> This equates to a high-risk approach with less than one-half of the potential species richness being maintained. Forty per cent forest cover at the watershed scale equates to a medium-risk approach that is likely to support more than one-half of the potential species richness and moderately healthy aquatic systems. Fifty per cent forest cover, or more, at the watershed scale equates to a low-risk approach that is likely to support most of the potential species and healthiest aquatic systems.

The choice as to what proportion of a watershed needs to be forested is a value-based decision that rests with the wider community. This decision will influence the degree to which

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<sup>10</sup> A mature deciduous tree can intercept more than 1900 to 2600 litres of water per year.

<sup>11</sup> Environment Canada, 'How Much Habitat is Enough?'

[http://www.ec.gc.ca/nature/default.asp?lang=En&n=E33B007C-1#\\_02\\_3\\_1](http://www.ec.gc.ca/nature/default.asp?lang=En&n=E33B007C-1#_02_3_1)

watershed associated riparian and aquatic ecosystem health is repaired, and uncontaminated water is returned to our aquifers.

Prince Edward Island's soils are highly fragile and need to be carefully managed. When our soil is overworked or overwatered, it loses its structure, fertility, and resilience, increasing the potential for soil erosion. However, with skillful management, many producers have been able to support the growth of a variety of valuable crops that help to underpin our Island economy.

Frequently, participants called into question the value of fall plowing. Benefits of fall plowing can include a more workable soil and the taking in and storing of autumn and winter precipitation. However, when poorly performed, fall plowing allows rainwater landing on the soil surface to accumulate above the compact plow pan layer causing it to run off the field and down the furrows resulting in siltation of watercourses. Fall plowing has also been implicated in damage to soil structure through such processes as 'puddling' and 'pulverizing' which can in turn aggravate the risk of water and wind erosion.

Many presenters were pleased to note that government has offered technical and financial assistance to landowners who are interested in protecting their land base by creating soil conservation structures, and/or strip cropping systems through the Canada-Prince Edward Island Agriculture Stewardship Program. Such incentives have also been provided through the Alternative Land Use Services (ALUS) Program which compensates owners for land that is lost as a consequence of establishing soil conservation structures.

However, despite efforts by federal and provincial government departments to improve knowledge about soil conservation methods, there appears to be a surprising degree of ignorance and/or underuse of these techniques. Reports show that the overall organic matter content of our soils continues to decline, reducing our soil's water holding capacity. Many presentations spoke of the soil erosion and soil loss that continues to be a significant problem in many sloped fields, resulting in loss of soil fertility and the degradation of soil tilth.

### **Waterways**

Within each healthy watershed are many complex systems involved in water purification. These systems are adaptable and, in general, remain stable and predictable. However, rapid changes caused by natural occurrences such as extreme rain events, or human activity - such as farming, land development, or construction - can compromise a watershed's ability to maintain the natural processes that contribute to water purification.

Over the long-term, even very small disturbances to the watershed can result in cumulative effects that harm animal and plant species. These will in turn disturb the natural balance in ecosystems, damaging the spawning grounds that support our shellfish and fishing industries.



Several presentations drew attention to the fact that our aquatic ecosystems have been degraded by the effects of pesticide and nitrate contamination<sup>12</sup>. Some farming practices can cause soil erosion and increase run-off. Similarly, heritage and unpaved roads can also accelerate soil erosion and runoff by creating a network of seasonal drainage 'lines' that if directly connected to stream channels, will add to the siltation of our watercourses.

Suspended sediment from any run-off source can impact the health of fresh, estuarine, and coastal waters. In Prince Edward Island, a provisional guideline for total suspended solids for clear-flow background was established at 4 mg per L by examining long-term data for the Bear River. Bear River is a relatively non-impacted stream in the eastern portion of the province.

Current Canadian Council of Ministers of the Environment (CCME) guidelines suggest that human activities should not increase suspended sediment concentrations by more than 25 mg per L above background levels during any short-term exposure period (e.g., 24-h). Applying the CCME guideline factor of 25 mg per L would mean a province-wide maximum permitted level of 29 mg per L of total suspended solids in watercourses. However, CCME guideline values are based on work from other jurisdictions and are not directly applicable across all of Prince Edward Island<sup>13</sup>.

From the scientific evidence presented, it appears that the ability of watersheds to provide clean water for drinking; support fish and shellfish propagation for harvest; and allow navigable waters for fishing and recreational use, has been diminished. Some commentators felt that if we are to properly manage watersheds into the future, it will be necessary to shift our approach from one exclusively centered on our own needs to one that is based around the needs of healthy ecosystems.

### General recommendations from participants

A new *Water Act* should

- ensure that key areas of each watershed remain sufficiently forested to improve their capacity to stabilize soil, reduce soil erosion, and clean and filter surface waters;
- establish a siltation strategy for the province to protect aquatic life from excessive suspended sediments in fresh, estuarine, and coastal waters.

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<sup>12</sup> For example, nitrate loading of waterways can encourage excessive growth of algae and sea lettuce, which may create anoxic events following decomposition.

<sup>13</sup> Aquatic species found in Prince Edward Island may be more or less tolerant to siltation than those found in other areas. Similarly, confounding factors such as temperature, light, flow regimes, stream topography, and native substrate types etc., must be accounted for when determining an appropriate clear-flow "natural" background for Prince Edward Island.

- establish guidelines for municipalities to maintain and increase the amount and width of urban forest buffers and green spaces, and refrain from infilling ditches in and around urban developments to increase the opportunity for storm water to be absorbed into the ground;
- remove fragile sloped land bordering watercourses from row crop production (including but not limited to corn and potatoes);
- establish a nutrient management/accounting programme with required limits for nutrient loading in 'at risk' watersheds and wetlands (Report of the Commission in Nitrates in Groundwater - Recommendation 7.2);
- use cross-compliance legislation to link water permitting to best land management practices (including, but not restricted to programmes such as ALUS) designed to implement conservation farm management and nutrient management plans;
- increase funding to land management programmes such as ALUS; and
- monitor, implement and enforce a minimum three-year crop rotation, with no exceptions.

#### 4. Environmental flows and ecosystem health

Knowing the water requirements (environmental flows) needed to sustain healthy aquatic and riparian<sup>14</sup> ecosystems is critical to proper water management. Environmental flows describe the quantity, timing, and quality of 'water flows' required to sustain freshwater and estuarine ecosystems and the human livelihoods that depend on them.

The Environmental Advisory Council received several presentations showing that the timing, frequency, and intensity of environmental pressures, separately, additively, and over time (cumulatively) will affect ecosystem health.

Some contributors felt that Government had not been aggressive enough in addressing the cumulative effects of reduced environmental flows and increased contamination of our groundwater and river systems. This, it was felt, combined with the adverse effects of climate change, have already put some of Prince Edward Island's rivers and watersheds under considerable stress.

Several presentations stressed that excessive extraction of water, and /or restrictions to the movement of water from groundwater to wetlands, springs and rivers has contributed to an increase in water temperature, and adversely impacted the species composition in our freshwater and estuarine ecosystems. Conversely, land management practices that allow too much water to enter rivers and estuaries in too short a period of time, have led to soil erosion, stream bank erosion and the subsequent siltation of our rivers and estuaries.

It was felt by many participants that consistent and adequate measures of hydrology, physical habitat, water quality, and biological function are needed to make management decisions that can recognize changes in watershed ecosystems. Determining what changes are acceptable requires a judgement of the adequate quantity, quality, and timing of flows in rivers that are needed to maintain ecological health. In as much as we are able to promote ground water recharge and maintenance, it was suggested that we should.

Addressing the needs of ecosystems is a key area of policy research that has not received significant attention from many governments across Canada. Much can be learned from local efforts to improve and incorporate ecosystem needs into watershed planning. Ecosystem services valuation and environmental flow assessments hold promise for supporting a more integrated management of our water resources.

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<sup>14</sup> Aquatic ecosystems are 'wet' ecosystems such as watercourses, lakes, ponds, vernal pools and wetlands. Some of these ecosystems may be dry during the summer months or frozen in the winter. Riparian ecosystems are the areas beside these aquatic ecosystems, supporting vegetation that can tolerate damper conditions and occasional flooding. Riparian ecosystems also occur in wet or dry gullies.

Many of the views expressed as how best to address water allocation and watershed management were at odds with each other. However, all parties in the discussions asked that the development of laws, regulations and policies be based on consistent, reliable and scientifically valid data. That being said, the Environmental Advisory Council acknowledges that any final determination of ecosystem water requirements will involve societal decisions on the preferred condition of the ecosystem and the way that water is taken.

Information presented as to how environmental water needs can be determined included

- assessing the timing and flow (level) of water needed to maintain ecosystem (environmental flow) and water cycle integrity and associated values (social and cultural);
- calculating the significance of the resource's ecological assets (natural capital<sup>15</sup>) and the consequences of its loss;
- identifying the type of infrastructure needed to access water and the water management options that this allows; and
- predicting the reliability of the water supply for environmental and human consumption.

