



IRRIGATION STRATEGY



2022

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EXECUTIVE SUMMARY

A temperate climate and productive sandstone aquifer has produced generous recharge rates that ensures sufficient water for needs across Prince Edward Island. However, increasingly, agricultural producers are finding that they need supplemental irrigation to ensure crop success. The recent implementation of the Water Act provides a new foundation for water management. The Legislative Assembly of Prince Edward Island supported the Standing Committee on Natural Resources and Environmental Sustainability studying the development of a sustainable irrigation strategy. The proposed irrigation strategy in this document reflects work of the Departments of Environment, Energy and Climate Action and Agriculture and Land. It

also includes consideration of presentations to the Standing Committee and their subsequent recommendations.



Guiding principles
of environmental
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Principles and Goals for the irrigation strategy flow from the Water Act with guiding principles of

environmental protection; responsible, prioritized usage; healthy soil; fair access; and planning and mitigation. The strategy will guide usage for irrigation across the province incorporating measurement and transparency. The strategy will continue to be refined over time as it is implemented and more information is obtained. Ultimately, issuance of permits will be tied to the strategy to provide its implementation.

History and Background

From its formation to today, Prince Edward Island has been able to benefit from abundant groundwater resources. The combination of thin, generally permeable soils overlying a highly productive sandstone aquifer and our humid temperate climate result in generous annual recharge rates that ensure an ample source of water for the Province's needs. Furthermore, current climate change projections, and analysis of their implications for groundwater recharge suggest groundwater will continue to provide a consistent and reliable source of water into the future.

While our geology provides us with the benefit of a plentiful recharge, our geography places the Province in a unique position where it is solely reliant on groundwater. Not only do our permeable soils and rapidly recharged aquifer reduce the occurrence of lakes of significant size, our rivers are relatively small and short. Storing drinking water in surface reservoirs like other Canadian jurisdictions is not the preferred option when the

groundwater reserve is so big and easily accessible.

Our province can be divided into more than 250 watersheds. While each watershed has certain unique properties such as size, land use and water demand, the fundamental characteristics of their groundwater regimes, and the principles by which they operate are relatively common across the Island and are well understood. These features greatly facilitate the management of water resources in the province, including the withdrawal of groundwater and surface water.

Water permitting on PEI is done on a watershed-by-watershed basis. Water extraction is to only occur up until the amount deemed harmful to freshwater aquatic life through limits set out in provisions for environmental flows. For the first time, this limit per watershed has been entrenched in regulation in 2021 with the enactment of the Water Act Water Withdrawal Regulations

The Water Act provides the foundation for water management in PEI. After years of thorough public consultation, the Act received

royal assent in 2017 and was proclaimed in 2021 after the development and consultation on its associated regulations. In the spring of 2021, a new draft amendment of the Water Withdrawal Regulations was provided to the public for comment. In this draft amendment, a change is proposed in how permits for high-capacity wells for agricultural irrigation are treated. Specifically, that the moratorium on high-capacity well permits be removed and replaced with an allowance for these permits to be granted subject to an irrigation strategy. The concept of a sustainable irrigation strategy was supported by the Legislative Assembly of Prince Edward Island who voted unanimously in support of the topic being studied by the Standing Committee on Natural Resources and Environmental Sustainability.

The moratorium on high-capacity wells on agricultural irrigation came into effect in 2002. From that point onward, the Province has not issued any additional permits for high-capacity wells for agricultural irrigation, while allowing the 36 wells that existed before 2002 to continue to operate.



The strategy is designed to guide water usage in PEI for irrigation across the province.

Agricultural growers interested in irrigating their crops after 2002 had the options of using surface water or low-capacity wells. During this time both options were used on PEI with some growers creating irrigation systems that relied on several low-capacity wells connected together or feeding holding ponds. The Water Act's wording now requires any system that used multiple low-capacity wells that has the same impact as a high-capacity well must be treated as a high-capacity well.

