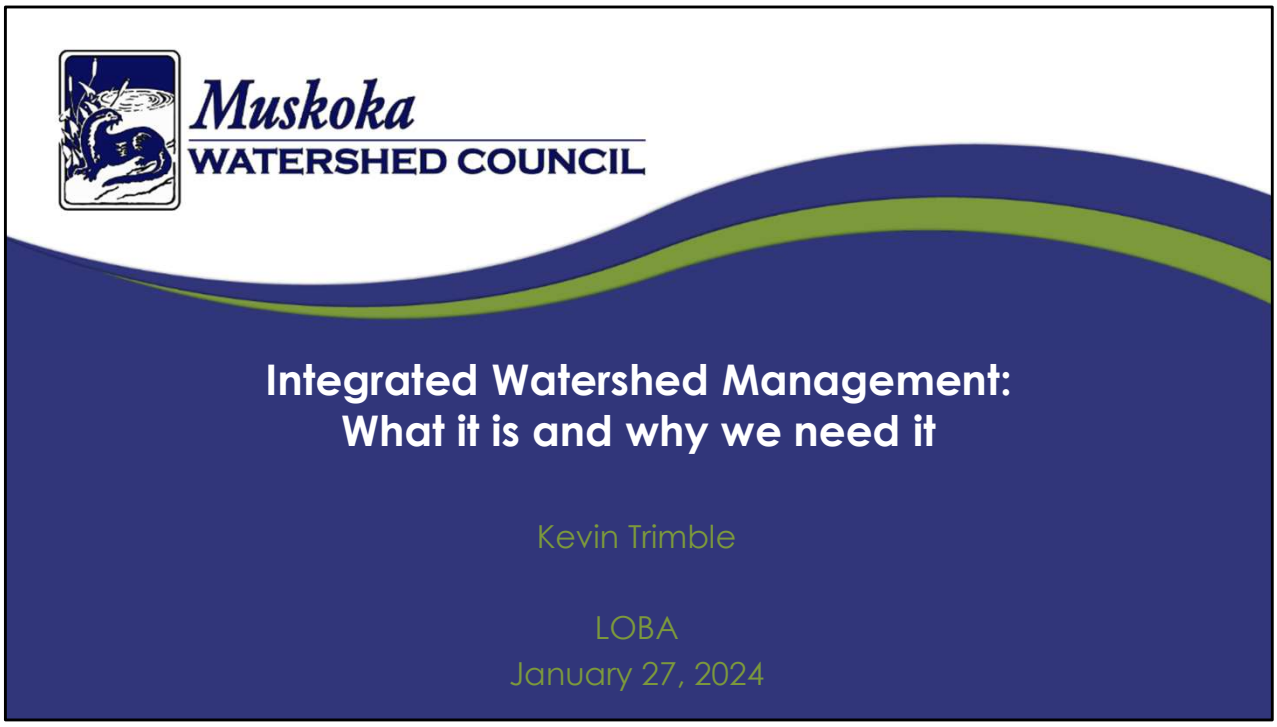


Integrated Watershed Management is a ridiculous technical term that captures a whole bunch of messy technical issues, but I'm going to trying to dissect it a bit and simplify it down because, as you'll see its really about a culture shift and the need for us all to become an informed community that can support subtle changes in the way our region is governed.

…. And I live on Brandy Lake in the Port Carling area.

I thought I'd put my thank yous at the front today because I've brazenly stolen other people's material - And this talk has really drawn heavily from technical material and presentations by a number of people – like our local power producers, MWC members, our partners in the District, and several outside experts we've relied on.