It was suggested that the criteria used to protect aquatic ecosystems should be set out in regulations and statutory water allocation plans, and relate directly to water availability under prevailing (seasonal) and future climatic conditions.

As part of the standard setting process it was suggested that government should be

- modeling multiple scenarios that predict, as best as possible, the impact of climate change on water resources, in terms of quantity and quality;
- tracking progress toward improved water conservation and water use efficiency;
- identifying and addressing environmental impacts, either positive or negative, caused by human activity; and
- enhancing the adoption of innovative technologies and practices that can prevent water wastage.

By making environmental flow management a key component of all decisions about water conservation and use, stakeholders at the watershed level will have more appropriate guidelines with which to make societal judgments about balancing water extraction with ecosystem needs.

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<sup>15</sup> **Natural capital** - is a concept that describes the sum of all the essentials for life that nature provides for humankind. These include clean air and water; the ability to produce and gather food, fuel, and raw materials from the land and sea; the regulation of our climate; flood protection; the prevention of soil erosion; the recycling of wastes; and the filtration of pollution.

## General recommendations from participants

A new *Water Act* should

- place a premium on protecting habitats for aquatic life and prohibit high capacity water extraction (diversion) near the headwaters of streams and rivers;
- where appropriate, create legislation requiring the repair of degraded ecosystems and the re-introduction of lost species;
- incorporate measures into the planning process that reduce, or mitigate, the adverse impact of human activities on the province's water resources;
- develop strategies that support timely responses to climate change;
- protect the integrity of the province's aquatic ecosystems, including fresh water streams, estuaries, and wetlands, through legislation that will set water extraction limits that do not affect environmental flows below a fixed threshold, and that do not adversely impact fish spawning grounds during the breeding season;
- make more efficient and effective provisions to protect the integrity of our water resources, including groundwater, fresh surface water, and estuarine ecosystems, and the aquatic industries or sectors these water resources support. Measures would include
  - harmonizing provincial and federal provisions for the discharge of wastewater and ensuring that effluent quality standards meet or exceed nationally recognized standards; and
  - providing legislated protection for sensitive areas such as well fields, at risk watersheds, the headwaters of streams and river, freshwater riparian and aquatic habitat, wetlands, fish spawning grounds and shellfish-producing estuaries.

## 5. Water quantity and conservation

Scientific information sourced from peer reviewed research provided at the public consultations showed that Prince Edward Island has adequate amounts of surface water and groundwater for its current human needs, defined here as day-to-day domestic use. Even so, as with all other provinces across Canada, the science has yet to determine the minimum environmental flows needed to support and protect aquatic habitats in seasonal streams and rivers with intermittent flows<sup>16</sup>, especially when groundwater is being extracted close to headwaters.

Peer reviewed research confirmed that intense water extraction by municipalities and certain sections of the agriculture industry is having a detrimental effect on some aquatic environments in the peak dry season, above and beyond traditional seasonal variations. Some commentators similarly questioned the effect of intense water extraction by processing operations. The increasing demand for water by municipalities and industry will inevitably place greater stress on Prince Edward Island's watercourses and further deplete the level of groundwater in oversubscribed watersheds.

While current predictions for rainfall do not suggest dramatic future changes to the annual recharge of our aquifers, it was reported that climate change is affecting the frequency and intensity of storm events. This has the potential to reduce the quantity of rainwater captured by our aquifers. Consequently steps will need to be taken to minimize water loss through storm water runoff out to estuaries.

In Prince Edward Island we are already seeing and feeling the effects of a number of impacts as a result of climate change. A range of possible effects have been predicted<sup>17</sup> including the following:

- an increase in storm events, increasing storm intensity, rising sea level, storm surges, coastal erosion, sediment redistribution (longshore drift), salt water intrusion into the aquifer, and river and coastal flooding;
- increased precipitation extremes, possible shifts in water tables, excessive moisture or drought, increased incidence of low river flows, and less winter snow cover;
- milder winters, early extended thaws, earlier starts to the growing season, and later frosts;

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<sup>16</sup> Seasonal streams (intermittent) flow during certain times of the year when smaller upstream waters are flowing and when groundwater provides enough water for stream flow. During dry periods, seasonal streams may not have flowing surface water.

<sup>17</sup> Natural Resources Canada - Climate Change  
<http://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessments/2016/18388>

- increased demand on the water resources needed for agricultural production, and stress on forest species that prefer cooler and wetter climates;
- changes in the types and diversity of plant and animal populations, species distributions and ecosystem composition; and
- potential damage from new plant pests and diseases, loss of fish species, if fish habitats change and new fish distribution and migration patterns develop.

Groundwater and surface water are still considered a 'renewable resource'. However, they cannot be taken for granted. Water availability may become more variable on a site-by-site-basis as precipitation times and intensity start to fluctuate.

The Environmental Advisory Council heard that it was not possible to make informed decisions on the allocation of water without accurate, up-to-date data on local water use. The cumulative impact of water extraction in a watershed requires more scientific study with particular emphasis on local-scale impact assessments as part of the review process.

At present, the rules for water allocation can change without the need to follow a formal decision-making process. In open discussion it was suggested that the introduction of water allocation limits based on locally determined watershed budgets would provide greater security to water users by ensuring that water allocations are not amended without due process. It was also suggested that creating a sustainable water allocation limit on a watershed-by-watershed basis would also involve balancing competing demands over time. This would require a transparent process that is built around stakeholder consultation and prescribed through regulation.

Many contributions stressed that current and future assessments of watershed management should take into consideration the cumulative effects of all our water use, not just the total amount of groundwater resources at our disposal. Decisions about water allocation, the scale and placement of new building developments, and the location, design, and operation of infrastructure were also viewed as important aspects of sustainable water management.

It was also suggested by some participants that the Minister responsible for Environment should have the power to define and amend the geographic boundaries for a water resource, and establish a water allocation accordingly. These limits would take into account factors such as

- hydrogeological and hydrological information,
- environmental water provisions,
- characteristics of the water resource,
- climate change,
- land use planning,
- public interest and

- existing water uses.

Under current legislation, extraction licenses specify a fixed annual volume of water that can be used. It was recommended by some that a new Act should give government a clear process to monitor and support decisions related to licensing, allocation, and risk assignment. A new legislative provision was also considered to be necessary to increase or decrease water entitlements, with clear and transparent rules to match water use with water availability. This, it was suggested, would allow government and users to respond quickly to short-term variability in water resources.

### General recommendations from participants

A new *Water Act* should

- tailor water usage to respective watersheds and develop a watershed budget and water allocation system in consultation with local advisory groups, communities, and municipalities. The mechanism should provide users with greater certainty and a clearer understanding of how water allocation will vary with availability;
- maintain the moratorium on all high capacity wells for the purposes of irrigation until such time as scientifically validated sustainable watershed budgeting and water allocation systems can be developed and approved on a watershed-by-watershed basis;
- establish and monitor legislated water quantity targets to help sustain riparian and aquatic habitats and provide a clean and secure water supply for all Islanders;
- require monitoring, reporting and enforcement of permitted water use amounts by all major users (including agricultural/industrial and municipal) and strengthen water conservation provisions in publically and privately operated agencies, utilities, and businesses; and
- establish water use efficiency standards for all water users.



## 6. New approaches to water resource protection

Complex ecosystems have developed in watersheds that are supported by, and gain stability from, interactions between a variety of chemical, biological, and physical processes. The interaction between these chemical, biological, and physical processes purifies our water and provides the life-support system for all plant and animal species.

Many commentators made the point that understanding the quantity and movement of water is critical to managing the health of these ecosystem processes. There is already a reasonable level of understanding of how pollution and excessive groundwater and surface water withdrawals have negatively impacted water quality and quantity in Prince Edward Island. The focus must now be on reversing these impacts. Where aquatic and riparian ecosystems are stressed beyond their natural ability to recover, it is desirable and feasible to change conditions back to those that existed before the harm was inflicted.

It was generally held that the new *Water Act* should not be as prescriptive on every management issue as to prevent the implementation of new technologies and innovative management practices. Government needs the latitude to select appropriate measures to repair, conserve and improve watersheds and their associated aquatic ecosystems.

Numerous commentators felt that the poor condition of many of the province's watercourses is evidence of the influence of human activity. Evidence was presented to suggest that major river systems, their catchment basins and associated ecosystems have been negatively impacted to varying degrees by municipal, industrial and agricultural development.

It was widely held by many of the participants at meetings across the province that fundamental to any *Water Act* is the recognition that the protection of the aquatic environment is essential for sustainable water management. Several asserted that the health of the aquatic environment is a key indicator of the quality of our all water resources, including the quality and quantity of our groundwater. Consequently it was suggested that Government needs to commit to maintaining, and restoring riparian and aquatic environments throughout the province.

Specific and well-targeted programmes exist already, for example, the Watershed Management Programme, ALUS and the Agricultural Stewardship Programme. These need to be accepted, fully adopted and better funded if we are to reverse the incremental and harmful impacts that poor watershed management and resource planning have had on our water quality and quantity.

