MANITOBA’S SURFACE WATER MANAGEMENT STRATEGY
This document is part of TomorrowNow - Manitoba's Green Plan; an eight-year strategic action plan for mobilizing Manitobans to work together to protect the environment while ensuring a prosperous and environmentally-conscious economy. In addition to the actions outlined in this plan, the province has other initiatives underway to ensure we protect the environment and sustainably manage our natural resources now, for tomorrow.

Manitoba’s goal is to be one of the most sustainable places to live on earth.
The Surface Water Management Strategy was developed through an extensive year-long stakeholder engagement process, including two invited workshops, web-based input, and over 50 face-to-face meetings. The balanced approach to sustainable surface water management presented here is fundamental to Manitoba’s social and economic future. This approach is organized around three pillars for action:

1. Improving and Protecting Water Quality
2. Preparing for Extreme Events

New integrated thinking about drainage aims to sustain a prosperous agricultural sector while protecting and improving the health of our watersheds. Reviving and enhancing the natural storage capacity and resiliency of watersheds will help to address flood, drought, and nitrogen and phosphorus run-off, producing a triple dividend for Manitobans.

**Fifty Actions**

Difficult decisions and bold actions are sometimes required to manage the risk from surplus and scarcity of water and water related hazards. To guide this task, the Surface Water Management Strategy articulates the high-level direction for taking an integrated approach. The strategy identifies 50 specific actions that Manitoba will lead to improve the landscape by 2020.

**No Net Loss of Wetland Benefits**

Some key actions include a new regulatory approach to streamline minor drainage, to focus on enforcement of illegal works, provide new protection for seasonal wetlands and to provide a framework where drainage and water retention can be considered together.

The completion of the wetland strategy and inventory will provide new information for wetlands restoration, and protection for terminal basins, and will also provide a mitigation and offset process for those cases where drainage is deemed necessary, achieving ‘no net loss’ of wetlands benefits across the landscape.

A renewed focus on water retention will provide needed information on the appropriate location and design of water retention structures for multiple benefits, including flood and drought mitigation and water quality improvement. Urban stormwater retention, establishment of new protected areas, and greater protection for shorelines are important components of this new integrated approach.

Recommendations for development of new policies that provide clear and transparent guidance and allow the province to lead by example on Crown lands are another key thread within the strategy. Co-ordinating government action on surface water management and engaging all key watershed stakeholders in moving forward are emphasized throughout the strategy. Much of the important work related to integrated surface water management is already underway throughout the province, as is evident upon reading through this document.

As a major component of TomorrowNow - Manitoba’s Green Plan, this Surface Water Management Strategy will allow Manitobans to better understand the complex connections among actions and initiatives at the individual, the watershed, and the basin scale. We are poised to align water-related initiatives across sectors and governments, achieve greater progress through co-ordinated action, and provide the necessary underpinning for a robust economy, food security, public health and safety and environmental resilience.
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INTRODUCTION

Manitoba’s unique location and history

Manitoba is uniquely located at the bottom of the very large drainage basin that used to be glacial Lake Agassiz, receiving water from neighboring jurisdictions to the south, east and west. Given the nature of our climate and topography, we are subject to the extremes of flood and drought, which can change drastically from year to year and sometimes within the same year.

The history of settlement has driven the development of a large drainage infrastructure network across parts of Manitoba, designed to move water efficiently off the land to support agricultural production, industrial development and urban settlement. While this has helped to ensure Manitoba’s development and ability to help feed the world, it has also undermined the natural storage capacity of wetlands thereby reducing the resilience of the landscape to both man-made and natural stresses such as development activities, severe weather, flooding, and drought. With repeatedly serious and costly flood damage, the prospect of extended drought, and the nutrient loading and resulting threat to the health of our waterways including Lake Winnipeg, such a continued practice is not sustainable. A modern balanced approach to surface water management is fundamental to Manitoba’s social and economic future.

Adopting a sustainable and integrated approach

It is time to adopt a more integrated approach to surface water management that strives to consider environmental, engineering, social and economic perspectives, that recognizes the importance of local and traditional knowledge and ensures that treaty and aboriginal rights are respected. We must more effectively consider cumulative downstream impacts, effects on the health of our rivers, lakes, wetlands and vulnerable riparian shorelines, and the need to retain water on the land for multiple beneficial outcomes such as reduction of flood and drought risk and protection of water quality.

Moving to sustainable water management - three pillars for action

Manitoba’s approach to sustainable water management is organized around three pillars for action:

- Pillar 1 – Improving and Protecting Water Quality
- Pillar 2 – Preparing for Extreme Events
- Pillar 3 – Co-ordination and Awareness

In response to stakeholder input, the strategy identifies 50 actions that Manitoba will lead or collaborate with others to achieve improvements to our landscape.

This will require changes in practice and in management decisions for many Manitobans. To facilitate this change, the Manitoba government will work with stakeholders to find the best solutions to our issues. The launch of the Growing Assurance- Ecological Goods and Services Program is the first step towards solutions. A partnership between the provincial and federal governments, the program is delivered by conservation districts and provides financial incentives to agricultural producers across Manitoba to enhance and protect ecological goods and services on the landscape. Changes to the way that drainage is licensed will be the next step, focusing on a risk based approach that will streamline the licensing process and identify projects that will have significant impacts and enhanced consequences for illegal drainage.

Improved adaptive capacity

Difficult decisions and bold actions are sometimes required to manage the risk from surplus and scarcity of water and water related hazards. Water security is achieved through a holistic approach to surface water management and a strong shared governance framework with clearly defined roles and responsibilities.