Groundwater extraction through a well (whether it is high-capacity or low-capacity) can have a less immediate impact on the streams in a watershed than the instantaneous impact that comes from surface water extraction. This is due to the slow movement of

groundwater compared to surface water and the more gradual way groundwater extraction affects the level of the water table in the aquifer. The Water Act and the Water Withdrawal Regulations both require the consideration of conservation and efficiency. In an agricultural setting, practices utilized for growing crops can change the amount of water needed to supplement precipitation. An irrigation strategy offers an opportunity to require that practices be utilized that promote features that lessen the amount of water used.

The use of irrigation water in the growing of crops also offers the ability to consider other issues important to the environment. One example is the impact of a stronger, healthy growing crop's use of fertilizer. Recent work

on PEI shows that where a crop is irrigated during dry periods, the crop uses more of the nitrate available in the soil. This results in less left in the soil profile at the end of the growing season which will reduce the amount leached to groundwater and subsequently transported to streams and estuaries.

Principles and Goals

Section 2 of the Water Act lists the purpose and goals from which the Act was built for:

The purpose of this Act is to support and promote the management, protection and enhancement of the water resources within the jurisdiction of the province, in recognition that:

(a) the Government has a guardianship role to play in ensuring that the quality, quantity, allocation, conservation and protection of water is managed in the interests of a common good that benefits and accommodates all living things in the province and their supporting ecosystems;

(b) access for everyone to a sufficient quantity and safe quality of reasonably affordable and accessible water for personal and domestic uses, and to basic sanitation that is safe and hygienic, is essential for an adequate standard of living;

(c) water is a renewable but finite resource, the withdrawal and use of which should be subject to a transparent evaluation and approval

process to ensure its long-term sustainability and availability;

(d) every person in the province has a duty to prevent, minimize and repair harm that the person may cause to water resources or the ecosystems supported by water resources; and

(e) where there is a threat of serious or irreparable damage to water resources, the lack of scientific certainty should not be used as a reason for postponing measures to prevent degradation of water resources, with the following goals:

(f) that present and future generations shall have sufficient, safe, acceptable, physically accessible and affordable water for domestic purposes;

(g) that access to and use of water be sustainable and not harm water quality, water security or the ecosystems that support water quality and water security;

(h) that the public be involved in and kept informed about the state of the water resources, including by access to Government reports and information concerning water resources and public consultation by the Government;

(i) that decisions with respect to

water management be made by applying consistent, science-based assessment processes, and decisions with respect to water allocation take into account seasonal conditions, climate change and the need to protect the long-term availability of groundwater, the security of aquatic ecosystems and the integrity of wetlands.

This strategy has been built with the same purpose and goals in mind. Specifically, the strategy relies on these guiding principles:

- **Protection of our local environment.**
- **Prioritized usage in accordance with the Water Act.**
- **Responsible usage by water users.**
- **Promoting healthy soil and a healthy environment.**
- **Fair access.**
- **Proactive planning and mitigation during extreme events**
- **Transparency and accountability.**



The Department of Environment, Energy and Climate Action has been limiting water extraction impacts on groundwater resources through permitting for decades.

The strategy is designed to guide water usage for irrigation across the province. Application of the strategy will occur for each water user in each region by watershed allocation.

While the principles noted above guide the strategy, the key components of the strategy are expanded in the subsequent sections of this document.