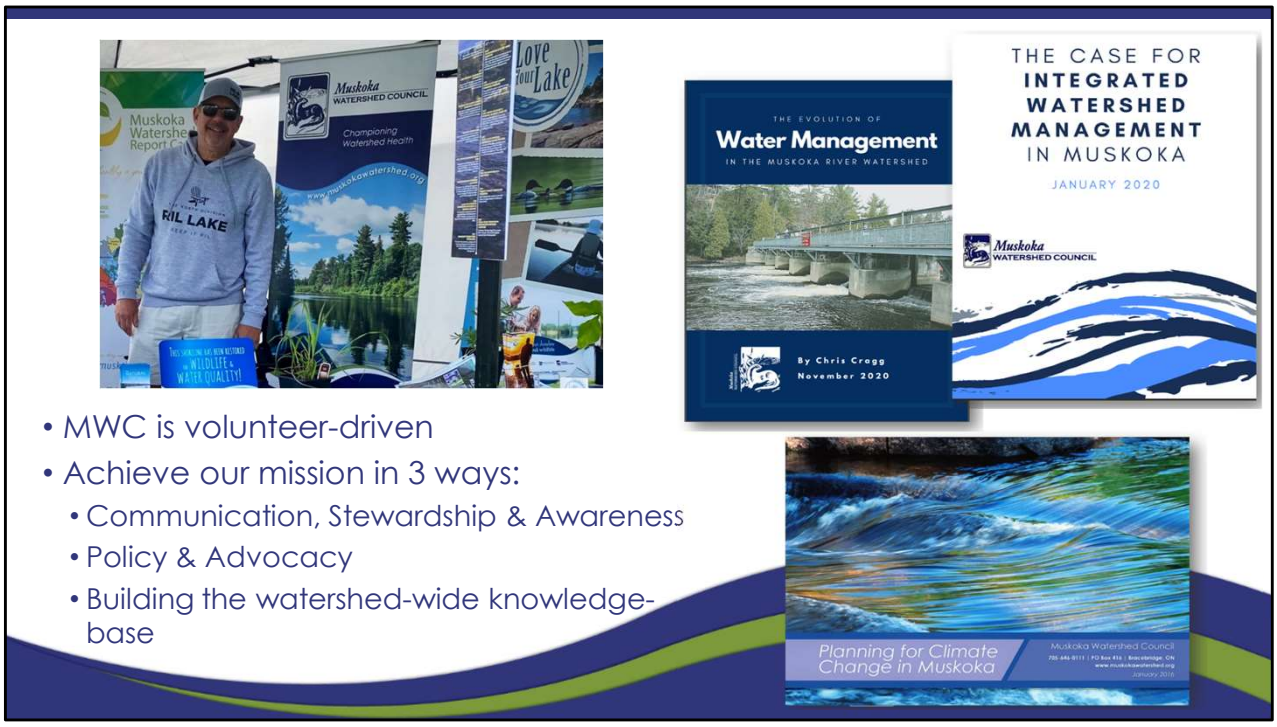
The Talk…

- Muskoka Watershed Council (MWC)
- Muskoka River Watershed
- The Status Quo and Why it Won't Work Anymore
- Integrated Watershed Management
- What's been done so far?
- Where do we go from here?

Muskoka WATERSHED COUNCIL

So I'll keep returning this outline but I've broken out some chunks to describe the watershed and how we currently manage it, and then I'll describe watershed management.

- Established in 2001 as collaboration between the District of Muskoka and the Community and the District continues to be our strongest in-kind supporter
- Incorporated as not-for-profit 2019 with the mission of empowering communities to protect and enhance watershed health and
- We provide non-partisan, apolitical, science-based advice to municipalities on environmental issues



We're almost completely volunteer-driven and we carry out our mission in 3 ways:

- Communication, stewardship and awareness
- Develop policy positions and advice
- Building the watershed-wide knowledge-base

We put out a watershed report card about every 5 years, we run a number of citizen science monitoring projects and waterfront stewardship programs.

We're currently running a new blue-green algae monitoring program with a number of lake associations

The Talk…

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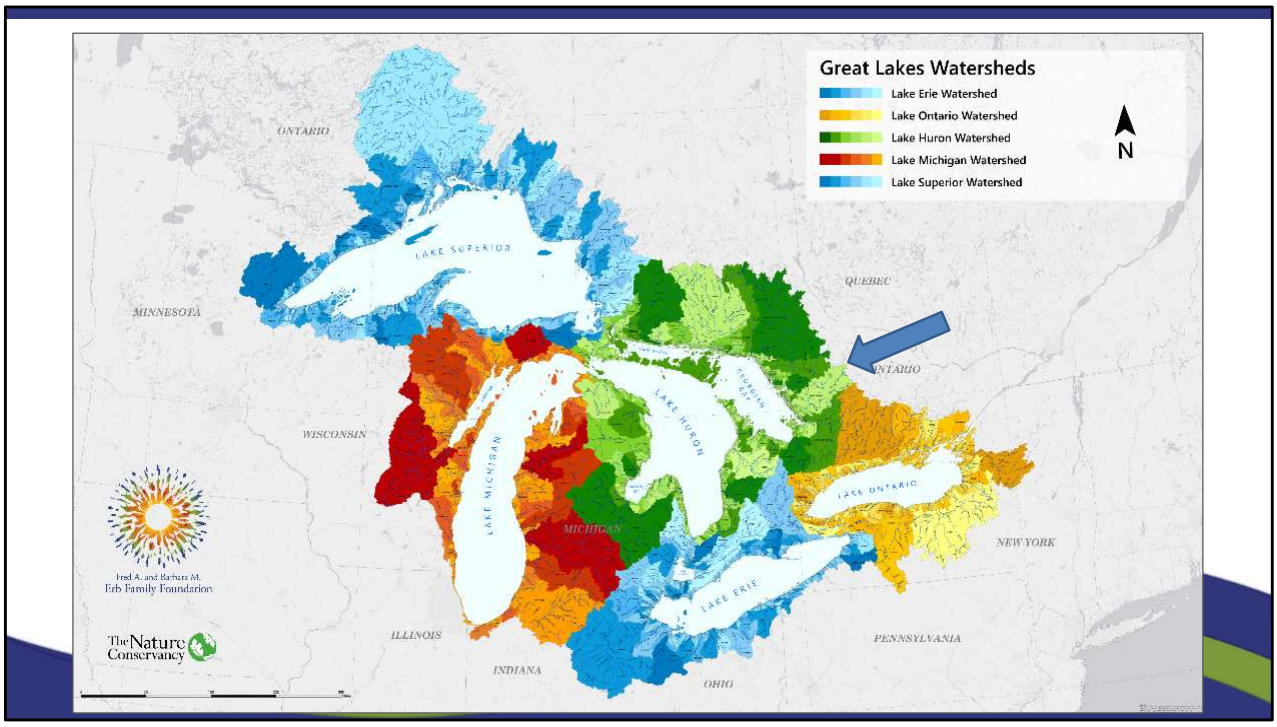
Muskoka WATERSHED COUNCIL