The Environmental Advisory Council consultation panel heard many differing opinions on where the responsibility should be held for decision-making about watershed management and water allocation. It is quite clear from the consultations that the consequences of often small,

individual management decisions have, over time, led to huge cumulative and mostly harmful environmental effects. These cumulative effects need to be recognized, so that decision-makers and users can best appreciate the consequences of, and accept the responsibility for, their individual decisions and actions. While government has an important role to play in the overall coordination of water protection and allocation, monitoring, and conservation, there is clearly a responsibility role for municipalities, communities, industry, stakeholder groups and individuals.

### General recommendations from participants

A new *Water Act* should

- establish local water advisory groups that will work with government to monitor, educate, inform, advise and provide guidance on water management and water allocation issues within each community watershed;
- maintain authority for management of the *Water Act* solely with the provincial government; and
- create appropriate powers to delegate specific authority, and provide support through adequate funding to non-government agencies - such as watershed groups, municipalities, regional authorities, and or a new position of environmental ombudsman. In this regard, all agencies (government and non-government) should be provided with adequate supports to help them create practical management plans, develop monitoring programmes, advance their research interests (based on sound science), and or advise or regulate the health and maintenance of watersheds and their associated ecosystems.

## Conclusions

At present, Prince Edward Island has adequate amounts of surface water and groundwater for its human needs. While current predictions for rainfall do not suggest dramatic future changes to the total annual recharge of our aquifers, climate change is destined to influence the pattern and timing of that recharge. As Prince Edward Island's population increases and the demands for water from industry rises, it appears critical that legislated water quantity and quality management plans are in place. These plans must be able to ensure long-term water security, protect our watersheds, and sustain our aquatic and riparian habitats and all those ecosystems that provide for a secure and healthy water supply.

From the public consultations, it was clear that any legislative, regulatory or policy framework should be drafted in such a way as to support efforts to

- conserve, protect, and restore the health of aquatic and riparian ecosystems;
- safeguard and enhance drinking water;
- regulate water use in a manner that respects ecosystem as well as human needs;
- ensure water security through use efficiency and conservation practices;
- encourage and enforce land use management practices that protect water quality, the integrity and health of watersheds, associated watercourses, and the groundwater resource;
- allow for the continuous adaptation of water management rules, as science advances, or natural conditions change; and
- standardize, streamline and make transparent government decision making.

The new Act need not be prescriptive on every management issue. It should, however, have the flexibility to provide municipalities, communities, advisory groups, and government with the tools to address water management issues according to the conditions at specific localities, now and in the future. We all depend on the ability to access basic water services and water resources. The proposed *Water Act* must be able to deliver on that.

## Appendix 1

### Background to the Consultation Process

#### List of Participants

##### *Public Consultations*

Cascumpec Bay Watershed  
Christine Dunphy (Independent)  
City of Charlottetown  
City of Summerside  
Coalition for the Protection of PEI Water  
Cooper Institute  
Cornwall & Area Watershed  
Council of Canadians  
CropLife Canada  
Darcy Lanthier (Independent)  
Daryl Guignon (Independent)  
Don Mazer (Independent)  
Don't Frack PEI  
Dr. Adam Fenech, University of Prince Edward Island  
Dr. Kerry MacQuarrie, University of New Brunswick  
Dr. Michael van den Heuvel, Canadian Rivers Institute/University of Prince Edward Island  
Dr. Yefang Jiang (Agriculture & Agri-Food Canada)  
ECO PEI  
Ellen's Creek Watershed Group & Wright's Creek Watershed Environmental Planning Cttee.  
Federation of Agriculture  
Federation of PEI Municipalities  
Fertilizer Canada  
Friends of Covehead & Brackley Bay  
Gary Schneider (Independent)  
Green Party of PEI  
John te Raa (Independent)  
Kensington North Watershed  
Kensington Water Management  
Latin American Mission Program  
Margaret MacKay (Independent)  
National Farmers Union  
PEI Fishermen's Association  
PEI Food Security Network  
PEI Potato Board  
PEI Shellfish Association  
Pesticide Free PEI

Provincial Catholic Womens League  
Sandy MacKay (Independent)  
Save Our Seas & Shores PEI  
Souris and Area Branch, PEI Wildlife Federation  
Southwest River Nitrate Group  
Teresa Doyle (Independent)  
Town of Stratford  
Coalition for the Protection of PEI Water  
Winter River & Tracadie Bay Watershed Association

***One-on-one consultations***

Atlantic Salmon Federation  
Cavendish Farms  
Dairy Farmers of PEI  
Ducks Unlimited  
Federation of Agriculture  
Hillsborough River Association  
Island Nature Trust  
Natural History Society of PEI  
Nature Conservancy of Canada  
PEI Fishermen's Association  
Watershed Alliance  
Don Jardine (Independent)

**Table 1. Summary of appointments for the public consultations for the Prince Edward Island Water Act**

<b>Date</b>	<b>Location</b>	<b>Group</b>
October 6, 2015	Charlottetown	Dr. Mike van den Heuvel Pesticide Free PEI City of Charlottetown Don Mazer
October 8, 2015	Charlottetown	Dr. Adam Fenech Town of Stratford Gary Schneider PEI Fishermen's Association
October, 13, 2015	Summerside	Provincial Catholic Womens League Cooper Institute Council of Canadians City of Summerside
October 20, 2015	Souris	Souris and Area Branch, PEI Wildlife Federation ECO PEI John te Raa Daryl Guignon
November 3, 2015	Montague	Dr. Kerry MacQuarrie Coalition for the Protection of PEI Water Green Party of PEI National Farmers Union
November 5, 2015	Charlottetown	Dr. Yefang Jiang Don't Frack PEI Winter River & Tracadie Bay Watershed Association Friends of Covehead & Brackley Bays
November 9, 2015	Crapaud	Tony Reddin Citizens Alliance & Blue Dot Yefang Jiang

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<b>Date</b>	<b>Location</b>	<b>Group</b>
November 17, 2015	Wellington	PEI Food Security Network Latin American Mission Program Save Our Seas & Shores PEI
November 24, 2015	Kensington	Kensington North Watershed Kensington Water Management Southwest River Nitrate Group Green Party of PEI
November 26, 2015	Elmsdale	Coalition for the Protection of PEI Water Federation of Agriculture Federation of PEI Municipalities Cascumpec Bay Watershed
December 2, 2015	Cornwall	Cornwall & Area Watershed PEI Potato Board PEI Shellfish Association Ellen's Creek Watershed Group
December 7, 2015	Charlottetown	CropLife Canada Fertilizer Canada Darcy Lanthier Sandy MacKay

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**Table 2. Summary of appointments for the one-on-one consultations for the Prince Edward Island *Water Act***

<b>Date</b>	<b>Location</b>	<b>Group</b>
September 24, 2015	PEI Analytical Laboratories	Nature Conservancy of Canada Island Nature Trust Dairy Farmers of PEI Ducks Unlimited
September 29, 2015	PEI Analytical Laboratories	Watershed Alliance PEI Fishermen's Association
November 19, 2015	PEI Analytical Laboratories	Federation of Agriculture Cavendish Farms Natural History Society of PEI Atlantic Salmon Federation Hillsborough River Association
January 20, 2016*	PEI Analytical Laboratories	Don Jardine

\* Presentation re-scheduled as the result of a storm cancellation



## Appendix 2

### Navigation aid to specific themes/concerns/recommendations

General theme	Concern/Recommendation	Stakeholder	
Protection	Actively protect, conserve and preserve wetlands	Ducks Unlimited	1
Legislation	Critical that the current PEI Wetland Conservation Policy remains effective	Ducks Unlimited	2
Conservation (wetlands)	Maintain 'no net loss' of wetlands and wetland function policy	Ducks Unlimited	3
Legislation	Wetlands need to be protected	Ducks Unlimited	4
Protection	Ensure that protection trumps resource use in any dual mandate legislation	Island Nature Trust	5
Monitoring	Ensure resources and effective monitoring allow for informed decision-making	Island Nature Trust	6
Analysis (Data)	Do not assume! No averages, particularly those from historical studies	Island Nature Trust	7
Protection	Ensure that all water is considered (e.g., in peat lands, springs, etc...)	Island Nature Trust	8
Watershed management	Link water and land management through land-use planning	Island Nature Trust	9
Buffer zones	Increase buffer width to 30 m, with 60-100 m buffers where needed	Nature Conserv. Canada	10
Legislation	Determine appropriate buffer widths based on unique circumstances of each watershed	Nature Conserv. Canada	11
Buffer zones	A "one size fits all" solution is not appropriate for buffer zone regulation	Dairy Farmers of PEI	12
Governance	Ensure authority re regulation of land is retained only by the provincial government	Dairy Farmers of PEI	13
Governance	Ensure municipalities remain subordinate to government decisions re agricultural matters	Dairy Farmers of PEI	14
Governance	Authority over water management in PEI to remain with government	Dairy Farmers of PEI	15
Watershed management	More independent, peer reviewed, scientific research is needed	PEI Fishermen's Assoc.	16
Water Act process	Current timeline to complete the <i>Water Act</i> is too aggressive	PEI Fishermen's Assoc.	17
Legislation	Need to differentiate between fresh water and saltwater high capacity wells	PEI Fishermen's Assoc.	18
High capacity wells	Maintain the moratorium on high capacity wells and monitor existing wells	PEI Fishermen's Assoc.	19
Water quality	Concern re groundwater to irrigate fields will draw up pesticides	PEI Fishermen's Assoc.	20
Climate change	Concern re more erratic precipitation in the future	PEI Fishermen's Assoc.	21