Variable weather patterns and a changing climate have a significant impact on the water regime in Manitoba and are important considerations as we continue to develop our surface water management expertise. Successful adaptation will be supported by integrated planning and cross-sectoral communication. Building environmental resilience through healthy ecosystems is one important goal. Building community resilience through education and shared decision making is equally important.
All of the programs, projects and activities that evolve through this integrated decision making process will require resources and people. Therefore, future programs and projects must provide targeted results for watersheds and multiple benefits for our environment, our people, and our economic sustainability.

Information about the engagement process and “What We Heard” is available on the Manitoba government website at www.manitoba.ca/conservation/waterstewardship/questionnaires/surface_water_management

LiDAR and other critical tools

Data acquisition and analysis to support knowledge growth is an important role for universities, governments and others. Data-sharing and timely access to information is the foundation for developing effective tools and facilitating effective planning. Data such as Light Detection and Ranging digital imagery (LiDAR), and information on land use change, new development, and the quality and quantity of water are integral to planning and management decisions, flood forecasting, risk assessment, responding to emergencies, ensuring public safety and improving adaptive capacity.

LiDAR is Light Detection And Ranging digital imagery.

LiDAR technology produces extremely accurate land elevation data, showing the surface of the earth (Digital Elevation Model or DEM), the surface vegetation (Digital Surface Model or DSM), and man-made structures. This data can be used for many analysis and mapping needs related to land and water planning and management.
MOVING TO SUSTAINABLE WATER MANAGEMENT:

Pillar 1 - Improving and Protecting Water Quality

Reviving and enhancing the natural storage capacity of watersheds can help to address flood, drought, and nutrient run-off, producing a triple dividend for Manitobans.

Many of the actions that provide water quality benefits also help us to be prepared for extreme events, and vice versa. For example, new water retention ponds help to provide drought and flood preparedness, but they may also retain excess nitrogen and phosphorus, thus helping to improve water quality too. These two highly interconnected topics are presented here in two separate subsections to provide some focus on each topic in turn. In reality, the multiple benefits and interconnected outcomes for any action need to be considered together.
MOVING TO SUSTAINABLE WATER MANAGEMENT: IMPROVING AND PROTECTING WATER QUALITY

OPPORTUNITIES AND CHALLENGES

Surface water management, land management practices and surface water quality are strongly linked and interconnected.

Good quality water is essential to aquatic ecosystems and to the health and well-being of all Manitobans. As industrial, municipal and agricultural development expands to serve an increasing population, the potential for pollution of our water resources also expands.

By enhancing the water storage capacity of the land in both natural (ex: wetlands) and engineered water retention structures, and ensuring that drainage is done in an appropriate and responsible manner, we will work to effectively reduce the rate of run-off of water off the land. This will alleviate downstream issues with excess water, reduce the amount of nitrogen and phosphorus transported downstream into our lakes and rivers, enhance flood and drought management and increase our resiliency to the impacts of climate change.

EXCESS NITROGEN AND PHOSPHORUS

The province is taking a strong proactive approach to protecting water quality across Manitoba and in particular, in reducing nitrogen and phosphorus nutrient loading to rivers and lakes. On average, about two thirds of the nitrogen and phosphorus loading to Lake Winnipeg from within Manitoba is contributed by run-off from land. Actions such as restoring wetlands help to slow the movement of water allowing time for nitrogen and phosphorus to settle out and be absorbed before they reach our rivers and lakes and cause algal blooms. Manitoba has committed to reducing nitrogen and phosphorus concentrations in Lake Winnipeg by 50 per cent. However, significant reductions in nutrient loading and improvements in water quality can only be made by adopting beneficial management practices, not only for surface water, but also on the surrounding agricultural, industrial and urban landscapes. Our efforts must focus on reducing the input of nitrogen and phosphorus into the environment, as well as reducing the movement of these nutrients off of the land and into waterways.

BIOMASS

Surface water retention sites can be linked directly to nutrient management through the practice of harvesting wetland plants (ecological biomass) from retention sites in the late summer or early fall. The International Institute for Sustainable Development (IISD) has demonstrated the practice of harvesting such ecological biomass (in this case “cattails” Typha spp.) from wetland areas, including the Netley-Libau marsh and Pelly’s Lake. Cattails absorb large amounts of phosphorus (up to 20 kg/hectare) and can produce up to 30 tonnes of biomass per hectare. Processing the biomass for nutrient extraction, bioenergy, carbon offsets and/or biomaterial end-uses creates a very low-cost or potentially profitable method for nutrient management.

EUTROPHICATION: Vital nutrients such as phosphorus and nitrogen are required for plant growth. However, the presence of excess phosphorus and nitrogen in lakes, wetlands and waterways contributes to algal blooms that impair both ecological and human health. There are many actions that individuals, industry, and governments must take to reduce the amount of phosphorus and nitrogen entering lakes, wetlands and waterways. Nutrient reduction is essential to future water health and economic prosperity in Manitoba.
The viability of nutrient management via ecological biomass harvesting depends on developing markets for these products and on the design of the surface water management sites, their internal drainage, and their water release strategy. Where appropriate, water storage and release strategies should encourage biomass production which can be harvested to permanently remove phosphorus from the system. See http://www.iisd.org/wic/research/wetlands/netleylibau.asp for more information.

Attention drawn to the many challenges facing Lake Winnipeg has resulted in many more Manitobans rallying around a common purpose: in addition to taking action to reverse the declining health of Lake Winnipeg, we also recognize that protecting the many lakes, wetlands and waterways across the province is a priority, as embodied in the new Lake Friendly Accord and Lake Friendly Stewards Alliance. (www.lakefriendly.ca/do-what-matters/lake-friendly-accord/)

DRAINAGE
Agricultural producers seek to enhance productivity from lands through drainage. This is important for individual and provincial economic success and to help feed the world’s fast growing population. For drainage to be sustainable however, it should be balanced with retention efforts to improve drought resilience, steward nutrients, and avoid issues with excess water being moved downstream.