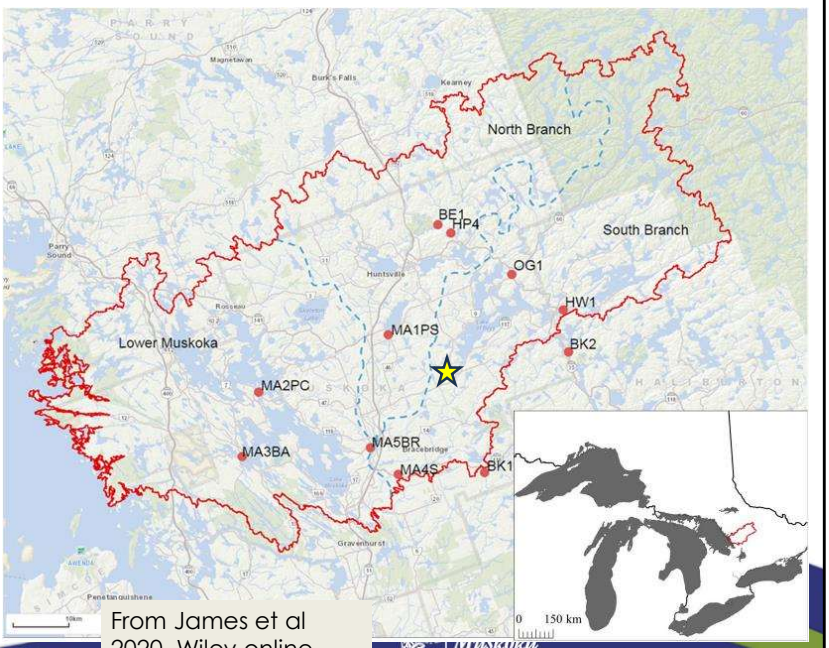


This is just zoomed out view of the watershed …. showing the way it fits into the Great Lakes ecosystem

Its almost the size of Prince Edward Island… and its just a bit smaller than the Grand River watershed by comparison

The Muskoka River Watershed

- 5100 sq kms
- ~1000 mm precipitation yearly
- 42 water control structures
- 2000 lakes covering 17% of watershed
- 6800 km of shoreline
- 38 provincially significant wetlands
- 19000 km of 1st and 2nd order streams



From James et al 2020, Wiley online

MUSKOKA WATERSHED COUNCIL

The Muskoka River watershed is about 5100 square kilometers, and it starts on the western slopes of the Algonquin dome and flows about 210 km to Georgian Bay with a drop of about 310 m in elevation on the way.

The yellow star shows us here today.