Key Components

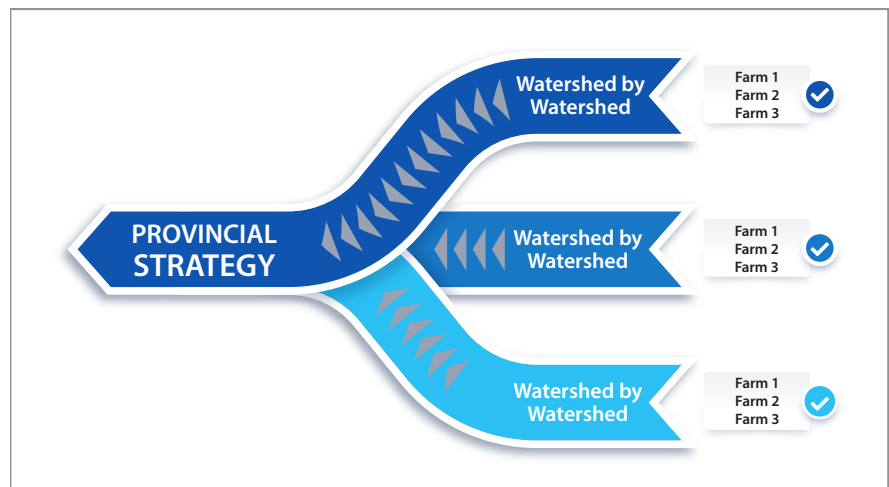
Protection of the Environment

In general, water used for irrigation does not make its way back to the groundwater nor the stream system. It is important that such extraction does not have such a high impact that an aquatic wildlife population is greatly affected. The Department of Environment, Energy and Climate Action has been

limiting water extraction impacts on groundwater resources through permitting for decades. In addition, during the last decade, it has also been

on PEI, may be improved in the future.

The Water Withdrawal Regulations' criteria for water withdrawal ensure



limiting impacts on stream flow for the protection of habitat for aquatic life including fish. With the Water Act Water Withdrawal Regulations, these protections have been given full statutory status. The protection levels being utilized have been developed through science and, with ongoing research on the topic of environmental flows

that groundwater extraction impacts are limited to 35% of the summer average stream base flow and that stream water extraction impacts are limited on a monthly basis equivalent to the difference between 70% flow frequency and 70% of the average flow. In addition, stream water extraction

must halt when the flow falls below 70% of the monthly average flow. These limitations are cumulative for an entire watershed and consider all users, even non-irrigation users.

Drought conditions are difficult for water users and result in low stream flows that are difficult for aquatic life. Reserving water for one affects the other. To balance this challenge, the Water Withdrawal Regulations provide for drought contingency planning. Larger users of water, including agricultural irrigators, will be required to create a Drought Contingency Plan for their operation. Such a plan will outline how they plan to reduce their water use during extreme drought conditions.

Improved Environmental Benefits

Trends of increasing nitrate (N) concentration in Island water have called attention to actions necessary for improvements in water quality.

Presence of significant nitrate concentrations in water has environmental, social, and economic implications. Anoxic conditions caused by nutrient loading has become commonplace in Island's estuaries.

Agriculture is considered a major contributor to elevated nitrate concentration in Island waters via leaching and

runoff. Approaches to reduce N loading into groundwater and surface water from crop production must focus on development and adoption of best management practices (BMP) aimed on reducing direct as well as indirect N leaching losses. One such practice is to keep the crops actively absorbing nutrients throughout much of the growing season. During dry conditions, especially during drought conditions, crops often slow or perhaps pause their growth. Providing moisture to the crop

root zone during these dry conditions allows the plants to stay active therefore continuing to absorb nutrients. Recent research on PEI has shown increased nitrogen uptake by potato plants with supplemental irrigation. Providing water to irrigate is one of many practices that will lead to less N leaching into our groundwater and/or running off into our rivers and streams contributing to better environmental outputs.

Precision agriculture is expected to play a big part in crop production in PEI in the near future. Precision agriculture is about using data gathered through various methods, including through drones, satellite mapping and sensors, to make decisions

about how to manage each individual piece of land. While a farmer may plant the same crop in two different fields, that crop may need different care based on field characteristics like soil type and pest pressures. Even differing characteristics within an individual field may call for different treatments. Water will play a role in precision agriculture as it evolves in PEI. Ensuring that nutrients applied get used by the plants, ensuring the crop are not water-stressed therefore susceptible to diseases or pests could mean fewer chemical inputs. Some crops can be fertilized many times throughout the year by adding nutrients to irrigation water ensuring the plants get only what they need.

Being efficient with fertilizers will also have climate change implications. Agriculture is a big contributor to PEI's greenhouse gas inventory. About ½ of agriculture emissions are associated with chemical fertilizers in PEI. Making sure more gets used efficiently by crops will mean that less ends up in the atmosphere therefore helping with PEI's ambitious climate change targets.