Agriculture is among the most vulnerable sectors to the risk and impacts of global climate change. There may be increased future demand for agricultural drainage, both surface and tile drainage, as a solution. Therefore, the agricultural sector is a key partner in implementing a new integrated approach to drainage. The challenge is to co-ordinate improvements to our knowledge base and to current agricultural practices by engaging all relevant sectors in the process. An integrated approach to drainage aims to sustain a prosperous agriculture sector while protecting and improving the health of our watersheds and aquatic ecosystems.

The Manitoba government is working with stakeholders to develop a new regulatory approach to drainage. This new approach incorporates an integrated watershed-based approach that will be implemented to better coordinate maintenance, consider the cumulative impacts of all types of existing drainage, and reduce downstream impacts such as flooding, erosion and degradation of water quality.

WETLANDS, TERMINAL BASINS, AND PROTECTED AREAS
Manitoba has a unique topography due to its past history of glacial processes and the current influence of climatic zones, major river courses, the distribution of soils and underlying geology. Wetlands and terminal basins are two of the geographical features that present both benefits and challenges for surface water management.
Wetlands

There are many different types of wetlands in Manitoba, but a feature shared by many is that they are water bodies that fluctuate from completely dry to very wet over time. The frequency of drying or flooding is one of the many factors that determine the type of wetland that may occur. The northern and eastern portions of Manitoba contain primarily bog and fen peatlands, while the southern and western portions of the province contain coastal marshes and shallow open water wetlands such as potholes, sloughs, and shallow lakes, some of which are terminal basins.

Wetlands provide climate change adaptation benefits through improved ecosystem health and resilience. Some of the specific ecological services performed by wetlands include:

- additional surface water storage to reduce the risks of flood and drought
- enhanced groundwater and aquifer recharge functions
- enhanced carbon storage for greenhouse gas mitigation
- preservation of prairie and boreal biodiversity – many species rely on wetlands for all or part of their life cycles
- sediment trapping and nutrient retention, which enhances water quality in downstream rivers and lakes
- benefits for income-generating activities related to tourism and outdoor recreation, cottage development, and support of First Nation and Métis traditional ways of life

Despite increasing recognition of all of these benefits, wetlands continue to be lost and degraded. The Manitoba Water Council has provided advice on the completion of a provincial wetland policy that will provide protection for the remaining wetlands found on both private and public land. As a first step in this direction, the Manitoba government is currently developing a Provincial Peatlands Stewardship Strategy and pursuing the protection of significant wetlands on Crown lands through the Save Lake Winnipeg Act. Manitoba Habitat Heritage Corporation is leading the delivery of the Lake Winnipeg Wetland Restoration Project to restore previously drained wetlands in the Lake Winnipeg Watershed thus preventing approximately 50 tonnes of phosphorus from entering Lake Winnipeg over the next 10 years.

Terminal Basins

Natural wetlands or shallow lakes that do not contain a natural outlet for water flow are called terminal basins or closed basins. They are characterized by a wide range of water levels over time, levels that are impacted by weather, climate and land use. This variability can be problematic for people living in and around such basins, but at the same time terminal basins provide many benefits to society and are vital to a healthy landscape. Land use in the upstream watershed and adjacent to a terminal basin needs to be planned and managed carefully to adapt to variable water levels, but there are differing opinions on how this should be done. Terminal basins are unique systems that must be protected and therefore, engineered outlets should be an option of last resort, as drainage of these basins can have significant negative impacts.

Protected Areas

The Protected Areas Network provides an important opportunity to conserve unique or untouched portions of our natural landscape for the benefit of all life, not just humans. The wide range of biodiversity in all natural regions has to be adequately protected. Protected areas must be set aside in both inhabited and remote regions of the province to maintain healthy natural ecosystems and thus provide landscape resilience and a refuge for both plant and animal species. Protected areas are land or water areas where logging, mining, hydro-electric development, oil and gas development, and other activities that harm or disturb habitat are legally prohibited. Aboriginal and treaty rights are respected in protected areas and they are available for hunting, trapping, fishing, medicinal plant gathering and other traditional activities.
MOVING TO SUSTAINABLE WATER MANAGEMENT: IMPROVING AND PROTECTING WATER QUALITY

ACTIONS

1. REDUCE NUTRIENT LOSS FROM ALL SOURCES
Responsibly apply nutrients from all sources (including municipal biosolids, inorganic fertilizer and manure) through strengthening of existing regulatory, incentive and educational programs, notably the 4R Nutrient Stewardship system. Implementing the 4R principles of nutrient source, rate, timing and placement reduces the amount of nutrients that may be lost in runoff to rivers, lakes and streams.

2. PROHIBIT WINTER APPLICATION OF MANURE
Work with landowners to ensure full compliance on the prohibition on winter manure application under the Save Lake Winnipeg Act.

3. DEVELOP SOURCE WATER PROTECTION PLANS
Protect drinking water through the continued development and implementation of Source Water Protection Plans by conservation districts, and the development of Drinking Water Plans by planning districts in the Capital Region as required by the Save Lake Winnipeg Act. (Guide to Developing a Drinking Water Plan: www.manitoba.ca/ia/plups/pdf/dwg.pdf)

4. DEVELOP STRONGER PROTECTION FOR SENSITIVE AND HIGH RISK AREAS
Develop stronger protection for sensitive and high risk areas that impact water quality such as shorelines, riparian areas, and wetlands, through the use of existing mechanisms such as the Provincial Land Use Policies, and where necessary, develop strategies and policies to deal with areas that are at particular risk.