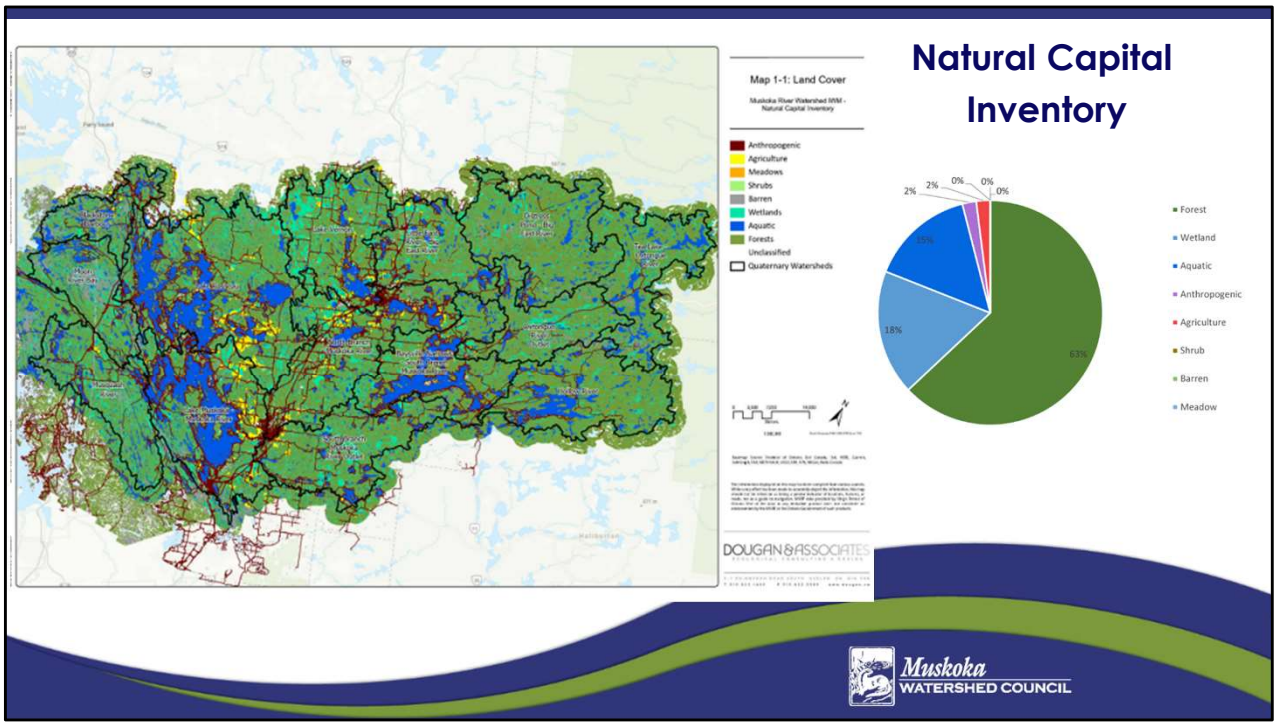
Gets ~1,000 mm precipitation every year

42 water control structures

The watershed has at least 2,000 lakes covering 17% of the watershed area with 6800 km of shoreline

A recent Natural Capital Inventory by Dougan and

Associates for the District of Muskoka indicates there are up to ~19,000 km of 1st and 2nd order tributaries



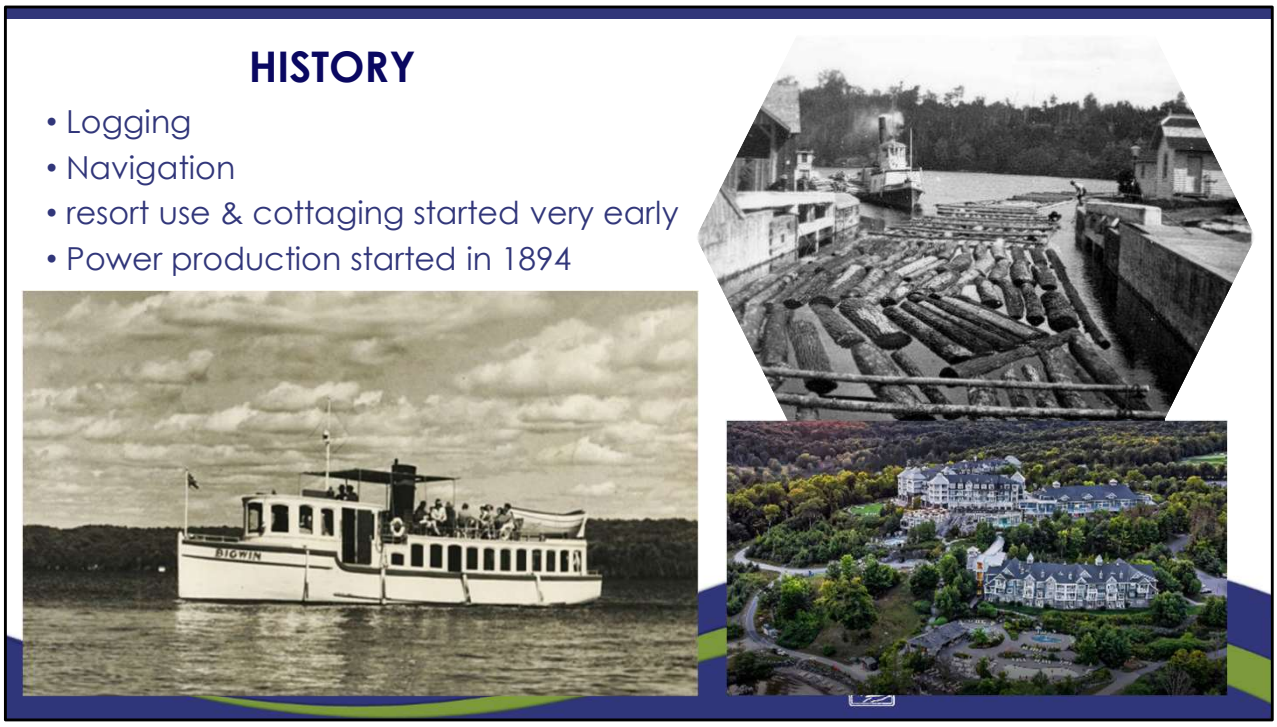
From that same study –

18% wetland

16% water

63% forested

So its over 90% natural



I know many of you are probably familiar with a lot of this but I thought I'd include it so we have the whole picture….. Just before european contact, the watershed was settled mainly with Anishnaabe peoples of the Algonqiun and Ojibwe nations, and post-contact saw Haudenoshaunee or Iroquoiian nations settling in the area along with Metis and Wendat or Huron.

