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Flood Damages in the Grand River Watershed

by **Dwight Boyd**, Grand River Conservation Authority

The roots of flood damages in the Grand River watershed began with the early settlement of the watershed in the 1800's. Rivers like the Grand and its major tributaries were seen as a source of water power. Mills and dams were constructed to harness this water power. Towns and commerce grow up around the mills and factories often on the flat fertile lands adjacent to the rivers and creeks. As commerce grew, more people came and settlement of the northern and upper reaches of the watershed began to occur.

Clearing the upper reaches of the forests and draining the wetlands did not go unnoticed. Downstream communities such as Brantford, Cambridge, Bridgeport and Guelph began to experience floods. Floods started to become an almost annual event mainly coinciding with the spring melt. The floods of the late 1920s and droughts of the early 1930s caused demands by the residents of the watershed for action. The Grand River Conservation Commission (GRCC) was empowered in 1938 with flood reduction as one of its main focuses.

Flood reduction has evolved since its early beginnings. Reducing damages from floods can take two forms; structural approaches and non-structural approaches. Generally, structural approaches include dams and dykes, deepening the river channel, building bigger bridges or diverting the river around affected communities.

Structural approaches to flood damage reduction in the Grand have taken the form of dams, dykes and channelization works. One of the first projects of the GRCC was the construction of the Shand Dam in the early 1940's. It was the first dam built for conservation purposes (flood control and flood operation) in Canada. Major reservoirs in the watershed include Shand Dam (1942), Conestogo Dam (1957), Guelph Dam (1976), Luther Dam (1952), Woolwich Dam (1974), Laurel Creek Reservoir (1968) and Shade's Mills reservoir (1973).

Reservoirs help reduce flood damages by storing water and

slowly releasing it to the river. Major dykes were constructed after the 1974 flood in Bridgeport, Cambridge and Brantford. Major channelization works have been completed in Brantford, Cambridge and Guelph. Structural measures are typically implemented where there is existing development, and where there is no alternative but structural measures to reduce flood damages.

Non-structural measures include softer approaches such as flood forecasting and warning, floodplain management, watershed planning, stormwater management, conservation practices and emergency response programs.

Flood forecasting and flood warnings provide residents with timely warning that a flood will occur. Short-term measures such as evacuating areas and removing valuable contents can help reduce the risk of lives being lost and reduce property damages.

Floodplain management focuses on identifying and mapping flood prone areas, and managing the type of land use in these areas to reduce the potential for loss of life or property damages. Floodplain management is implemented through the Conservation Authorities Act and the Planning Act.

Watershed planning and stormwater management focus on how new development areas should manage water to avoid creating new flooding problems. Conservation practices, like tree planting, help improve the landscape's ability to hold and slowly release water.

Has flood damage been reduced? Yes. The average annual flood damage cost total from the nine largest flood damage centres in the watershed is \$500,000 per year. If major dykes and channel works were not in place in communities like Brantford and Cambridge, the estimated average annual cost of flood damages would be \$2,500,000 per year. Without the flood reduction provided by both major reservoirs and major dykes, it is estimated the average annual cost of flood damages would be \$5,500,000.

While estimates can be made of the flood damage saving from structural measures it is harder to estimate the flood damage dollar saving of softer non-structural measures. It is reasonable to suggest the biggest savings in flood damages are from the implementation of good floodplain and watershed management.

The day-to-day work of the Conservation Authority and municipal planners throughout the watershed should not be underestimated, although their work in implementing good floodplain management is not as visible as a flood control structure. All residents of the watershed and the province reap the financial benefits of their work.

Other important on-going work related to flood damage reduction is the maintenance and advancement of the flood forecasting and warning system. The warning system is tested annually. The other key work is the constant maintenance and checking of flood control structures. Annual inspections are made of flood control structures and long-term structural maintenance plans are in place.

We have come a long way in reducing flood damages in the

Grand River watershed. Much of this work could not have been achieved without cooperation and assistance from all levels of government. The biggest challenge ahead is maintaining a constant state of readiness for the next big flood, and continual implementation of good floodplain management and watershed planning principals.