5. PROMOTE URBAN STORM WATER MANAGEMENT
Promote the awareness and adoption of effective surface water management techniques in urban areas such as storm water recapture, naturalized retention ponds, rainwater gardens, and other innovative approaches. One useful tool for this is the Stormwater Management Guide for Schools developed by Rivers West Inc. and funded through the Water Stewardship Fund. (www.riverswest.ca/media/documents/ENGFINALDIGAUG_2012.pdf)

6. BUILD TECHNICAL CAPACITY
Build technical capacity within government, universities and the public to enhance the scientific understanding of nutrient transport from land to water including beneficial practices for land and surface water management that will reduce the runoff rate of excess water off the land and reduce nitrogen and phosphorus loading to rivers, lakes and wetlands.

7. CREATE NO NET LOSS OF WETLANDS BENEFITS FRAMEWORK
Establish a new regulatory approach to manage drainage and water retention that will reduce the risks to property from excess water, safeguard human health, conserve and protect wetlands and other sensitive habitat, provide resilience to droughts, reduce the risk of flooding by retaining water within the watershed, and minimize the loss of nutrients from the landscape. Provide a mitigation framework for appropriate compensation for unavoidable wetland drainage.

8. IMPROVE WATER AND NUTRIENT RETENTION OPTIONS (see Towards Sustainable Drainage and Water Retention - A Proposed New Regulatory Approach)
Liaise with the University of Manitoba’s Watershed Systems Research Program, International Institute for Sustainable Development, and others in leading research into natural and engineered on-farm water retention options including retention pond design and cattail harvesting that will remove nitrogen and phosphorus.
9. ASSESS CUMULATIVE IMPACTS OF DRAINAGE

Develop watershed-based models to analyze and predict the cumulative impacts of drainage activities in the watershed, as well as monitor and assess water runoff patterns and potential landscape scale changes to drainage and water retention.

10. IMPLEMENT A WATERSHED-BASED PLANNING FRAMEWORK FOR DRAINAGE

Implement, through co-operation with conservation districts, a watershed-based planning framework for local drainage that incorporates the concept of ‘no net increase in water export (on a watershed basis)’. The concept of no net increase of water export cannot be implemented one project at a time but can only be considered in an overall watershed-based planning framework where water retention and drainage projects can be considered together.

11. CLARIFY ROLES AND RESPONSIBILITIES FOR DRAINAGE

Revisit and clarify the roles of the province, municipalities, planning districts, conservation districts, and private land owners relating to drainage activities, including maintenance, and improved mechanisms for coordination.

The concept of ‘no net increase in water export’ on a watershed basis simply means that the current total volume of water leaving the watershed will not increase as a result of human activities such as drainage. Any new activities that would increase the total volume of water leaving the watershed must be mitigated to the extent possible by increasing water storage capacity within the watershed.

This will require a new integrated approach to drainage. An integrated approach to drainage aims to sustain a prosperous agriculture sector while protecting and improving the health of our watersheds and aquatic ecosystems.

The challenge is to ensure that research and development efforts address real needs of the agriculture sector and that advancements in our knowledge base are communicated effectively to agricultural producers so that they can make informed management decisions.

12. COMPLETE A PROVINCIAL WETLAND STRATEGY

Expedite the completion of a comprehensive provincial Wetland Strategy that inventories and provides adequate protection to all types of wetlands in Manitoba. This strategy will reference the Manitoba Water Council’s “Seeking Manitobans’ Perspectives on Wetlands”, the Peatlands Stewardship Strategy, Wetlands of Provincial Significance and Manitoba’s Ecological Goods and Services Policy Framework for agricultural lands. This strategy will ensure that Manitoba’s wetlands are adequately protected and provide strong provincial leadership to ensure collaborative participation among stakeholders to conserve and protect wetlands.
13. PROTECT TERMINAL BASINS

Protect terminal basins to ensure that the ecological value and natural ecosystem function of these unique ecosystems is maintained first and foremost. Installing drainage infrastructure on terminal basins is not generally supported and will only occur to protect human health or prevent dislocation of primary residences. In such cases mitigative measures would be required in other areas of the watershed to compensate for the loss of ecological value.

14. DEVELOP MANAGEMENT PLANS FOR TERMINAL BASINS

Management plans for terminal basins will be developed by working through the conservation districts’ Integrated Watershed Management Planning stakeholder engagement process to identify watershed-based solutions that recognize the natural variation in water levels that will occur. This could include such approaches as limiting upstream drainage, improving upstream water retention, and allowing only appropriate land use such as seasonal haying, conservation easements, and establishing or restoring natural areas in the land adjacent to the basin.

15. CREATE NEW PROTECTED AREAS

Increase the number and extent of small protected areas in Agro-Manitoba to conserve remnant prairie, vulnerable wetlands of significance, and fragmented habitat and habitat corridors for species at risk through the new Protected Areas Strategy currently being developed. The province will continue to work with partner agencies to secure conservation agreements on privately owned land that protect valuable habitat and natural areas in perpetuity.

Ecosystem functions are the physical, chemical and biological processes that contribute to the self maintenance and overall health of the living natural system.

Ecosystem goods and services are the tangible benefits humans derive, directly and indirectly, from the natural environment, such as provision of clean air and water, breakdown of contaminants, productive soils, usable goods, and aesthetic enjoyment and recreation in nature.

An ecosystem approach recognizes and protects the value of non-marketable ecosystem services, such as flood control, drought management, enhanced groundwater and aquifer recharge functions, preservation of biodiversity and habitat, sediment trapping and nutrient retention which enhances water quality.