European settlement started in the mid 1800s but I find it amazing how fast the earliest logging industry transitioned into tourism throughout the Muskoka Lakes.

Many of the original dams were constructed in the late

1880’s to early 1900’s to facilitate the transport of logs to sawmills or the diversion of water to power the mills, and to aid in commercial river navigation.

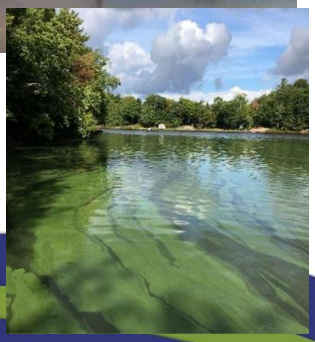
We’ve had at least 6 major floods in the watershed, the most recent being in 2013, 2016, the biggest in 2019 when a state of emergency was declared.

One of the biggest challenges we face here is that its almost impossible to imagine there could be a problem – and I was thinking about this on the boat over to Bigwin one day … when you look up and down the lake I was thinking wow who would ever think there's anything to be concerned about in a world class place like this

Nothing pulls a community together more than some big issue that everyone can rally around and that's a foundation of community driven watershed management – but all we have is an occasional flood that comes and goes…

MULTIPLE & COMBINED TRENDS

- Climate change
- Development
- Flooding & drought risk
- Water quality issues
- Governance & water management



Muskoka WATERSHED COUNCIL

But in reality there's a number of trends that we're concerned about, and many of these were described in our latest watershed report card that came out last fall

So some of these are familiar to you but we have a number climate change effects starting to show up here….. we've seen changes in development pressures and styles, we've had both flood and drought risks and frequencies, and a number of water quality issues – and an even bigger concern is the combinations of some of these trends – so I'm going to walk through some of them just to get a feel….

How do we govern the Muskoka River watershed?

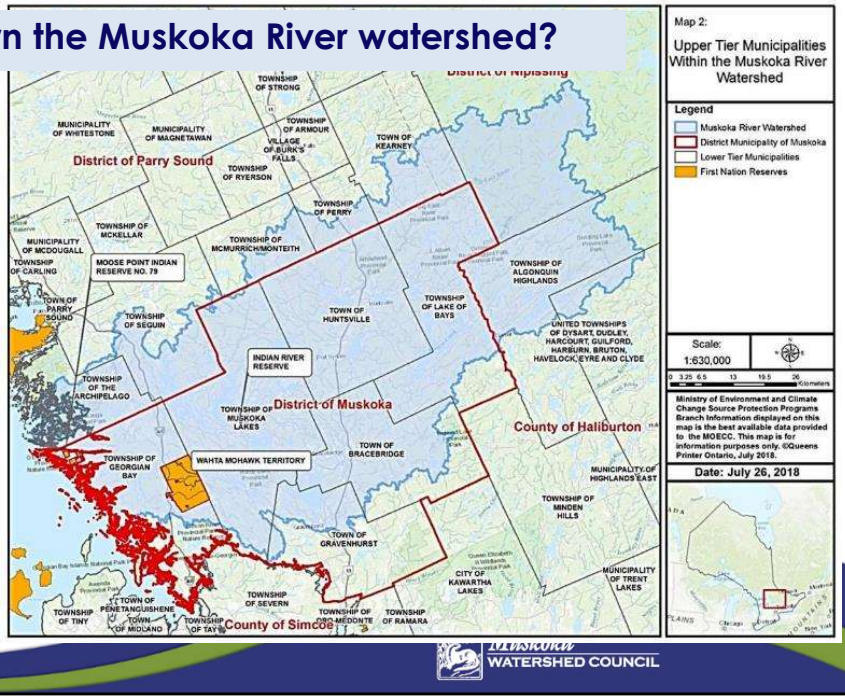
How many municipal governments ?

17

How many upper and lower tier ?

4 upper
13 lower

At least 3 First Nations



In terms of Land use the watershed is governed by 17 municipalities, 4 upper tier and 13 local municipalities - Plus several First Nations in the watersehd, and obviously a large chunk of Algonquin Provincial Park in its headwaters.