Dwight Boyd is a Senior Water Resources Engineer with the GRCA and a Conservation Authority representative on the Provincial Flood Forecasting and Warning committee. His flood-related responsibilities include preparation of flood forecasts, planning and administration of the real-time data collection system and maintenance of the GRCA flood damage database.

The First Flush of Spring

by **Tracey Ryan**, GRCA

We all know that melting snow influences river flows and water quantity but did you know that melting snow also has a tremendous impact on water quality? To understand this you need only to think about what the landscape looks like in the late winter, with slush, grit and dirty-looking snow, and then imagine the fresh and clean landscape in the spring after the snow has gone.

The melting snow and spring rains have washed over the landscape, flushing soil, road salt, yard waste, manure and other materials into local watercourses. In some areas, spring runoff accounts for over 50% of the annual load of phosphorus and suspended solids (soil and organic matter) in watercourses.

Early spring runoff from farm fields can carry fertilizers, manure, and suspended soil into the river. At this time, conservation farm practices are especially important. Using no-till agriculture and cover crops, and protecting waterways with buffer strips can significantly reduce pollution entering the river. One of the easiest ways to recognize the effectiveness of conservation tillage is to look at the colour of the snow at the edges of farm fields. Brown snow drifts are a sign that topsoil has been left unprotected and is moving off the field into ditches and onto roadsides. Fields that have some type of cover on them, whether it is a cover crop or residue from a previous crop tend to have little or no soil moving off them. The snow drifts bordering these fields are white.

The same phenomena can be found on construction sites. Many developments leave vast areas stripped of grass as they build. These areas potentially add to the phosphorus and sediment that washes off in the spring. Melting snow from urban and rural roadways also carries large quantities of road salt into the river. This problem is receiving a great deal of study as researchers work on coming up with a cost-effective and safe alternative to salt. In the meantime, road safety in the winter cannot be compromised.

Urban and rural home owners should take care of their yard waste. Composting leaves and yard waste makes the best use of this resource while at the same time ensuring that it does not add to pollution in streams. If your community has

municipal composting with leaf collection in the fall, try to ensure that leaves do not sit at the curb for extended periods of time or that you do not put your leaves out after the collection date in hopes that they will disappear. Where they go will be down the storm sewer and into the river. Proper disposal of pet wastes also ensures that you are not adding to water quality problems.

Property owners who have the privilege of a watercourse on their property should ensure that it is properly buffered. A buffer of natural vegetation along a watercourse provides a number of benefits to water quality and aquatic life. Stream side buffers also trap sediment and organic matter that is washing off adjacent landscapes with snow melt. They slow down the effect of melting snow and allow natural processes to work at utilizing nutrients and re-charging groundwater.

Many simple measures help the overall water quality picture. If we all make some effort to protect our vital waterways from some of undesirable impacts of the arrival of warm weather, spring in the Grand watershed can be truly a time of renewal and hope.

MILESTONES

Heritage Day Workshop

The 3rd Annual Heritage Day workshop and celebration was an overwhelming success. Over 100 participants attended the event on Monday, February 21st, 2000, at the Cambridge Arts Theatre. The workshop was hosted by the Grand Strategy Heritage Working Group and was generously sponsored by the City of Cambridge and the GRCA.

The theme was River Towns: Building on our Grand Heritage. An excellent roster of speakers provided insight and inspiration for developing and promoting the Grand River and its outstanding heritage as the living, vibrant heart of our communities.

John Gerstmar from the Meewasin Valley Authority in Saskatchewan presented the keynote address. John shared his experiences regarding the opportunities and challenges in providing a river focus for residents of the City of Saskatoon. Dr. Gary Warrick from the Brantford Campus of Wilfrid Laurier University provided an historical overview of pre-European settlement in the Grand River watershed. He was followed by Paul General from the Six Nations Eco-Centre who offered his personal perspective of the importance, past and present, of the Grand River to his family and the people of the Six Nations. In the afternoon, Lee Kennaley, Commissioner of Planning and Development for the Region of Haldimand-Norfolk spoke about the exciting prospects for promoting the rich natural and cultural assets of the southern Grand watershed. Mark Conway, from Dillon Consulting, updated participants regarding plans to focus downtown activity on the river in Cambridge.