Under the new Federal-Provincial-Territorial initiative, the Growing Assurance Ecological Goods and Services Program will help conservation districts and landowners conserve and enhance ecological goods and services on the agricultural landscape.
MOVING TO SUSTAINABLE WATER MANAGEMENT:

Pillar 2 - Preparing for Extreme Events
MOVING TO SUSTAINABLE WATER MANAGEMENT: PREPARING FOR EXTREME EVENTS

OPPORTUNITIES AND CHALLENGES

Prairie climates are prone to extreme variability in both temperature and precipitation. Extreme events such as flooding, droughts, and severe rainstorms pose significant risks to Manitobans and significant challenges to surface water management. It is anticipated that the frequency, intensity, and unpredictability of these events will increase with global climate change. While we will never be able to entirely eliminate the impacts of these events, it is imperative that we are proactive and maximize our ability to respond to these events so as to minimize the economic impacts and human suffering they inevitably cause.

WATER RETENTION AND STORAGE

Multi-purpose, multi-scale water retention and storage that integrates both natural and engineered solutions is an important part of mitigating the impacts of extreme events. These retention systems allow water to be stored on the landscape thereby lowering peak flood levels and also providing extra water that can be distributed during times of drought. These projects need to be engineered to meet the needs of water storage, but when properly planned and appropriately situated they can provide many additional environmental benefits. Every effort should be made to maximize these benefits to increase the overall health of the landscape. Priority must also be placed on ensuring that natural storage retention areas such as wetlands are protected and restored, not only to retain water but to provide their many additional benefits to the landscape and society.

DROUGHT PREPAREDNESS

Reliable quantities of water are required to maintain healthy environments for people and ecosystems and to support agricultural production and economic growth. The challenge of drought management is compounded by increasing demand for the use of limited water resources and climate change predictions for reduced water availability. Manitoba’s new drought strategy will provide a response framework for an integrated approach to minimize the environmental, social and economic impacts of drought on Manitoba’s people, economy and environment.

FLOOD MANAGEMENT AND MITIGATION

Manitoba is subject to extreme flooding events that can have devastating impacts. Manitoba’s flood management and mitigation efforts seek to reduce damages and human suffering caused by flooding. The Manitoba government’s planned and engineered flood infrastructure has saved the province billions of dollars in avoided flood damage. It is necessary to examine this infrastructure to ensure it is capable of meeting the uncertainties and challenges of a future where climate is more variable and less predictable. In addition, the control of development on lands that are susceptible to flooding is the most economical and reasonable means to limit the impacts of flooding. It is also essential to have adequate tools such as LiDAR data to more effectively determine the flood risk throughout the province and to inform future surface water management planning.

Manitobans must accept and live within the natural variability that is inherent in our climate. We need to realize that activities that are suitable in dry years may not be suitable in that same location in wet years and plan accordingly. One of the easiest ways to decrease our vulnerability to extreme events is by ensuring that our land use and development is appropriate for the full range of conditions that can be expected in a particular area. New approaches to the management of crown lands will provide us with a way to “lead by example” in preparing and managing for extreme events.
ACTIONS

16. LEAD BY EXAMPLE ON CROWN LAND
Lead by example by minimizing drainage of Crown land, and where appropriate, use this provincial resource to retain water in the watershed to improve drought resiliency, reduce flood risk, improve water quality and support healthy ecosystems.

17. IMPLEMENT BASIN-LEVEL WATER RETENTION AND STORAGE
Provide support and technical expertise to complete the Assiniboine Basin and Lake Manitoba Flood Mitigation Study which is conducting basin-level assessments that include identification of potential water storage areas at various scales for multiple uses. Follow up with implementation of recommendations for additional water retention and storage.

18. PROMOTE WATERSHED AND SMALL SCALE WATER RETENTION AND STORAGE
Work with conservation districts and agricultural producers to target small scale watershed and on-farm water retention and storage aspects of their programming, including options to provide incentives to preserve and restore wetlands on privately owned land.

19. SUPPORT ON-FARM WATER RETENTION OPTIONS AND RESEARCH
Provide education, incentives and technical advice to landowners to support on-farm water retention projects. Liaise with the University of Manitoba’s Watershed Systems Research Program and others in leading research into natural and engineered on-farm water retention options including new research and innovation in retention pond design that will offer farmers greater water management options on their land.

20. ENCOURAGE WATER CONSERVATION
Encourage all Manitobans to strive for water use efficiency, reducing water consumption and demand even in non-drought conditions. Complete a comprehensive provincial water conservation strategy by 2020 and encourage the adoption of innovative Water Soft Paths approaches to water conservation at the municipal, planning district, and community level.

21. DEVELOP A BASIN DROUGHT ASSESSMENT TEAM
Develop a Basin Drought Assessment Team, as part of the new Drought Management Strategy, with representation from various agencies and nongovernmental stakeholders and water users for each major river basin representing the local level interests to provide direction and input at the local level.

22. ENSURE ADEQUATE MONITORING CAPABILITIES
Ensure adequate monitoring capabilities are in place to update and inform drought severity indicators used to determine drought stage and develop adequate communication channels to inform stakeholders and the public of the status of drought.

23. CONDUCT BASIN-LEVEL STUDIES FOR DROUGHT PREPAREDNESS
Conduct basin-level studies with researchers and partner agencies to provide a foundation for drought preparedness assessments, identifying water demand and vulnerabilities, and potential water storage and distribution in each basin.
MOVING TO SUSTAINABLE WATER MANAGEMENT: PREPARING FOR EXTREME EVENTS

24. ENSURE OPTIMAL WATER STORAGE AND DISTRIBUTION IN DROUGHT CONDITIONS

Ensure that operating procedures for existing and new water control and supply structures and reservoirs are appropriate for the optimal storage and distribution of water during a drought. Review and update operating procedures and guidelines for existing water control and supply structures and reservoirs to meet future water demand due to economic growth, climate change and extreme drought conditions.