And all of these municipalities do the best that they can to take the bigger picture into account in their Official Plans, approval processes and infrastructure planning, plus we have a number provincial and federal regulations …. So THAT's a lot of government --- but we don't currently have coordinated watershed wide information

or tools

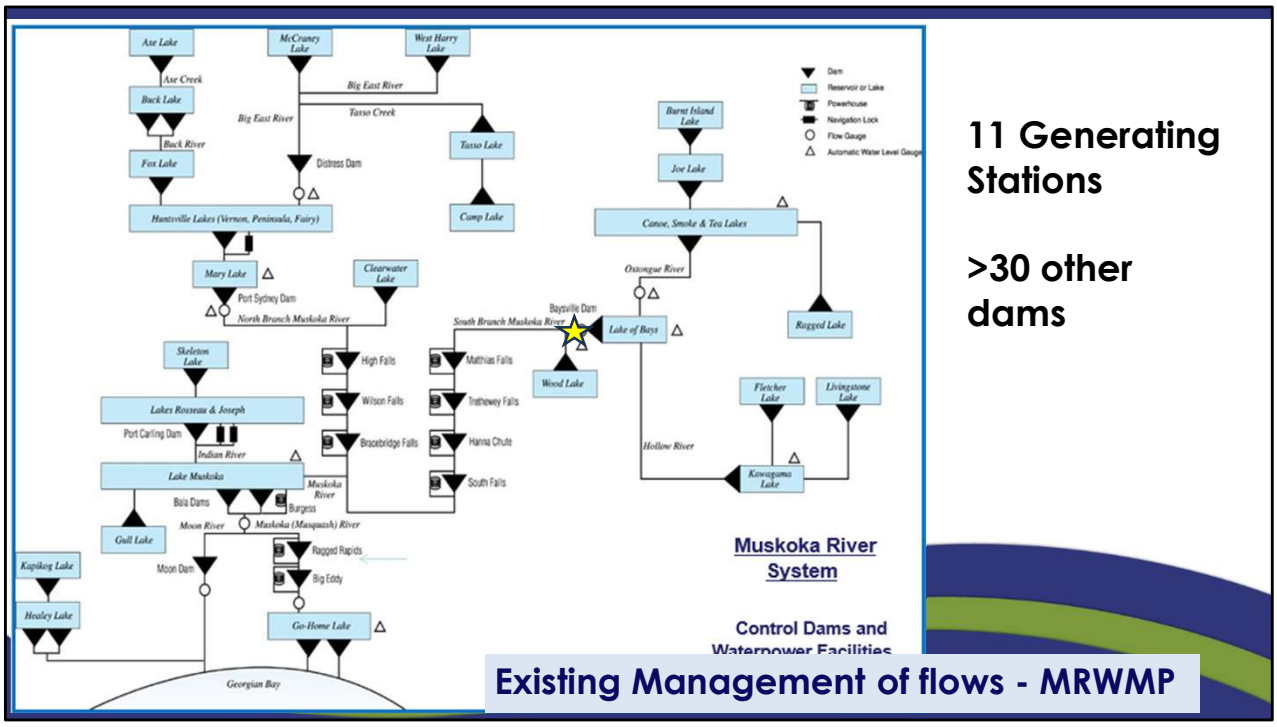
One of the recent projects carried out by the District shows some of the inconsistencies in environmental approval criteria across our municipalities – and there are different requirements on opposite shores of the same lake in some cases – like Lake of Bays.

Now we also have the Muskoka River Water management Plan that's implemented by our power producers as part of their coordinated operations

And I'm going to say this several times today, because even our own members frequently trip on it ---- a Water management plan is NOT a WaterSHED management plan. The difference is huge but we accidentally mix up the terms….

I only have time to make a few comments about this plan, but that paper on the right is an excellent description of its history and how it works and its on our website at

muskokawatershed.org



So we have about 42 dams in the watershed, 11 of which Hydro-electric Generating stations

And you can where we are at the yellow star there….

The main change when the MRWMP was finalized in 2006 was the use of operating zones, or rule curves, and these took away a bit of the operational flexibility of the power dams in order to provide considerations for navigation and fish