Later, participants shared approaches on how the Grand River and its outstanding heritage can be incorporated as a dynamic aspect of our communities. The ideas came fast and furious. Some of these ideas are:

- Extend the Grand River Scenic Parkway signage to the middle and north watershed
- Develop more and better interpretive signage along trails and in areas of interest throughout the watershed
- Erect a Canadian Heritage River plaque in every watershed community
- Hold an annual canoe race or triathlon
- Link gaps in the trail system in the watershed to create a continuous network
- Create a Grand River Water Trail
- Explore opportunities to interpret known archaeological sites.
- Link community theatres and other historic attractions along the river
- Have more community forums exchange of information and ideas
- Promote Grand River Country as an exciting, diverse, and unique tourist destination

Comments expressed at the workshop will be compiled in a report. Information about when and how you can obtain a copy will be announced in a future issue of Grand Actions. At the workshop conclusion, participants were encouraged to share their ideas with others to grow the seeds for future actions in communities throughout the watershed.

WHAT'S HAPPENING?

Maples Ring in the Millennium

The Arbour Week Steering Committee for Ontario has named any native maple as the "Millennium Maple". That means wherever you are, the native maple that is appropriate for your site can be the "Millennium Maple".

A great way to mark the Millennium and create a legacy for the future is to create a Millennium Maple Ring. You can make a Millennium Maple Ring by planting 20 native maples in a circle. Each tree represents one of the twenty centuries of the past two thousand years. All that is needed is a park or schoolyard or other area with an acre of available space.

To illustrate, let's look at an example using sugar maples. Being a large tree at maturity, the sugar maple might require about 9 metre (about 30 feet) spacing between trees. A circle with a diameter of 60 metres (about 200 feet) makes a circle big enough to have twenty trees at 9-metre spacing. The area taken up by a circle of this size is about 0.3 hectares (0.7 acres).

Inside the Millennium Maple Ring could be a play area, or gazebo, etc. A plaque at a suitable access point could explain the significance of the Millennium Maple Ring. A school establishing a Millennium Maple Ring could easily link lessons to the project, for example: write an essay about the important events that took place during the century represented by the tree your group planted. Imagine what a special place a Millennium Maple Ring will be a century from now. Beautiful, towering maples will encircle a space dedicated to reflecting on the passage of time.

The Future of Cruickston Park

The Nature Conservancy of Canada, a national, non-advocacy environmental organization, has submitted a letter of intent to acquire environmentally-significant portions of the Cruickston Park Farm, a large parcel of land located on the outskirts of the City of Cambridge. The Farm has been the focus of intense local concern since the University of Guelph announced its intention to sell the 913-acre property late last year. The Conservancy offered to lead the efforts to secure the Farm when it became apparent that the City of Cambridge and local conservation interests wanted to see the most sensitive lands set aside for conservation.

A report prepared for the University in 1996 concluded that "the forested area to the south-west. is older and more undisturbed than other forest stands on the property and is a likely area to be of pre-settlement origin". This may one of only a handful of pre-settlement forests remaining in southern Ontario.

In 1995, the University canceled plans to selectively log approximately 1,400 trees from the forested portions. There is nothing in the Region of Waterloo's new Tree By-law to prevent a future owner from logging the woodland in a manner which would have a long-lasting impact upon the 'old growth' character of this hardwood forest ecosystem - unique in Waterloo Region. To ensure this forest is never cut for development, or profit, The Conservancy and its supporters agree it should be acquired and held in conservation ownership.

The Nature Conservancy of Canada has the support of the City of Cambridge and Kitchener-Waterloo Field Naturalists in hopes that conservation interests can acquire all or parts of the property.

In submitting the letter of intent, the first phase in the bidding process for prospective purchasers, the Conservancy has started a campaign to solicit pledges from individuals and local businesses. Formal offers to purchase must be submitted by March 21, 2000. With pledges of support, if the Conservancy's offer is accepted in late March, it will be in a strong position to proceed with a fundraising campaign for the final purchase ? an amount that could be well over \$1.5 million.