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Soil Health

“Soil health” is a term often used to define the ability of a soil to function. It focuses on all three primary soil properties: the physical, chemical and biological components and how they affect plant productivity.

Maintaining soil health and building organic matter are important to crop productivity. Soil organic matter contributes to several beneficial soil functions, one of which is increased nutrient and water holding capacity.

Soil health relates to water use for supplemental irrigation through a soil’s water holding capacity. The water holding capacity of the soil refers to the ability of the soil to store water for crop use. The capacity to hold water can vary based

on soil texture, but it can also be influenced by soil health. Improving soil health and organic matter levels can improve water holding capacity of the soil and improve overall efficiency in water use for supplemental irrigation. Farm management practices can be incorporated to maximize the benefits of water use through supplemental irrigation.

A system of soil quality monitoring and improvement, called a **Soil Health Improvement Plan (SHIP)**, will be piloted for newly irrigated fields and tied to water permitting. The intention of a SHIP is to link supplemental irrigation to the promotion and adoption of beneficial management practices to optimize the effective and efficient use of water for irrigation through

ensuring optimal soil health and soil productivity.

A SHIP service will be delivered by the Department of Agriculture and Land’s Soil and Water Conservation Specialists. Farm participants completing Soil Health Improvement Plans will be required to submit property numbers and field identification, along with the latest results from Soil Health Analysis Testing, and complete information forms about their farm management practices.

SHIP will have a soil health assessment component individualized to each agricultural operation. The soil health assessment will include **three** indicators of soil health:

- 1. Soil Health Analysis Testing**
- 2. RUSLE2 Soil Erosion Prediction Model**
 - a. Soil Erosion Prediction
 - b. Soil Conditioning Index

Farm participants will create individual Soil Health Improvement Plans for each irrigated property. They will then have an individualized prescription for soil health based on the characteristics of each property. Follow up on progress during the rotation will be a requirement. From a permitting standpoint, water withdrawal permits for agricultural irrigation will not be made available unless the user is in good standing with this program.

Equitable Access

To ensure adequate stream flows are in place for aquatic habitat, the Water Withdrawal Regulations under the Water Act prescribe the amount of water permitted to be

withdrawn in any given watershed. These permits can be granted for groundwater or surface water extraction. With the amount being allocated to any given watershed being capped, certain watersheds could see the total demand for water withdrawal exceeding the amount available.

Recognizing this and the reality that not all growers who may wish to irrigate in the future may be ready to do so today, the permitting process needs to be flexible. To accomplish this in situations where a new water user wishes to access permitted water and the watershed is fully allocated, the amount of water permitted for each user will be scaled back to accommodate the new user provided the new user can meet the requirements in the strategy.

Existing irrigation permit holders will need to apply for new permits going forward. Irrigators with low capacity wells that don't currently have permits will also need to apply for permits going forward. New permits will be subject to the same rigour regardless of whether a permit was granted previously. Further, they will be expected to comply with any new requirements expected

under this strategy.