General theme	Concern/Recommendation	Stakeholder	
Monitoring	Need for aquatic ecosystem health monitoring	PEI W'tershd. Alliance	23
Pesticides	Legislation must protect water quality and quantity	PEI W'tershd. Alliance	24
Monitoring	Adequate public resources needed for a strategic, effective monitoring program	PEI W'tershd. Alliance	25
Nitrates	Concerns expressed re nitrates in drinking water	PEI W'tershd. Alliance	26
Anoxic events	Concerns expressed re anoxic events	PEI W'tershd. Alliance	27
Pesticides	Concerns expressed re pesticides in drinking water	PEI W'tershd. Alliance	28
Fish kills	Concerns expressed re fish kills	PEI W'tershd. Alliance	29
Soil erosion	Concerns expressed re erosion and siltation	PEI W'tershd. Alliance	30
Climate change	Climate change and water availability are growing concerns	PEI W'tershd. Alliance	31
Research	Concerns expressed re water extraction, salt water intrusion and habitat degradation	PEI W'tershd. Alliance	32
Protection (habitats)	Protect habitats and natural environment	PEI W'tershd. Alliance	33
Resource allocation	Prioritize access to water and avoid water shortages/water excesses	PEI W'tershd. Alliance	34
Watershed management	Watershed management required on ecologically relevant scale	PEI W'tershd. Alliance	35
Environmental flow	Environmental water flows required to sustain aquatic ecosystems and human wellbeing	Canadian Rivers Inst.	36
<i>Water Act</i> process	Consultation is required at every stage of Act development	Canadian Rivers Inst.	37
<i>Water Act</i> process	Consultation and negotiation required in the development of regulations	Canadian Rivers Inst.	38
Nutrient management	Set nitrogen loading targets for watersheds through regulation	Canadian Rivers Inst.	39
Fish kills	Concerns expressed regarding fish kills	Canadian Rivers Inst.	40
Monitoring	Need for appropriate tools for planning and managing land use	Canadian Rivers Inst.	41
Soil erosion	Concern re agriculture increasing soil erosion susceptibility	Canadian Rivers Inst.	42
Governance	Need a governance structure/tax base to manage water on a watershed basis	Canadian Rivers Inst.	43
Legislation	Streamline legislation	City of Charlottetown	44
Water management	Need for water loss management strategy	City of Charlottetown	45
Monitoring	Introduce water metering	City of Charlottetown	46
Infrastructure	Improve infrastructure renewal	City of Charlottetown	47
Education	Improve education, storm water redirection, water capture	City of Charlottetown	48
Resource allocation	Improve water resource allocation - city a primary user	City of Charlottetown	49

General theme	Concern/Recommendation	Stakeholder	
Public Trust/Human Rights	Water is a public trust, common good, and a human right	Don Mazer	50
Environmental Rights	Plants and animals have a right to water	Don Mazer	51
Ecosystems	Need to protect ecosystem health	Don Mazer	52
Transparency	Transparent public process required	Don Mazer	53
Resource allocation	Reduce city water extraction to 'manageable' levels	Don Mazer	54
Financial support	Watershed management groups need better funding	Don Mazer	55
Resource allocation	Prevent another Winter River	Don Mazer	56
Monitoring	Keep moratorium on high capacity wells and monitor existing wells for contaminants	Pesticide Free PEI	57
Sustainable farming	Encourage sustainable, organic, mixed farming models	Pesticide Free PEI	58
Pesticides	Province-wide ban on the sale and use of cosmetic lawn pesticides	Pesticide Free PEI	59
Climate change	Precipitation likely to be 7 per cent less by 2020's	Adam Fenech, UPEI	60
Education	Strengthen the water education component in our school system	Gary Schneider	61
Monitoring	Increase monitoring and enforcement efforts that help courts uphold legislation	Gary Schneider	62
Governance	Province is responsible for monitoring and enforcement, not watershed groups	Gary Schneider	63
Precautionary principle	The Act should focus on the 'precautionary principle'	Gary Schneider	64
Human Rights	Access to clean water should be recognized as a basic human right	Gary Schneider	65
Environmental flow	Have legally enforceable minimum environmental flows in each watershed	Gary Schneider	66
Buffer zone	Legislate an increase in the minimum buffer zone to 20 metres	Gary Schneider	67
Pollution	Prohibit introducing foreign matter into streams	Gary Schneider	68
Nutrient management	Establish clear, enforceable targets to reduce nitrogen fertilizer inputs	Gary Schneider	69
Pesticides	Create policy that effectively reduces pesticide use across the board	Gary Schneider	70
Legislation	Remove all loopholes in a mandatory three-year crop rotation	Gary Schneider	71
Financial support	Fair compensation required for additional land taken out of production	Gary Schneider	72
Financial support	More financial and human resources for watershed groups	Peter Meggs	73

General theme	Concern/Recommendation	Stakeholder	
Governance	Province to be fully incorporated with municipalities of a sustainable size	Town of Stratford	74
Legislation	Unified land use and water legislation will ensure planning authorities are effective	Town of Stratford	75
Watershed management	Sustainable watershed management is required in municipality operations	Town of Stratford	76
Governance	Watershed boundaries should be used in developing municipal boundaries	Town of Stratford	77
Water conservation	Water efficient devices should be incorporated into new development and retrofits	Town of Stratford	78
Legislation	Harmonize federal and provincial requirements for sewer treatment facilities	Town of Stratford	79
Stormwater management	Disallow storm water connections to the sanitary sewer systems	Town of Stratford	80
Governance	Engage municipalities in the decision re regulating water	Town of Stratford	81
Resource allocation	Outline criteria for and prioritization of water use	Town of Stratford	82
Legislation	Review definition of a wetland or watercourse as well as the size of the buffer zones	Town of Stratford	83
Well field protection	Well field protection plans be required from water utilities	Town of Stratford	84
Well field protection	Well fields outside of municipality boundaries should still be protected	Town of Stratford	85
Resource allocation	Present and future potable water requirements should be identified and reserved	Town of Stratford	86
Infrastructure	Infrastructure should be designed based on future predictions and not past experience	Town of Stratford	87
Stormwater management	Stormwater management plans should be created for all watersheds	Town of Stratford	88
Governance	Hold City of Summerside accountable for operation of water and wastewater systems	City of Summerside	89
Education	Incorporate measures for education of the public on environmentally sensitive issues	City of Summerside	90
Stormwater management	End the practice of overwhelming sanitary sewers with storm water flow	City of Summerside	91
Legislation	Integrate water/sewer utility and Health Canada Guidelines for drinking water	City of Summerside	92
Financial support	Fund municipalities for ongoing water and wastewater Infrastructure upgrades	City of Summerside	93
Resource protection	Regulate human activity which puts groundwater at risk	City of Summerside	94
Monitoring	Continued regulation of water and wastewater testing required	City of Summerside	95
Pollution	Concerns expressed re increasing nitrate and pesticide contamination in groundwater	City of Summerside	96
Stormwater management	Storm water management to protect drinking and wastewater systems	City of Summerside	97
Environmental Rights	Recognize the rights of Mother Earth	Leo Broderick	98
Human Rights	Affirm water as a human right and a public trust	Leo Broderick	99
Public Trust	Confirm the public ownership of surface and groundwater	Leo Broderick	100

General theme	Concern/Recommendation	Stakeholder	
Financial support	Ensure financial, personnel, and public resources needed to implement the Act	Leo Broderick	101
High capacity wells	Oppose lifting moratorium on high capacity wells	Leo Broderick	102
Resource protection	Establish a Land Trust	Leo Broderick	103
Environmental flow	Concern re stream flow and aquatic health function of available groundwater	Daryl Guignon	104
Environmental flow	Dry stream beds in summer or early autumn mean unreported fish kills occurring	Daryl Guignon	105
Climate change	Intensity of storm events may lead to less aquifer recharge	Daryl Guignon	106
Pollution	Concern expressed re pesticides in groundwater	Daryl Guignon	107
Financial support	Landowners should be encouraged to protect wildlife zones through land donation	Daryl Guignon	108
Buffer zones	Require a minimum 60 m buffer zones in riparian zones	Daryl Guignon	109
<i>Water Act process</i>	Involve all stakeholders and government	ECOPEI	110
Environmental flow	Establish minimum environmental flow rates	ECOPEI	111
Buffer zones	Require enhanced buffer zones	ECOPEI	112
Monitoring	Increase monitoring and enforcement	ECOPEI	113
Ecosystems	Reintroduce historic (lost) species	ECOPEI	114
Ecosystems	Support ecosystem health and biodiversity	ECOPEI	115
Ecosystems	Repair degraded ecosystems	ECOPEI	116
Soil erosion	Safe-guard soil against soil erosion	ECOPEI	117
Education	Improve the water education curriculum in our school system	ECOPEI	118
Resource allocation	Charlottetown is pumping the Winter River dry	John te Raa	119
Environmental flow	<i>Water Act</i> should address urban water needs and support healthy environmental flows	John te Raa	120
<i>Water Act process</i>	The consultation process is proceeding too quickly	Wildlife Fed.	121
Education	Public not well educated enough on water issues	Wildlife Fed.	122
Public Trust	Water is an essential common good that belongs to all	Wildlife Fed.	123
Environmental Rights	All beings are entitled to what they need to exist	Wildlife Fed.	124
Nitrates	Nitrate contamination is a major issue	Wildlife Fed.	125