The NCC is a non-profit organization that takes a business-like approach to land conservation and wildlife preservation. Its plan of action is partnership building and entering into creative conservation solutions with any individual, corporation, community group, conservation group, or government body that shares its passion for habitat protection.

For more information or to pledge your support contact The Nature Conservancy of Canada, Ontario. Phone: (519) 826-0068, or toll free, 1-877-343-3532. Fax: (519) 826-9206. E-Mail: ontario@natureconservancy.ca Pledge Sheets are also available at any City of Cambridge facility (City Hall, libraries, etc.).

Waterloo Region Heritage Fair

Heritage Day saw the beginning of a new tradition for the Waterloo Region and the Grand River watershed. On Monday, February 21, 2000, Joseph Schneider Haus Museum hosted the first Waterloo Regional Heritage Fair.

The event was a celebration of our Canadian heritage as interpreted and presented by local students in Grades 4 through 9. Student projects included representations of our culture "Then and Now"; a retrospective of Sheppard Public School; word and image portraits of the Selkirk Colony, Mackenzie King's Berlin, and Sir Wilfrid Laurier's influence in opening the Canadian West; and computer-based, audio-visual documentaries of "Canadians In History", "Landmines", and "Remembrance Day". The Heritage Singers of New Dundee Public School were also on hand for the opening reception to share a selection of Canadian folk songs with participants and visitors to the Fair. The day was further enhanced by a series of workshops for students. These included sessions given by local story-teller Mary-Eileen McClear, highlighting our oral traditions, and introductions to traditional Pennsylvania German Mennonite folk arts by Joseph Schneider Haus staff.

This multi-media showcase of Canadian history and influence in local, provincial, national, and international spheres is part of a national programme of Heritage Fairs initiated by the Charles R. Bronfman Foundation and supported by community and national partners. The success of this first Waterloo Regional Heritage Fair can certainly be attributed to the hard work of students, teachers, and the generous support of the GRCA, the Regional Municipality of Waterloo, the City of Waterloo, the Waterloo Region District School Board, the Waterloo Catholic District School Board, Joseph Schneider Haus Museum, First Avenue Information Systems, Changescape Consulting, Kitchener Beverages, Reggie's Deli Express, Sobey's, Tim Hortons, Trios Catering, Vincenzo's, and Zehrs Markets.

To learn more about the National Heritage Fairs Project, the Waterloo Regional Heritage Fair, or how to become involved in the next Heritage Fair event on May 12, 2000, please call (519)742-7752.

Long Term Water Strategy

In early February, Thomas Schmidt, Director of Water Services for the Regional Municipality of Waterloo, presented to the Regional Council three preferred alternatives for water supply from the Region's Long Term Water Strategy Study. The Region has been studying alternative sources for future water supply. An evaluation of the options has been completed and three of these have been identified as preliminary preferred alternatives. These options are Aquifer Storage and Recovery (ASR) with a groundwater component, a Displacement Pipeline to Lake Huron or Lake Erie, and a strategic plan that incorporates both ASR with groundwater and a Displacement Pipeline to Lake Huron or Lake Erie.

The capital costs for these alternatives ranges from \$72 million for the ASR and groundwater option to the strategic plan option of both the ASR with groundwater and a

displacement pipeline that would cost \$520 million. The strategic plan option gives the Region the ability to initially take smaller and less expensive steps that take into account changes in the projected growth, while at the same time preparing for future, greater cost expansions. The Long Term Water Strategy (LTWS) began in 1991 with the purpose of selecting a water supply option to serve the Region of Waterloo to the year 2041. The final phase has focussed on the short-listing and evaluation of 16 water supply options. A final decision on the water supply option is expected in April 2000.

Thanks for Your Support

Thanks to all the readers who responded to our November survey with comments, and in many cases, donations. All donations will be used to offset the printing and distribution costs of this newsletter and are very much appreciated. As many ideas and suggestions as possible have been incorporated into our recent editions. We are always pleased to hear from our readers and welcome suggestions on contents. Don't forget to give us enough time to include your calendar events!