Efficient Use

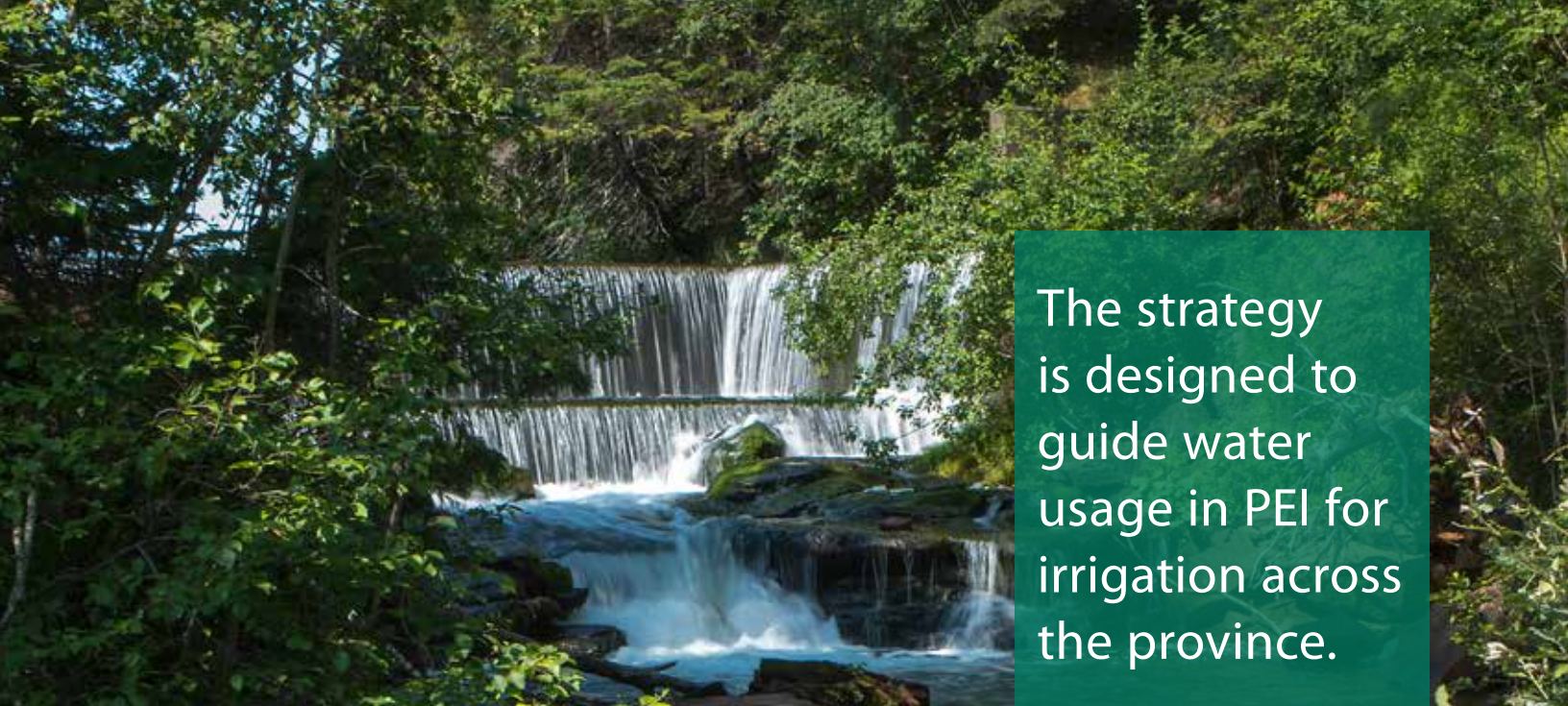
The Water Act outlines the importance of conservation in provincial water management. To help this, efficient use of water can ensure there is as little water withdrawn as is needed.

The **Soil Health Improvement Plan (SHIP)** will monitor soil health over time and encourage soil building practices that support water holding capacity. This will help ensure the proper amount of water is withdrawn.

The agriculture industry continues to adopt new innovations that will advance the efficiency of irrigation. Some of these innovations, such as new application equipment, precision agriculture, and decision agriculture technology, will allow farms to reallocate farm inputs, water included, to adapt to topography, soil type and fertility. The objective is to apply the least amount of water per acre to

maintain soil moisture. This technology allows farms to produce the most food per acre while lowering traditional water use.

Weather stations, crop modelling, monitors, and sensors provide data to farms to encourage selective



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application of supplemental water to meet crop requirements.

The Prince Edward Island Department of Agriculture and Land encourages water conservation by providing financial and technical support for innovation in irrigation efficiency.

Monitoring and Transparency

The Water Act strives for improved transparency on water management with Island residents. To achieve this, it mandates a water registry. It shows the holders of Water Withdrawal Permits, their permitted amounts and the amounts that they use. Water utilization by watershed is shown as compared to the amount of available water while protecting aquatic habitat. The registry also shows the status of watershed health and identifies the issues that stress them. There are links

to water quality data and relevant science reports. When they are completed, there will be annual state of the water reports.