<b>General theme</b>	<b>Concern/Recommendation</b>	<b>Stakeholder</b>	
Anoxic events	Anoxic events still occur frequently	Wildlife Fed.	126
Nitrates	Concern regarding nitrates in the Northumberland Strait	Wildlife Fed.	127
Soil erosion	Concern regarding excessive erosion and sedimentation	Wildlife Fed.	128
Pesticides	Concern regarding pesticides in drinking water	Wildlife Fed.	129
Fish kills	Concern regarding 50 fish kills in 50 years	Wildlife Fed.	130
Resource allocation	Concern regarding water shortages/water excesses/over extraction	Wildlife Fed.	131
High capacity wells	High capacity wells have negative impact on 1st order streams	Wildlife Fed.	132
Monitoring	Concern regarding need for aquatic ecosystem health monitoring	Wildlife Fed.	133
Resource allocation	Concern regarding prioritization of access to water	Wildlife Fed.	134
User pay	For-profit users of water must pay the fair market value to Islanders	Wildlife Fed.	135
Water conservation	Must avoid water wastage	Wildlife Fed.	136
Research	Need greater collaboration to improve knowledge base	Wildlife Fed.	137
Water conservation	Solutions to involve using low-flow toilets, showerheads, rain barrels, etc	Wildlife Fed.	138
Monitoring	Implement water meters and re-use of storm water runoff	Wildlife Fed.	139
Resource allocation	Concern regarding clean water for animals and the maintenance of good sanitation	PEI Pork	140
Nutrient management	Pork industry contributor of natural nutrients to Island crops	PEI Pork	141
Governance	Water regulation must remain the mandate of the provincial government	PEI Pork	142
Water protection	Safe water supply is a major component in a healthy and vibrant tourism industry	TIAPEI	143
Ecosystems	Protect the landscape and its viewscapes	TIAPEI	144
Pollution	Water contamination is detrimental to tourism	TIAPEI	145
Governance	Island branded as a “green,” environmentally responsible jurisdiction	TIAPEI	146
Monitoring	Implement a strict water testing policy to ensure a safe water supply	TIAPEI	147
Strategic planning	Aim for health, quality of life, social equity and solidarity	Coalit'n 4 Protect.	148
Legislation	State guiding principles in the <i>Water Act's</i> preamble	Coalit'n 4 Protect.	149
Precautionary principle	Employ the precautionary principle	Coalit'n 4 Protect.	150
Strategic planning	Guide government decision-making and Islanders' application requests	Coalit'n 4 Protect.	151

General theme	Concern/Recommendation	Stakeholder	
Conservation	Key themes of environmental protection, economic efficiency and access to knowledge	Coalit'n 4 Protect.	152
Intergenerational equity	Abide by intergenerational equity	Coalit'n 4 Protect.	153
Polluter pays principle	Employ the polluter pays principle	Coalit'n 4 Protect.	154
Ecosystem	Respect ecosystem support capacity	Coalit'n 4 Protect.	155
Governance	Delegate powers and responsibilities to appropriate authorities	Coalit'n 4 Protect.	156
Strategic planning	With known risks, preventative, mitigating and corrective actions must be taken	Coalit'n 4 Protect.	157
Science based decisions	Models used to investigate groundwater flow consistent with the state-of-practice	Dr. Kerry MacQuarrie	158
Science based decisions	Groundwater flow models sufficient for groundwater-supply management purposes	Dr. Kerry MacQuarrie	159
Science based decisions	Groundwater flow models applied by Environment considered appropriate	Dr. Kerry MacQuarrie	160
Monitoring	More localized site-specific studies are required for water extraction policy	Dr. Kerry MacQuarrie	161
Environmental flow	Distance of well(s) from streams affects environmental flow rates	Dr. Kerry MacQuarrie	162
High capacity wells	Aquifer recharge values known to be in the range of 250 to 450 mm per year	Dr. Kerry MacQuarrie	163
Monitoring	Long-term, groundwater monitoring is a key component of groundwater management	Dr. Kerry MacQuarrie	164
New technology	Decision making needs to be supported by science and modeling techniques	Dr. Kerry MacQuarrie	165
New technology	Outline key sustainability goals	Dr. Kerry MacQuarrie	166
Ecosystems	The <i>Water Act</i> to underpin the life-giving connection to all life	Nat. Farm. Union	167
Precautionary approach	Apply the precautionary principle to every aspect of the <i>Water Act</i>	Nat. Farm. Union	168
Protection	Ensure a permanent ban on hydraulic fracturing (fracking)	Nat. Farm. Union	169
High capacity wells	Extend the moratorium on high capacity wells for ten years (or longer )	Nat. Farm. Union	170
Organic farming	Make organic farming easier for beginner farmers to adopt	Nat. Farm. Union	171
Public Trust	<i>Water Act</i> should declare that water is a common trust	Nat. Farm. Union	172
Intergenerational equity	<i>Water Act</i> should be enforceable and enforced	Nat. Farm. Union	173
Science based decisions	Be sure the Act is based on 'true' science	Nat. Farm. Union	174
Climate change	Factor in present and future threats of climate change	Nat. Farm. Union	175
Transparency	Encourage a transparent, public process by which to develop the <i>Water Act</i>	Nat. Farm. Union	176
Organic farming	Require better stewardship of the soil and enforce mandated crop rotations	Teresa Doyle	177

General theme	Concern/Recommendation	Stakeholder	
Organic farming	Set strict targets to phase out chemical fertilizers and pesticides	Teresa Doyle	178
Financial support	Guarantee livable income for food producers	Teresa Doyle	179
Protection	Groundwater extraction should maintain stream flow for aquatic habitat protection	Jefang Jiang	180
Resource allocation	Reduce the City of Charlottetown's water extraction totals from the Winter River	Winter Rv. Trac. Bay	181
High capacity wells	Involve watershed groups in the permitting process for high capacity wells	Winter Rv. Trac. Bay	182
Protection	Enforce existing permits and regulations and penalize infractions	Winter Rv. Trac. Bay	183
Sustainability	Set criteria for declaring drought conditions	Winter Rv. Trac. Bay	184
Transparency	Share data freely	Winter Rv. Trac. Bay	185
Watershed management	Analyze the connectivity of groundwater reservoirs in adjacent watersheds	Winter Rv. Trac. Bay	186
Watershed management	Draw groundwater resources from unconnected multiple sources	Winter Rv. Trac. Bay	187
High capacity wells	Do not permit high capacity wells near river headwaters	Winter Rv. Trac. Bay	188
Monitoring	Mandatory third party long-term monitoring programs of large scale water extraction	Winter Rv. Trac. Bay	189
Resource allocation	Return water to the Winter River to reduce the amount of "one way flow"	Winter Rv. Trac. Bay	190
Protection	Outright ban on hydraulic fracturing (fracking) in PEI	Don't Frack PEI	191
Watershed management	Manage water on a watershed basis	Friends Covehead BB	192
Governance	Include watershed groups in the development of policies and regulations	Friends Covehead BB	193
Conservation	Develop water quality targets for all watersheds	Friends Covehead BB	194
Governance	Regulate users, assign responsibility and enforce compliance	Friends Covehead BB	195
Precautionary approach	Proceed only on the basis of reliable scientific evidence	Friends Covehead BB	196
Monitoring	Invest in better water quality monitoring equipment	Friends Covehead BB	197
Monitoring	Coordinate water monitoring efforts provincially	Friends Covehead BB	198
New technology	Examine feasibility of a sea lettuce harvesting and composting industry	Friends Covehead BB	199
Nutrient management	Increase tidal flow in estuaries and reduce nutrient contamination of ground water	Friends Covehead BB	200
Nutrient management	Encourage the adoption of sustainable farming practices	Friends Covehead BB	201
Nutrient management	Adopt nutrient management plans (4R's)	Friends Covehead BB	202