LOOK WHO'S TAKING ACTION

Paris Students Help Gilbert Creek

by Shane Mann

Over the last two years the GRCA and many partners, with substantial support through federal government Action 21 funding, have undertaken to protect Gilbert Creek. The Creek is a small cold water stream that flows largely through the former Town of Paris. One of the partners in this effort was the students of Paris District High School. Students worked under the supervision of GRCA staff to assist with efforts such as tree planting, largely through the Paris Golf Course.

Over the last year the high school has undertaken to complement and extend these efforts. Through funding received from the Ministry of Natural Resources' CFWIP program, the Ontario Federation of Anglers and Hunters - Zone J, Canada Trust's Friends of the Environment Fund and the Brant Rod and Gun Club, the high school students carried out further work on the Golf Course property and extended this work to upstream properties. These properties include the Paris Girl Guide Camp and one private property.

Trees and shrubs were planted to stabilize streambanks, shade the water-course, and to prevent erosion at a cattle crossing. Wood duck boxes were built by high school students and erected throughout the watershed. Benthic sampling and a spawning survey was undertaken. All of this work was done under the guidance and supervision of GRCA staff. Water quality test equipment was purchased and a testing schedule has been developed and sites selected. This will help to build a database of water quality results that will be very important as development encroaches on this watershed.

In this effort students learned much about aquatic ecology but perhaps the most important lessons came about through the work with the community partners and the connection that students have made to their community and a small green piece within it. Thanks to the GRCA, the MNR, the OFAH - Zone J, Canada Trust and the Rod and Gun Club for making this possible.

Waterwheels

by Bruce Davison

How much does water cost? According to the Regional Municipality of Waterloo, \$30.4 million has been spent on groundwater treatment and reservoir projects since 1995 (in the Region of Waterloo alone). Whether you know it or not, your tax dollars are working to protect this precious resource.

Canadians use more water per person than any other country except the United States (Source: November 1999 issue of Equinox Magazine). This suggests that we all have a part to play in reducing our water use. The good news is that Waterloo has a wealth of knowledge about water.

When I first came to the University of Waterloo, I had no idea that this area was world-renowned for its expertise in the understanding of water. Seeing this as an opportunity, I have been very fortunate to have excellent academic and work experiences in the world of water. Despite my interest and experience, there are still many questions that remain unanswered. Reading the books *Water* by Marq de Villiers and *Pillar of Sand* by Sandra Postel have helped to answer some of these questions, but a sense of urgency remains. We need to reduce our consumption to help meet the needs of the coming decades.

To help achieve this goal, I will be cycling across Canada from May to September to increase public awareness. With the expertise of the Canadian Water Resources Association, I plan to help gather and spread accurate information about Canada's water resources. Discussions are already underway to include this effort in the learning environment of the Engineering Science Quest camp at the University of Waterloo. To find out more about the ride, please visit the Waterwheels website at <http://waterwheels.uwaterloo.ca>

DID YOU KNOW?

- René Brûhan de Galin e, a French missionary, explored the Grand River from 1669 to 1670, and in 1670 drew what is believed to be the first map of the Grand River.
- In March 1852, Mr. Thompson of Cruikston Park, Blair, had his buildings flooded by the suddenly rising Grand River, and lost his stock and orchards in just a few minutes. In this same flood, "buildings were sailing gallantly down the stream" past Galt from around Preston.
- In January 1906, heavy flooding of the Grand River shut down the Brantford power plant and left the city in darkness for two nights. The malleable iron works was also closed, causing 100 men to lose

two day's work. Another similar stoppage of the power plant occurred one month later.