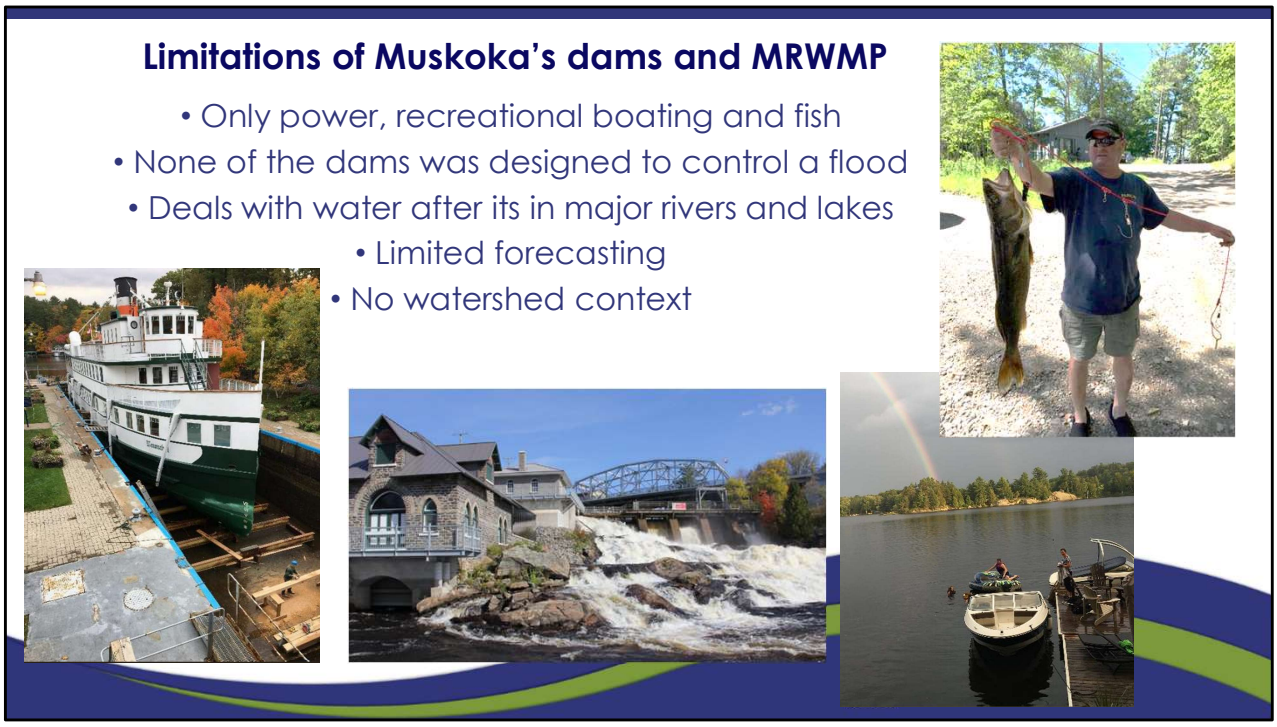
For example,

Longer period of high water in spring (riparian wetlands, sustained discharge for walleye spawning)

Natural drawdown through summer-early fall

Fall drawdown (depending on the lake) to push lake trout spawning deeper on their shoals to minimize the risk of eggs being stranded

Reduced midwinter drawdown to protect late emerging lake trout -- again to protect eggs

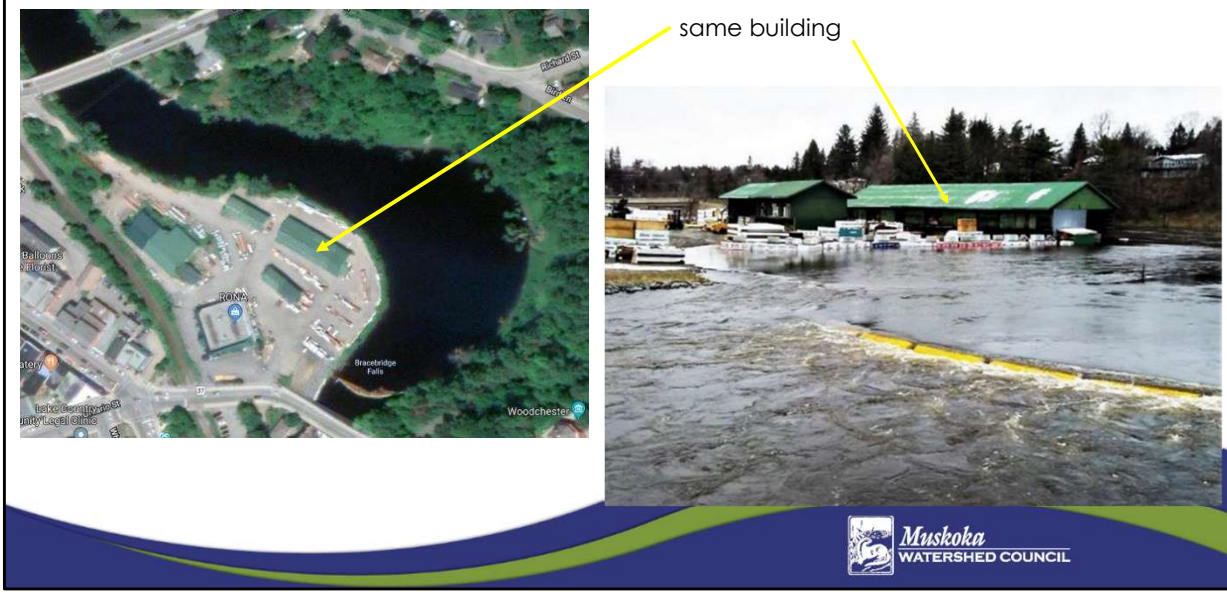


But the most important points I wanted to make about this is that the water management plan only deals with

- power, recreational boating and fish
- There's No flood management infrastructure in our watershed
- None of the dams was designed to control a flood
- Deals with water after its in major rivers and lakes with limited forecasting and no broader watershed considerations

But these last part always catches me because …..

Floods don't start here



Muskoka WATERSHED COUNCIL

Floods don't start in our major lakes and rivers….

Headwaters, Forests, Wetlands

Muskoka WATERSHED COUNCIL

They start here where we have a massive network of up to 19,000 km of headwater tributaries, most of which has never been assessed or monitored or considered in for their functions in the watershed.