25. IMPLEMENT BASIN-LEVEL FLOOD MITIGATION MEASURES

Implement recommendations of the Assiniboine Basin and Lake Manitoba Flood Mitigation Study which is conducting basin-level assessments to identify optimal areas for additional water retention and storage as well as structural (such as large dams) and non-structural (such as land use change) flood mitigation measures.

26. GREATER RESTRICTION OF DEVELOPMENT ON FLOOD PRONE LANDS

Apply existing controls on development more stringently in flood prone lands and update building codes to minimize flood damage. For example: require that buildings be built to an appropriate flood protection level by defining flood protection levels in local by-laws; adopt and enforce minimum safe setback distances for structures to reduce susceptibility to flooding and erosion; reduce the vulnerability of basements to flooding through restrictions on the size and placement of basement windows; and prohibit location in basements of electrical and mechanical works such as electrical panels and furnaces. The roles and responsibilities of the province and municipalities in mapping flood prone lands and adopting supportive policies in development plans need to be clearly identified, with greater focus on implementation and enforcement.

Droughts can have major and far-reaching economic impacts, including significant impacts on agriculture, irrigation, power generation, fisheries, drinking water supplies, manufacturing and recreation. Droughts can also have significant environmental impacts on wildlife, aquatic ecosystems, water quality, wetlands, soil erosion and ecological habitat destruction.

27. GREATER IMPLEMENTATION OF EXISTING DESIGNATED FLOOD AREA LEGISLATION

Identify additional designated flood areas that are at high risk for flooding. Under current legislation, new development in a designated flood area must have flood protection levels that comply with the 100 year flood level or the flood of record with an additional 2 foot freeboard. For example this generally involves the construction of ring dykes or the raising of structures on pads.

28. EVALUATE AND IMPROVE FLOOD PROTECTION WORKS

Investigate the optimal use of existing flood protection works including the Red River Floodway, the Shellmouth Dam, the Portage Diversion and the Fairford River Water Control Structure. Evaluate options for additional water control works for flood protection using a full cost benefit analysis to determine the viability of each.
MOVING TO SUSTAINABLE WATER MANAGEMENT: PREPARING FOR EXTREME EVENTS

29. COLLECT AND SHARE LiDAR DATA
Support the collection, analysis and sharing of LiDAR data for all of municipal Manitoba to support flood-risk mapping and other critical surface water planning functions.

30. BUILD CLIMATE CHANGE ADAPTATION CAPACITY AND RESILIENCY
Support municipalities, planning districts, conservation districts, communities and landowners to build technical capacity to understand and implement climate change adaptation activities. Encourage integrated and adaptive planning in municipal development plans and Integrated Watershed Management Plans that increases resiliency and anticipates climate change impacts. (see Planning Resource Guide – Climate Change Adaptation through Land Use Planning www.manitoba.ca/ia/plups/pdf/cca.pdf)

31. LIMIT DEVELOPMENT ON VULNERABLE LANDS
Develop stronger restrictions, setbacks and standards for development on lands that are potentially vulnerable to the extreme events associated with severe and variable weather (ex: shorelines, riparian areas, wetlands and other vulnerable lands), and clearly identify enforcement responsibilities. Measures include: designating hazard lands, dedicating shoreline reserves, maintaining and enhancing shoreline vegetation, and setbacks from water bodies.

32. ENHANCE SCIENTIFIC UNDERSTANDING
Build increased technical capacity within government to enhance the scientific understanding of climate change adaptation and to provide the required technical support and tools to community planning processes.

Climate change adaptation means action that enhances adjustment in natural or human systems in response to climate change effects, which moderates harm or exploits beneficial opportunities. Adaptation means being resilient and being ready for change.

By contrast, climate change mitigation is action to reduce the emissions to the atmosphere or enhance the sinks (long-term storage) of greenhouse gases which contribute to climate change.

Some of the major challenges for water arising from climate change may include: extreme variability of water quantity and deterioration of water quality; extreme drought; increased demands on ground and surface water and water infrastructure; required enhancement of weather and flood forecasting technology; changes to Northern and Arctic ecosystems; severe stresses on large lake basin ecosystems; and increased vulnerability of wetlands, river systems, and coastal areas.
MOVING TO SUSTAINABLE WATER MANAGEMENT:

Pillar 3 - Co-ordination and Awareness
OPPORTUNITIES AND CHALLENGES
WATERSHED AND BASIN CONNECTIVITY

For most of Manitoba’s settled history, water has been managed on political boundaries such as municipalities and as private land holdings. Land and water have often been managed as separate entities. A more co-ordinated and holistic approach to land and water management is needed; one that takes into consideration the impacts that land use decisions have on water and vice versa. The watershed has been identified as the most effective organizational unit for co-ordinating land and water management and planning.

Local watersheds are nested within river drainage basins and a connected network of river basins forms a basin system, such as the Lake Winnipeg basin system which is over one million square kilometers in size. Watersheds and basins provide a hydrological and practical framework for integrating management of our water and other natural resources, as well as the agricultural, residential, industrial and cottage development that depends on these resources. Understanding the connectivity within watersheds, river basins, and basin systems is essential when planning and managing activities for the future.