General theme	Concern/Recommendation	Stakeholder	
Nutrient management	Implement new fertilizer application techniques	Friends Covehead BB	203
Nutrient management	Place emphasis on maintaining a high organic matter content in soil	Friends Covehead BB	204
Soil conservation	Develop better top soil retention strategies	Friends Covehead BB	205
Ecosystems	Increase new wetland development	Friends Covehead BB	206
Nutrient management	Support research and adoption of nutrient management planning	Friends Covehead BB	207
Nutrient management	Establish clear nitrogen loading targets, and means of reaching these targets	Friends Covehead BB	208
Protection	Recognize that infilling of estuaries and bays harms ecosystems, fishers, and tourism	Friends Covehead BB	209
Siltation	Develop federal and provincial collaboration to remedy siltation in estuaries	Friends Covehead BB	210
Research	Consider test projects to find new means of improving tidal flushing	Friends Covehead BB	211
Buffer zones	Vary buffer zone size according to topography and land use, and penalize infringements	Friends Covehead BB	212
Soil conservation	Assist landowners in creating berms and better drainage infrastructure	Friends Covehead BB	213
Protection	Highway construction must utilize the most environmentally sensitive practices	Friends Covehead BB	214
Mandatory crop rotation	Amend crop rotation rules to designate corn as a row crop	Friends Covehead BB	215
Wetlands	Prohibit row crops on sloped lands bordering watercourses	Friends Covehead BB	216
Soil conservation	Increase use of cover crops and reduce fall cultivation	Friends Covehead BB	217
High capacity wells	Keep the 'moratorium' in place and include uses outside agriculture	Sierra Club	218
High capacity wells	Examine present policy on active high capacity water wells	Sierra Club	219
Pollution	Assess hazards from contaminants through high capacity well pumping	Sierra Club	220
Organic farming	Develop programs to increase soil organic matter	Sierra Club	221
Protection	Develop a 'water' policy to restore and protect PEI's groundwater resource	Sierra Club	222
Organic farming	Encourage move to sustainable agriculture based on organic farming principles	Sierra Club	223
Nitrates	Include a clear strategy in the <i>Water Act</i> designed to reduce nitrates in drinking water	Sierra Club	224
Monitoring	Establish enforceable drinking water standards	Blue Dot PEI	225
Environmental Rights	Incorporate environmental rights into the <i>Water Act</i>	Blue Dot PEI	226
Intergenerational equity	Develop environmental rights to protect the environment for all generations	Blue Dot PEI	227
Procedural Rights	Ensure that our laws and policies support our survival, and prioritize key social values	Blue Dot PEI	228
Human Rights	Water as a human right better ensures all live lives of dignity, equality, and freedom	Blue Dot PEI	229

General theme	Concern/Recommendation	Stakeholder	
Governance	Water as a human right set[s] out clear procedural requirements for policy-making	Blue Dot PEI	230
Ecosystems	Water as a human right may provide remedies for environmental harm	Blue Dot PEI	231
Transparency	Allow greater access to information	Blue Dot PEI	232
Transparency	Create better Independent oversight	Blue Dot PEI	233
Procedural Rights	Encourage public participation in environmental governance and decision-making	Blue Dot PEI	234
Organic farming	Develop a food policy based on a sustainable local food [production] system	PEI Food Security Net.	235
High capacity wells	Keep the moratorium on high capacity wells in place	PEI Food Security Net.	236
Organic farming	Increase [soil] organic matter content and protect soils from further degradation	PEI Food Security Net.	237
Monitoring	Set out a protocol for determining water use needs all 'water users'	PEI Food Security Net.	238
Financial support	Support food producers financially to take land out of production	PEI Food Security Net.	239
Protection	Ban 'fracking' [hydraulic fracturing]	PEI Food Security Net.	240
Water quantity	Concerns raised re water quantity	Latin Amer. Missn. Prog.	241
Procedural Rights	Concerns raised re lack of engagement of Aboriginal Peoples	Latin Amer. Missn. Prog.	242
Transparency	Concerns raised re opportunity to participate	Latin Amer. Missn. Prog.	243
Research	Concerns raised re lack of research	Latin Amer. Missn. Prog.	244
Transparency	Concerns raised re lack of transparency	Latin Amer. Missn. Prog.	245
Resource allocation	Concerns raised re enforcement	Latin Amer. Missn. Prog.	246
Legislation	Concerns raised re quality of the Act	Latin Amer. Missn. Prog.	247
Protection	Concerns raised re pollution of PEI water resulting from oil and gas exploration	Save Our Seas & Shores	248
Ecosystems	Create a right to clean, safe drinking water, and protect the health of aquatic systems	Save Our Seas & Shores	249
High capacity wells	Keep moratorium on high capacity wells for agricultural irrigation	Save Our Seas & Shores	250
<i>Water Act process</i>	Extend the timeline for the introduction of legislation	PEI Fed. Agriculture	251
Monitoring	Concern about the need for additional science and monitoring	PEI Fed. Agriculture	252
Research	Conduct a scientific review of water use on PEI farms	PEI Fed. Agriculture	253
Permitting process	Water permitting should be strictly monitored	PEI Fed. Agriculture	254

General theme	Concern/Recommendation	Stakeholder	
Resource allocation	Develop a Code of Practice for water use	PEI Fed. Agriculture	255
Resource allocation	Ensure the agriculture community has access to an adequate water supply	PEI Fed. Agriculture	256
Buffer zone	Maintain existing buffer zone regulations	PEI Fed. Agriculture	257
Legislation	Create flexible, effective and clear legislation	PEI Fed. Agriculture	258
Governance	Maintain authority for management of Act solely with the provincial government	PEI Fed. Agriculture	259
Monitoring	Report annually on the uptake of nutrient management plans	Nat. Hist. Soc. PEI	260
Organic farming	Encourage BMP and organic farming methods to reduce soil erosion	Nat. Hist. Soc. PEI	261
Buffer zones	Increase buffer zones to 30 m	Nat. Hist. Soc. PEI	262
Monitoring	Create a long-term multiple watershed monitoring programme	Nat. Hist. Soc. PEI	263
Monitoring	Fully enforce <i>Agricultural Crop Rotation Act</i> and buffer zone regulations	Nat. Hist. Soc. PEI	264
High capacity wells	Keep moratorium on high capacity wells for irrigation	Nat. Hist. Soc. PEI	265
Ecosystems	Concerns raised re: biodiversity loss, contamination, siltation, and over extraction	Nat. Hist. Soc. PEI	266
Science based decisions	Base decisions on good, sound science in individual watersheds	Cavendish Farms	267
Irrigation ponds	Construct ponds to collect irrigation water filled by high capacity wells	Cavendish Farms	268
Irrigation ponds	Capture spring runoff to fill irrigation ponds	Cavendish Farms	269
High capacity wells	Increase well capacity limits from 50 gpm to 200–250 gpm	Cavendish Farms	270
High capacity wells	Allow well water to be pumped out of streams at acceptable times of the year	Cavendish Farms	271
Precautionary approach	Use the precautionary principle for water use regulations/environmental flows	Atlantic Salm. Fed.	272
Environmental flow	Develop convincing data on aquifer extraction and [environmental] river flows	Atlantic Salm. Fed.	273
Monitoring	Develop stringent permitting process for water extraction	Atlantic Salm. Fed.	274
Monitoring	Water extraction permits to incorporate monitoring and cancellation prerogatives	Atlantic Salm. Fed.	275
Monitoring	Fund increased water use monitoring from those seeking water extraction permits	Atlantic Salm. Fed.	276
Organic farming	Encourage soil nutrient management and low demand short season potato cultivars	Hillsboro. Rv. Assoc.	277
Ecosystems	Improve fish passage and water quality	Hillsboro. Rv. Assoc.	278
Financial support	Fund and upgrade sewage management facilities	Hillsboro. Rv. Assoc.	279

General theme	Concern/Recommendation	Stakeholder	
Monitoring	Implement recommendations from previous environmental reports	Hillsboro. Rv. Assoc.	280
Ecosystems	Remove silt from impoundments, streams, wetlands, and estuaries	Hillsboro. Rv. Assoc.	281
Research	Conduct aquatic health science studies	Hillsboro. Rv. Assoc.	282
Enforcement	Provide staff to properly address the scope of the Act	Hillsboro. Rv. Assoc.	283
Polluter pays principle	Develop an amelioration fund financed by the polluter pays principle	Hillsboro. Rv. Assoc.	284
Conservation	Encourage the building of irrigation storage ponds	Hillsboro. Rv. Assoc.	285
Legislation	Create disincentives rather than incentives	Hillsboro. Rv. Assoc.	286
Protection	Redefine row crops [to include corn]	Hillsboro. Rv. Assoc.	287
Conservation Farming	Move to a four year monitored crop rotation	Hillsboro. Rv. Assoc.	288
Financial support	Support better and free access to science literature	Hillsboro. Rv. Assoc.	289
User pay	Require user pay for nitrate filters, high capacity wells, and water quality monitoring	Hillsboro. Rv. Assoc.	290
Conservation	Create green cover standards within municipality cores	Hillsboro. Rv. Assoc.	291
Buffer zones	Create wider watercourse buffers	Hillsboro. Rv. Assoc.	292
Water conservation	Municipalities must curtail water over consumption or pay a penalty	Hillsboro. Rv. Assoc.	293
Infrastructure	Match infrastructure capacity to meet climate change predictions	Hillsboro. Rv. Assoc.	294
Water recharge planning	Develop a water recharge planning strategy	Hillsboro. Rv. Assoc.	295
Increase ALUS	Raise ALUS payments to encourage adoption of best management practices	Nitrate Ken. N. W'tershd.	296
Low N potato cultivars	Create a coalition of groups to promote environmental low impact potato cultivar use	Nitrate Ken. N. W'tershd.	297
Research	Create advocacy group to examine ground and surface water management research	Nitrate Ken. N. W'tershd.	298
Conservation farming	Conduct literature review and research on conservation farming	Nitrate Ken. N. W'tershd.	299
Soil erosion	Require that crop rotations are designed to retain field soil as the top priority	Ken. N. W'tershd. Auth.	300
Clay road management	Require that private roads are managed to prevent siltation in watercourses	Ken. N. W'tershd. Auth.	301
Silt strategy	Develop a 'silt strategy' for the province	Ken. N. W'tershd. Auth.	302
Resource allocation	Assist watershed groups in carrying out data collection and scientific research	Ken. N. W'tershd. Auth.	303
Science based decisions	Use science-based decision making re watersheds and ecosystem management	Ken. N. W'tershd. Auth.	304
Resource allocation	Provide adequate and timely levels of funding for watershed groups	Ken. N. W'tershd. Auth.	305
Communication	Provide advance notice to watershed groups of construction work by government depts.	Ken. N. W'tershd. Auth.	306