- In 1974, the Grand River watershed experienced an extreme flood that caused damages of \$7-10 million, excluding business losses and clean-up costs. In Cambridge, the flow was the highest in recorded history.
- Flood waters can be extremely dangerous. The force of 15 cm (6 inches) of swiftly moving water can knock people off their feet. Cars are easily swept away in just over half a metre (2 feet) of moving water.
- Guelph, Waterloo, Kitchener, Cambridge and Brantford are Ontario's only major cities relying solely on groundwater and an inland river system for water supply and treated wastewater disposal. In the Grand watershed, only Dunnville, Caledonia and Cayuga rely on Great Lakes water for their water supply.
- A riparian zone is an area of land adjacent to a watercourse that is typically vegetated and provides a "filter" for trapping sediment and other pollutants while providing aquatic and wildlife habitat.
- While the river is cleaner today than in years past, pollutants still enter the river from rural non-point sources and urban activities in about equal proportions taking into consideration the entire river system.
- The Grand River Scenic Parkway follows existing roads along the Grand River, through Six Nations lands and Haldimand-Norfolk to the river's mouth. Route signage incorporates the Canadian Heritage Rivers logo.

GRAND ACTIONS CALENDAR

Soil and Water Conservation Society - Ontario Chapter Workshop, March 23, 2000, 8:00 a.m. to 4:30 p.m. The workshop, on Assessing the Vulnerability of Ontario's Water Resources to Climate Change, will be held at GRCA Headquarters, Clyde Road, Cambridge. Scientists and water managers will speak on Water Quantity: Floods and Droughts; Water Supply and Demand; and Water Quality. After lunch, working groups will explore Public Policy and Programs, Community Economic Development, Agriculture, Recreation, Fisheries and Aquatic Science, Public Health and Safety. They will address five objectives; vulnerability, tools and skills, process, relationships and individual contribution. To register, contact John Parish at (905) 877-9531. Email: jparish@aztec-net.com

Brant Woodlot Owners Association Annual Meeting will be held at the end of March - Contact Bruce Zavitz at 519 448-9406 for details.

First meeting for A Watershed Forest Plan for the Grand River, Saturday, April 1, 2000, 9:00 a.m. to 3:00 p.m. at the GRCA head office, 400 Clyde Road, Cambridge. Space is limited, and participants must register by March 24. Call Martin Neumann (519) 621-2763, ext. 258. A grant in support of this plan was received from Canada Trust's Friends of the Environment Foundation.

Wellington Society for the Countryside Annual Meeting, April 1, 2000 at the Turfgrass Institute, Guelph. For details phone Laraine Cremmen, (519) 766-0158, or George Collin at (519) 787-1849.

Tourism Trends Conference, Thursday, April 13, 2000, at the Best Western Brant Park Inn, Brantford. Guest speakers include Stephen Smith, Canadian Tourism Commission; Hon. Cam Jackson, the Minister of Tourism for Ontario; and Peter McFadden, President of the Southern Ontario Tourism Organization. Seminar topics will include Agricultural, Aboriginal and Adventure Tourism, Help the Media Sell your Story, Packaging Successful Tours, and Selling Your Destination at Trade

Shows. For information or to register, phone (519) 752-5656 or email sylvester@bfree.on.ca

Earth Day Tree Planting, Saturday, April 29, 2000, at Southwest Optimist Park, Kitchener, at Homer Watson Blvd. and Pioneer Drive. For more details, call Jennifer Hawkins, at (519) 621-2763, ext. 268.

Fourth International Conference on the Science and Management of Protected Areas, May 14 to 19, 2000, (Sampa IV) at the University of Waterloo. Topics include regional planning approaches to parks and protected areas. Key areas of interest include fragmented landscapes, the municipal and regional context and watershed. For information contact Stephen Lauer, (519) 622-4035 or email sampaa@prioritygrow.on.ca

Caring for Our Land: Stewardship and Conservation in Canada, June 3 to 6, 2000, a National Millennium Conference at the University of Guelph. For more information contact Peter Mitchell, (519) 824-4120, or email claws@uoguelph.ca

For more information about The Grand Strategy
contact Barbara Veale
at the Grand River Conservation Authority.
Phone: (519) 621-2761
Fax: (519) 621-4844

For newsletter enquiries or submissions
contact the Editor, Liz Leedham, c/o **Barbara Veale** at the above
address.

Newsletter submissions must be made by the 15th day of each month to
be included in the following month's newsletter.

Donations and corporate sponsorships towards the cost of producing this
newsletter are always welcome. Please contact **Ralph Beaumont** at
(519) 621-2761 for more information.



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