LOCAL WATERSHED AGENCIES – A SHARED GOVERNANCE SUCCESS STORY

In Manitoba, we are fortunate to have strong local watershed-based organizations called conservation districts. The Conservation Districts Program is a working model of shared governance that gains its strength from empowered local decision making to meet municipal and provincial priorities for water and the environment. Even where some of their physical boundaries may not run along true watershed boundaries, the conservation districts make every effort to plan and deliver programming on a watershed basis. The 18 conservation districts have been recognized as Water Planning Authorities under The Water Protection Act and in this capacity they lead the development of Integrated Watershed Management Plans (IWMPs). See www.manitoba.ca/conservation/waterstewardship/iwmp/

Integrated Watershed Management Plans emphasize local priorities, issues, and solutions within a municipal and provincial perspective.

Basin level planning provides directions and goals that all smaller watershed plans can support through their local actions. Examples include the Red River Basin Natural Resources Framework Plan and The State of the Saskatchewan River Basin.

National and continental water organizations promote co-operation and co-ordination across jurisdictional boundaries. Examples include the National Administrators Table for the Hydrometric Program, the Prairie Provinces Water Board, and the International Joint Commission’s International Red River Board and International Souris River Board.

Interconnections at Every Scale: From Basin Systems to River Basins to Local Watersheds

Lake Winnipeg Basin System  ➔  Red River Basin  ➔  Seine River Watershed
INTEGRATING WATER GOVERNANCE AND PLANNING APPROACHES

Water governance and planning functions in Manitoba are somewhat fragmented, with multiple levels of governments, multiple provincial departments and non-government organizations holding or sharing responsibility. This can lead to challenges with co-ordination, effectiveness, capacity, legitimacy, and accountability.

We must also ensure that water governance and planning approaches respect treaty and aboriginal rights, aboriginal peoples’ ancestral ties to the land, and traditional uses of natural resources. We must ensure that aboriginal peoples are included and involved in the development of planning functions related to water and the environment.

Managing the shared governance of water successfully is challenging because fisheries habitat, navigation and international waters are federal responsibilities, but water resources, freshwater fish stocks, and water supply are provincial responsibilities. Municipalities often have the responsibility for managing water supply and permitting development that is located adjacent to lakes, rivers and wetlands. Individuals are responsible for employing beneficial management practices and following bylaws, regulations and policies related to water.

DATA GATHERING, SHARING AND RESEARCH

Accurate and timely information is the foundation of good decision making and is integral to planning and management. The acquisition, interpretation, and sharing of data must be a priority focus to underpin the integrated approach envisioned for a successful Surface Water Management Strategy.

For the purposes of surface water management, spatially specific data are required to allow planners and project managers to use the full power of Geographic Information Systems (GIS) capabilities. This includes water information, soils, topography, vegetative cover, land use and built infrastructure, to name just a few information needs. GeoManitoba co-ordinates the acquisition of mapping and geospatial information for Manitoba and is leading the development of a new imagery strategy for Manitoba. Stakeholders unanimously identified the acquisition of ortho-photo imagery and LiDAR as a top priority need for planning and management of surface water.

Research is required to address priority water issues related to changing land-use practices and the impacts on water quality, flood risk, drought resilience, and habitat loss. Continued research into the potential effects and benefits of beneficial management practices and the criteria and design for distributed surface water retention are also extremely critical, as has been noted in other sections of this strategy.

Risk assessment and risk management play a large role in surface water management. Some aspects of risk assessment and management are well-developed, particularly in relation to flood forecasting and the engineering design of water infrastructure. However, the scope of risk management is broader than that for surface water and needs to include such things as robust and accessible data-bases, extensive hydrometric and water quality monitoring stations, complete spatial mapping of landscapes,
moving to sustainable water management: co-ordination and awareness

soils, water bodies and other relevant data in Manitoba at relatively fine scales, the development of models for prediction and analysis of cumulative impacts at the watershed scale, complete inventories of wetlands, culverts, wells (both public and private), other water infrastructure, improved standards for drain construction and many other items of this nature. Targeted work to address gaps in our current knowledge is a crucial prerequisite for success.

engagement and capacity building

All Manitobans have responsibility for water stewardship. We need to provide opportunities and information for those who are already looking for ways to be more involved and we need to find new ways to engage more Manitobans.

Private landowners, whether they are urban or municipal residents, cottage owners, or agricultural producers, can have significant impacts on land and water through their actions. Most landowners are interested in “doing the right thing”, but they want clear signals and information as to “what the right thing is” from government. Formalizing the direct connections between land-use planning and surface water management is an important element for co-ordinated action and improved communication.

Capacity building is a way of achieving continuous improvement, and it is the underpinning of adaptive management. Capacity building is an acknowledged ongoing need by municipalities, planning districts, conservation districts and government staff. Needed capacity may be technical in nature, such as expertise with GIS, modelling, engineering, and hydrology, or it may be knowledge-based, such as improved understanding of ecosystem science, watershed concepts, and the complexities of climate change adaptation. Capacity building also refers to the development of decision support tools, the strengthening of community awareness and the building of formalized communication networks to make it easier to share information in a timely way.

Engagement and capacity building are facilitated by ensuring that the roles and responsibilities of federal, provincial, municipal and First Nations governments, Metis communities, environmental and industry organizations, conservation districts, other community groups, and individuals are clearly described and respected.

One of the most positive early outcomes during the development of the Surface Water Management Strategy has been the discussion, information sharing, and idea building that has occurred at two Surface Water Summits and at more than 50 meetings held province-wide with stakeholders, other governments, and other provincial departments.
MOVING TO SUSTAINABLE WATER MANAGEMENT: CO-ORDINATION AND AWARENESS

ACTIONS

33. ADOPT WATERSHED-BASED APPROACHES
Encourage all agencies active in the Manitoba landscape to adopt inclusive watershed-based delivery models for land and water programming.