General theme	Concern/Recommendation	Stakeholder	
Ombudsman	Create a position for an Ombudsman to respond to environmental concerns	Ken. N. Watershd. Auth.	307
Incorporation	Full incorporation of the Island	Town of Kensington	308
Monitoring	Require all municipalities track and report extraction rates from their well fields	Town of Kensington	309
Oil tank storage	Raise petroleum storage regulations to higher standards of safety	Town of Kensington	310
Communication	Create public awareness campaign re water conservation	Town of Kensington	311
New technology	Require all schools to adopt water conservation measures	Town of Kensington	312
Financial support	Increase funding to municipalities for water and sewage management	Town of Kensington	313
Ecosystems	Protect and ensure the health of all aquatic ecosystems for generations to come	Coalit'n 4 Protect.	314
Water Advisory Board	Create a Water Advisory Board	Coalit'n 4 Protect.	315
Intergenerational equity	Adopt intergenerational equity and precautionary principle as guiding themes	Coalit'n 4 Protect.	316
Human Rights	Enshrine the right to clean drinking water in the <i>Water Act</i>	Coalit'n 4 Protect.	317
Conservation Farming	Use only sustainable agricultural practices	Coalit'n 4 Protect.	318
High capacity wells	Maintain moratorium for new high capacity wells and monitor existing ones	Coalit'n 4 Protect.	319
Protection	Ban hydraulic fracturing (fracking)	Coalit'n 4 Protect.	320
Resource allocation	Develop priorities for access to water considering how much we really need	Coalit'n 4 Protect.	321
Financial support	Fund and empower watershed groups	Coalit'n 4 Protect.	322
Water Act process	Extend the timeline for the introduction of legislation	PEI Fed. Agriculture	323
Science based decisions	Conduct a scientific review of PEI farm water use	PEI Fed. Agriculture	324
Monitoring	Water permitting should be strictly monitored	PEI Fed. Agriculture	325
Conservation Farming	Permitting irrigation to include soil conservation and organic matter component	PEI Fed. Agriculture	326
Irrigation specialist	Develop Code of Practice for water use	PEI Fed. Agriculture	327
Resource allocation	Ensure the agriculture community has access to adequate water supply	PEI Fed. Agriculture	328
Buffer zones	Existing buffer zone regulations to remain unchanged	PEI Fed. Agriculture	329
Governance	Retain authority for management of the Act solely with the provincial government	PEI Fed. Agriculture	330
Governance	Ensure water management decisions do not reside with municipalities	PEI Fed. Agriculture	331
Governance	Do not delegate authority for water management to any advisory groups	PEI Fed. Agriculture	332

General theme	Concern/Recommendation	Stakeholder	
High capacity wells	Maintain moratorium on high capacity well for 10 years	Casc'pec W'tershd. Assoc.	333
Infrastructure	Evaluate current infrastructure re surface water flow	Casc'pec W'tershd. Assoc.	334
Climate change	Review of land use policies in light of climate change	Casc'pec W'tershd. Assoc.	335
ALUS upgrade	Review ALUS program re improving surface water management	Casc'pec W'tershd. Assoc.	336
New technology	Research alternate methods of irrigation that would not require high capacity wells	Casc'pec Water'hd. Assoc.	337
Conservation farming	Government should support crop varieties that could be farmed more sustainably	Casc'pec Water'hd. Assoc.	338
Increase forestation	Government should develop and implemented a more aggressive forestry program	Casc'pec Water'hd. Assoc.	339
Buffer zones	Government should review PEI buffer zone legislation	Casc'pec W'tershd. Assoc.	340
Communication	Create education program re water issues in Prince Edward Island	Casc'pec W'tershd. Assoc.	341
Ombudsman	Establish an environmental commissioner and PEI Environmental Bill of Rights	Casc'pec W'tershd. Assoc.	342
Human Rights	Declare clean water to be a human right and ensure its availability now and in the future	Cornwall Area W'tershd.	343
Intergenerational equity	Use the precautionary principle and intergenerational equity in developing legislation	Cornwall Area W'tershd.	344
Polluter pays principle	Make polluters pay [for the damage they cause]	Cornwall Area W'tershd.	345
User fees	Require payment for industrial water usage	Cornwall Area W'tershd.	346
Licensing users	License non-domestic water use	Cornwall Area W'tershd.	347
Monitoring	[Increased] funding for watershed groups	Cornwall Area W'tershd.	348
Resource allocation	Monitor and assess water use to regulate groundwater allocation	Cornwall Area W'tershd.	349
Increase forestation	Increase forest cover especially around at risk areas such as riparian zones	Cornwall Area W'tershd.	350
Well field protection	[More] rights to protect the waterways, [and] well fields	Cornwall Area W'tershd.	351
Conservation farming	Address soil erosion, contamination, habitat fragmentation and water usage	Cornwall Area W'tershd.	352
Protection	Protect the quantity and quality of groundwater now and for future generations	PEI Potato Board	353
Science based decisions	Use science-based decision making to develop legislation and regulations	PEI Potato Board	354
Resource allocation	Give agriculture regulated access to water	PEI Potato Board	355
Monitoring	Develop pilot program for monitoring all new high capacity wells	PEI Potato Board	356
Permitting process	Retain existing permits for surface water for irrigation purposes	PEI Potato Board	357
Financial support	Increase funding to Land Resource Stewardship programmes	PEI Potato Board	358

General theme	Concern/Recommendation	Stakeholder	
Financial support	Invest in building and maintaining soil conservation structures	PEI Potato Board	359
Monitoring	Continue long-term monitoring of surface water and groundwater for contaminants	PEI Potato Board	360
Science based decisions	Provide context when sharing water quality information	PEI Potato Board	361
Nutrient management	Support programs for reducing nutrient loading in ground and surface water	PEI Potato Board	362
ALUS upgrade	Incentivize land retirement under ALUS programs	PEI Potato Board	363
Resource allocation	Create stable funding for watershed groups	PEI Potato Board	364
Organic farming	Improve research into increasing soil organic matter content	PEI Potato Board	365
Resource allocation	Consult agricultural and watershed groups re regulation development	PEI Potato Board	366
Regulatory review	Review regulations on a periodic basis and reduce red tape	PEI Potato Board	367
<i>Water Act process</i>			
Protection	Allow enough time for quality community engagement and contribution	PEI Shellfish Assoc.	368
Enforcement	Develop an unbiased policy that will protect all Island water	PEI Shellfish Assoc.	369
Polluter pays	Develop regulations and policy that will be administered in a fair and impartial way	PEI Shellfish Assoc.	370
Protection	Develop a system with deterrents to protect Island water and assoc. habitats	PEI Shellfish Assoc.	371
	Work with all Island [organizations] to protect the future of our water supply	PEI Shellfish Assoc.	372
Buffer zones	Redefine water course buffer zones	Ellen's/Wrights Watershd.	373
Monitoring	Assess the topographical health and factor it into buffer zone calculations	Ellen's/Wrights Watershd.	374
ALUS upgrade	Fund incentives for landowners to adopt best land management practices	Ellen's/Wrights Watershd.	375
Ditch-infilling	End ditch-infilling in favour of best storm water management practices	Ellen's/Wrights Watershd.	376
Infrastructure	Develop a culvert replacement capital plan	Ellen's/Wrights Watershd.	377
Pesticides	Enact cosmetic pesticide ban	Ellen's/Wrights Watershd.	378
High capacity wells	Require communities with high capacity wells to enforce water conservation measures	Ellen's/Wrights Watershd.	379
Education	Improve public awareness re the value of urban watershed management	Ellen's/Wrights Watershd.	380
Pesticides	Health Canada ensures pesticides go through safety assessment before approval	CropLife	381
Legislation	Build from existing legislation and not be overly prescriptive	Fertilizer Canada	382
Science based decisions	Consider research-based approaches to understand impact of nitrates in water	Fertilizer Canada	383