The registry includes such information as stream flow and current and historical groundwater levels. Tracking this information is critical to both determining what is an appropriate amount of water to use in a watershed but also acts as a double check to confirm that usage and its impacts are staying within acceptable limits.

Applicability

While a lot of this strategy focuses on agricultural irrigation, the same permitting requirements (with the exception of the soil health components) will be in place for other irrigators seeking high-capacity wells as well.

Irrigation for other purposes such as golf courses will also need to adhere to all of the allocation and environmental protection requirements noted in this strategy.

The strategy only pertains to water users that require permits for their irrigation needs. Specifically, this means the use of 25 m³ of water or more per day. All permit holders would have to comply with the irrigation strategy components for the watershed where they are sourcing the water.

Governance

Water withdrawal permits for irrigation will only be provided if the applicant is in good standing with the requirements of this strategy. Assessment and issuance of the permits (including determination of whether

the applicant is abiding by the strategy) will be done by a central body. Currently, this central body is the Department of Environment, Energy and Climate Action as it has traditionally and as is prescribed in the Water Act. Exploration of how this can be done by an arm's length, independent body is under way which has been indicated as a preferred model by stakeholders.

The independent body will extend beyond irrigation. The Department envisions a water authority which will take an all-encompassing view toward water management while factoring the needs of both people and aquatic life. Depending on the scope of what falls under the water authority, legislative

amendments will likely be required. Consultation will occur on this before the final direction is decided.

In instances where the watershed reaches 80% of its allocation, the local irrigation users in the region will be required to complete a Watershed Irrigation Plan which will outline how the users will adhere to the principles of this strategy while complying with the limits prescribed in the Water Withdrawal Regulations.

Transition, Applicability and Future Changes

The department considered all feedback in revising the strategy provided from

public consultation in 2021. While this version of the strategy is considered final, the Department plans on continually revisiting the strategy as more information comes to light. The department considers the strategy to be fluid and will treat it as such. As the application of the irrigation strategy is tied to the issuance of permits, it is important to note that the Water Act provides a five-year period for water users to get in compliance with the new Act. This means existing irrigators are allowed to continue under the Water Act for that period of time before applying for a permit under the Water Act. The department will be encouraging an earlier application for a Water Withdrawal permit under the Water Act.

The Water Act affords existing permits and legal water extraction activities a

transition period until June 16, 2026 to comply with the Water Act by obtaining a permit under it. As such, the Irrigation Strategy will also have a transition period by the end of which all permits and water extraction for irrigation will be required to be in compliance with it. Through this transition period, different components will come into play in a gradual fashion.

Watershed Irrigation Plans will require time to determine and once created will require time for changes in equipment and wells utilized to be made. As a result, Watershed Irrigation Plans for watersheds where the allocation of water is currently above 80% of the available water will not be required until 2023. The plans, when needed, may have a migration path within it of up to two years for changes in equipment or wells to be made to comply with it. It is, however, expected that any applicant in a

watershed meeting this criteria demonstrate that they are working toward this deadline if their application is to be approved.

In 2022, the first permits for the extraction of water from watercourses will be issued under the Water Withdrawal Regulations. Where these permits are for sites that were utilized in 2019-2021, they will continue to be issued in 2022 without a requirement that they be within a Watershed Irrigation Plan when the watershed where they are located requires such a plan. Where these permits are for sites that were utilized in 2019-2021, permits will be issued in 2022 without a requirement for a SHIP until 2023. New sites in 2022 for irrigation from surface water sources will require a SHIP at the time of issuance.

In the future, there may

be a time when usage in a watershed increases above 80% of the available water. When this occurs, a Watershed Irrigation Plan must be crafted and approved within a year. These plans also, when needed, may have a migration path within them of up to two years for changes in equipment or wells to be made to comply with it.

At all times, during the transition period and after, stream criteria in the Water Withdrawal Regulations requiring the cessation of pumping from surface water sources when the stream flow falls below 70% of the monthly average flow will be complied with and pumping be required to be stopped.



Irrigation Strategy

2022