34. DEVELOP LINKED BASIN AND WATERSHED PLANS
Develop linked basin and watershed plans for improved surface water management that intersect with land use planning at the watershed scale. Basin plans should be linked with efforts in neighbouring jurisdictions.

35. BUILD TRANSBOUNDARY CO-OPERATION
Build transboundary co-operation with all Manitobans and neighboring jurisdictions, expanding on existing relationships and developing new ones where necessary, such as the Lake Friendly Accord.

36. BUILD AN INTERAGENCY SURFACE WATER ADVISORY TEAM
Build a basin-level integrated technical and planning advisory team to support surface water decision making. This will be an inter-agency team to provide expertise and advice from a number of perspectives to all watershed residents, from conservation districts, planning districts and municipalities to individual landowners.

37. CO-ORDINATE GOVERNMENT ACTION ON SURFACE WATER MANAGEMENT
Establish an Water Management Directorate, which will consist of 1) a director-level steering group to facilitate co-ordination of government action and mandates as they relate to surface water management and 2) a deputy minister-level oversight committee to provide senior oversight.

38. ALIGN PLANNING PROCESSES
Align and co-ordinate integrated watershed management planning, municipal development planning and other planning processes where possible, ensuring cross-over support and communication. Develop mechanisms to better co-ordinate interest-specific planning processes such as environmental farm plans, agricultural water needs, drinking water plans, etc. to improve efficiency and co-operation between various stakeholders, agencies and government departments and to avoid ‘planning burnout’.

39. ENSURE INCLUSION AND PARTICIPATION
Ensure that shared governance approaches are inclusive of all watershed stakeholders, including Metis communities and First Nations.

40. IMPROVE WEB-BASED TOOLS FOR DATA SHARING
Improve scientific data sharing through the development and enhancement of web-based tools, ensuring data are available to decision-makers and interpreted in a user-friendly format.

41. COLLECT AND SHARE GEOSPATIAL DATA
Support GeoManitoba in its efforts to co-ordinate, collect and share critical geospatial data needed for all aspects of integrated surface water management.
MOVING TO SUSTAINABLE WATER MANAGEMENT: CO-ORDINATION AND AWARENESS

42. FOSTER COLLABORATIVE RESEARCH
Identify and prioritize information needs and gaps to support specific science needs for water management in Manitoba. Foster collaborative science networks between research institutions, watershed agencies, and government.

43. DEVELOP RISK MANAGEMENT TOOLS
Develop risk management tools for surface water management decision-making to better inform and direct integrated watershed-based approaches.

44. SHARE INFORMATION AND TECHNICAL ADVICE
Develop and share integrated information and technical advice with urban and rural landowners to facilitate improved individual watershed-based land and water management planning and decision-making.

45. SHARE LOCAL AND TRADITIONAL KNOWLEDGE
Provide multiple formal and informal opportunities for watershed residents to share local and traditional knowledge and local watershed perspectives.

46. ESTABLISH THE LAKE FRIENDLY ACCORD
Support the Lake Friendly education and awareness campaign to encourage and build public awareness of the significance of water issues and a sense of responsibility for working towards solutions. (www.lakefriendly.ca)

47. LEAD THE NEW LAKE FRIENDLY STEWARDS ALLIANCE
The province will help lead and facilitate the work of the new, Lake Friendly Stewards Alliance, which is the group of stakeholders tasked with helping implement the Lake Friendly Accord. The Alliance will engage stakeholders from across the nine jurisdictions of the Lake Winnipeg Basin to work together to solve the complex issues surrounding the health of Lake Winnipeg through enhanced collaboration and co-ordination; improved reporting and accountability; increased efficiencies, innovation and technology transfer; and enhanced stewardship and economic opportunities.

48. BUILD CAPACITY AND OUTREACH
Work in conjunction with all government departments, conservation districts and other organizations to develop and deliver capacity building workshops, education and outreach to all watershed residents.

49. BUILD PARTNERSHIPS
Encourage the work of all watershed stakeholders in partnership building, networking, knowledge gathering and developing education modules for public schools and community groups.

50. MAXIMIZE EFFECTIVE COMMUNICATION THROUGH TECHNOLOGY
Create web-based and other technology-supported tools to maximize effective communication, particularly during extreme events such as floods and droughts.
MANITOBA’S SURFACE WATER MANAGEMENT STRATEGY

NEXT STEPS TO THE FUTURE

Important work related to integrated surface water management is already underway throughout the province, as is evident upon reading through this Surface Water Management Strategy. This strategy and other interconnected initiatives reflective of its priorities are highlighted in “TomorrowNow – Manitoba’s Green Plan”, the government’s eight-year strategic plan for protecting the environment while ensuring a prosperous and environmentally conscious economy. Moving forward, the task is to bring cohesion to the many ongoing initiatives and priorities being carried out by government departments, other levels of government and other agencies and organizations.

FINAL WORDS

This Surface Water Management Strategy will allow Manitobans to better understand the complex connections among actions and initiatives at the individual, the watershed, and the basin scale. We are poised to align water-related initiatives across sectors and governments, achieve greater progress through co-ordinated action, and provide the necessary underpinning for a robust economy, food security, public health and safety, and environmental resilience.

YOUR INPUT IS IMPORTANT

We would like to hear your input on the Surface Water Management Strategy. Please send your comments to:

Manitoba Conservation and Water Stewardship
Box 11 - 200 Saulteaux Crescent
Winnipeg Manitoba R3J 3W3
Email: surfacewater@gov.mb.ca
“An integrated surface water management plan will strengthen flood plain management to reduce the vulnerability of the built environment to flood damage, reduce drought risk across the landscape, enhance both agricultural productivity and the function of aquatic ecosystems, offer recreational opportunities, and improve and protect water quality.”

– Statement from the Manitoba Water Council