General theme	Concern/Recommendation	Stakeholder	
Communication	Work with industry stakeholders in developing the Act	Fertilizer Canada	384
Nutrient management	Promote 4R Nutrient Stewardship in the province	Fertilizer Canada	385
Legislation	Recognize 4R Nutrient Stewardship in the PEI <i>Water Act</i>	Fertilizer Canada	386
Education	Improve education on water and water-related management	Sandy MacKay	387
Communication	Involve First Nations in the discussion process	Sandy MacKay	388
End fall plowing	End the practice of fall plowing	Sandy MacKay	389
Permit to irrigate	Require permits to irrigate agricultural soils	Sandy MacKay	390
Organic farming	Encourage organic farming practices	Darcie Lanthier	391
Soil conservation	Develop strategies for reducing run-off	Darcie Lanthier	392
Water conservation	Remove taxes from, and add incentives to, water saving devices	Darcie Lanthier	393
Legislation	Prohibit watering lawns and driveways	Darcie Lanthier	394
Protection	Zero tolerance for fish kills	Darcie Lanthier	395
High capacity wells	Maintain the moratorium on high capacity wells for irrigation	Darcie Lanthier	396
<i>Water Act process</i>	Public consultation must not be hurried	S. Shore W'tershd. Assoc.	397
Strategic planning	Stewardship of waterways is a long-term commitment	S. Shore W'tershd. Assoc.	398
Watershed management	Watersheds know no political boundaries	S. Shore W'tershd. Assoc.	399
Woodlot management	Encourage good stewardship of woodland and forests in riparian and buffer zones	PEI Woodlot Assoc.	400
Woodlot management	Stewardship of waterways is a long-term commitment	PEI Woodlot Assoc.	401
Public Trust	Water is a common good and a public trust	Community Milton Park	402
Science based decisions	Water extraction to be tied to healthy (and proven) annual recharge rates	Community Milton Park	403
Ditch-infilling	Ditch infilling should be limited	Community Milton Park	404
Monitoring	Provide easy access to real time monitoring of water use online	Community Milton Park	405
Water conservation	Conservation guidelines to be tied to annual recharge rates	Community Milton Park	406
Watershed Management	Water extraction permits issued for a defined period of time only	Community Milton Park	407



General theme	Concern/Recommendation	Stakeholder	
Watershed management	Water should be managed on a watershed basis	Community Milton Park	408
Protection	Risers should be required for residential septic tanks	Community Milton Park	409
Protection	Require one-acre residential lot sizes in the agricultural zone	Community Milton Park	410
Legislation	Define man-made drainage structures as non-water courses; e.g., drainage ditches	PEI Wild Blueberry Assoc.	411
Legislation	Re-define 'water-tolerant vegetation' as 'aquatic vegetation' in wetland areas	PEI Wild Blueberry Assoc.	412
Precautionary approach	Incorporate the concept of the Precautionary Principle	Citizens Alliance PEI	413
Intergenerational equity	Incorporate the concept of Intergenerational Equity	Citizens Alliance PEI	414
Communication	Incorporate public involvement throughout water policy making governance	Citizens Alliance PEI	415
Communication	Allow sufficient time to get the legislation right	PEI Soil & Crop Assoc.	416
Science based decisions	Decisions must be science and research based	PEI Soil & Crop Assoc.	417
Communication	Public consultation should help to develop legislation	PEI Soil & Crop Assoc.	418
Resource allocation	Supplemental irrigation should be allowed	PEI Soil & Crop Assoc.	419
High capacity wells	Higher capacity wells and streams should be used to refill irrigation ponds	PEI Soil & Crop Assoc.	420
High capacity wells	Recommended a stepwise high capacity well permitting process	PEI Soil & Crop Assoc.	421
Science based decisions	Research feasibility of large scale water storage systems	Inst. of Agrologists	422
New technology	Development of large scale water storage systems for irrigation	Inst. of Agrologists	423
Monitoring	Maintain water quality	Inst. of Agrologists	424
Soil erosion	Maintain and expand soil conservation programmes (soil organic matter, etc.)	Inst. of Agrologists	425
Nutrient management	Maintain and expand nutrient management programs	Inst. of Agrologists	426

General theme	Concern/Recommendation	Stakeholder	
Planning	Stewardship - the guiding principle for all decisions relating to the environment	MacKillop C'tre	427
Intergenerational equity	Plan to conserve fresh water for current and future generations	MacKillop C'tre	428
Protection	Protection of our groundwater is critical	Don Jardine	429
Enforcement	A new <i>Water Act</i> will be useless unless there is a commitment to enforcement	Don Jardine	430
Resource allocation	Water use and allocation should be ranked in priority fashion.	Don Jardine	431
Water conservation	Conservation measures need to be implemented	Don Jardine	432
Education	Education of the public and potential water users is essential	Don Jardine	433
Communication	Public engagement is necessary to protect this resource for future generations	Don Jardine	434

Please note: Entries have been edited for reasons of space. Readers of this report are strongly encouraged to review the source documents collected during the consultation period for a complete record of the proceedings at [www.gov.pe.ca/wateract](http://www.gov.pe.ca/wateract).

## Appendix 3

### *Glossary of terms*

**Anoxic conditions** - occur when areas of sea water or fresh water are depleted of dissolved oxygen. A sudden influx of nutrients (phosphate/nitrate) - often a byproduct of agricultural runoff or sewage discharge - can result in large but short-lived algal and/or seaweed blooms that use up the available dissolved oxygen in water killing estuarine and marine life.

**Aquatic ecosystems** - are 'wet' ecosystems such as watercourses, lakes, ponds, pools, and wetlands.

**Aquifer** - is an underground layer of permeable rock, gravel or sediment that contains or transmits water.

**Domestic** - of or involving the home or the family.

**Environmental flow** - is the quantity, timing, and quality of water flows required to sustain river, wetland, or coastal ecosystems and the human livelihoods that depend on them.

**Ecosystem** - is a self-regulating, healthy, biological community of living organisms that interact with each other and the physical environment in which they all live. It can include people, plants, animals, microorganisms, water, air, and soil.

**Groundwater** - is water that naturally occurs beneath the surface of the ground. It is normally extracted by pumping and frequently referred to as well water.

**High capacity wells** - are any wells of any depth that pump more than 50 imperial gallons (0.223 cubic metres) of water per minute.

**Hydrogeology** - is the branch of geology that deals with the occurrence, distribution, and effect of ground water.

**Hydrological** - is the scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil, in underlying rocks, and in the atmosphere.

**Policy** - is a high-level overall plan, formal statement of principles, or formal series of rules and procedures used to guide decisions, reach goals, and achieve rational outcomes now and in the near future.

It is the role of a policy to

- translate values into operations,

- ensure compliance with legal and statutory responsibilities,
- guide a government department towards the achievement of its strategic plan,
- set standards, and
- improve the management of risk.

**Natural capital** - is a concept that describes the sum of all the essentials for life that nature provides for humankind. These include clean air and water; the ability to produce and gather food, fuel, and raw materials from the land and sea; the regulation of our climate; flood protection; the prevention of soil erosion; the recycling of wastes; and the filtration of pollution.

**Personal** - concerning or affecting a particular person or their private life.

**Renewable resource** - is a natural resource that can replenish itself with the passage of time, either through biological reproduction or some other naturally recurring process.

**Riparian ecology** - is the sum of all the relationships formed between plants, animals and the land and water environment associated with a stream or river system, pond, lake, or estuary.

**Risk assessment** - is the determination of probability, magnitude and cost (loss) associated with the occurrence of a recognized threat or hazard.

**Regulations** - are a set of rules or orders issued by an executive authority and used to enforce an enabling statute.

**Stakeholder** - A person, group or organization that has a direct or sufficient connection with an interest.

**Storm water** - is the result of severe rainfall or snowmelt. Stormwater that does not soak into the ground becomes surface runoff, which either flows directly into surface waterways or is channeled into storm sewers that eventually discharge to surface waters.

**Surface water** - is water that is open to the atmosphere, and occurs naturally in streams, ponds, lakes, rivers, and estuaries.

**Sustainable** - is something of, relating to, or being a method for using a resource that neither depletes nor permanently damages it. Sustainable policy making is usually associated with processes that are participatory, transparent, equitable, and accountable.

**Sustainable development** - is a form of human development in which resource use aims to meet the human needs '... of the present without compromising the ability of future

generations to meet their own needs." <sup>18</sup> Sustainable development is often used to identify a process of growth and/or resource use, where the amount of the resource remains constant, or rises over time.

**Transparency** - in a government context implies openness, communication, and accountability. Transparency is the intentional sharing of information in such a way that all may see what actions are being performed and why.

**Well field** - is an area containing one or more wells that produce usable amounts of water.



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<sup>18</sup> 'Our Common Future', also known as the Brundtland Report, from the United Nations World Commission on Environment and Development (WCED) 1987 <http://www.un-documents.net/wced-ocf.htm>



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