We also have a massive amount of forest cover and over 94,000 ha of wetlands.

The MECP research group in Dorset, has said that about half our annual precipitation goes back to the atmosphere through forest evapotranspiration.

Floods are not as simple as bathtub that overflows, But

we haven’t really thought about how the entire watershed works as a system that includes water and biological functions

In 2019 MWC held a Watershed conference that ironically landed just as one of our hugest floods was peaking. And a local resident interviewed for the Toronto news the day before said “They have to do something about all this water!!!” And the theme of the conference became “Who is They??”

And a really weird irony in the Muskoka watershed is that this almost total lack of a flood control system or infrastructure exists on a group of lakes with more waterfront development inside floodlines and out over the water than almost anywhere else in central and southern Ontario.

Urban & Waterfront development

Muskoka WATERSHED COUNCIL

The building industry is one of the few solid pillars of our economy but I don't know of anywhere in Ontario where the utter dependency of the this economy on the state of our environment is so strong.

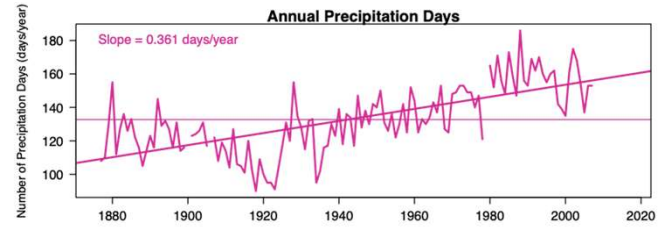
But we're finding that demand to develop, or especially redevelop waterfront properties is increasing and also that we have a huge housing crisis in our urban centres right now so development pressure in general is going up.

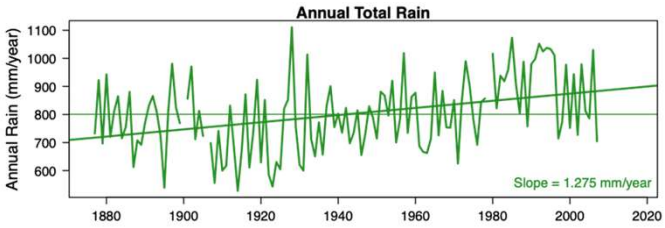
And the forms of waterfront development are also changing to larger more aggressive clearing and

landscaping.

But again, its quite ironic that a chunk of our economy is dependent on building inside floodplains and out over the water in a system without any flood control infrastructure.

Climate Change – Precipitation Days





Muskoka WATERSHED COUNCIL

So now lets add a few examples of climate trends into this soup

MWC has been fortunate to have a couple of volunteers who are able to look at climate data focused exclusively on weather stations right here in our watershed…..

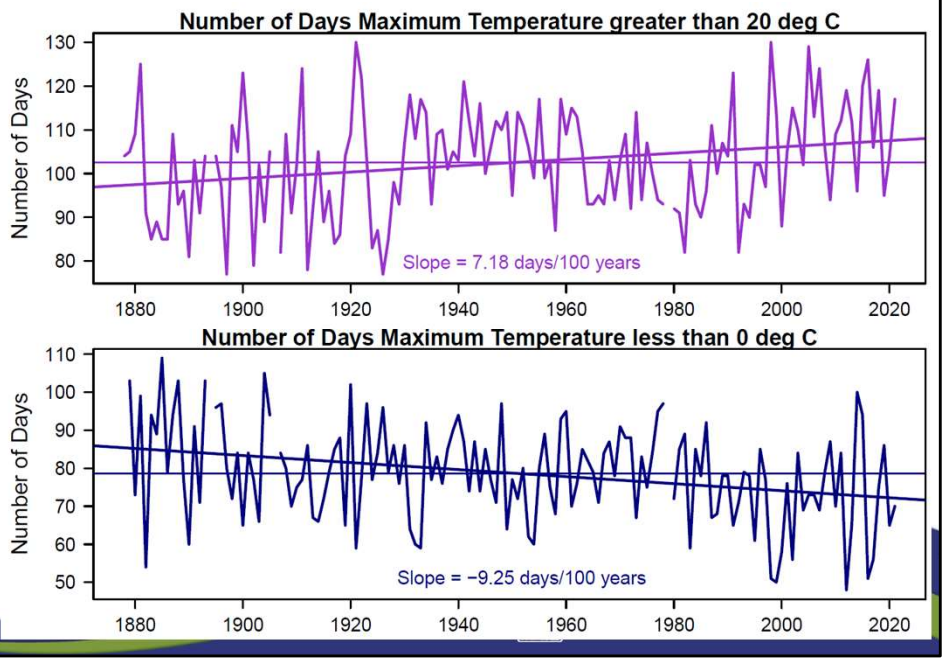
And we've put a lot of this into the background reports that went into the report card and they're all available on our website,

And we are now seeing some obvious trends like this increase in the number of days with rainfall and an

increase in total annual amount of rain….

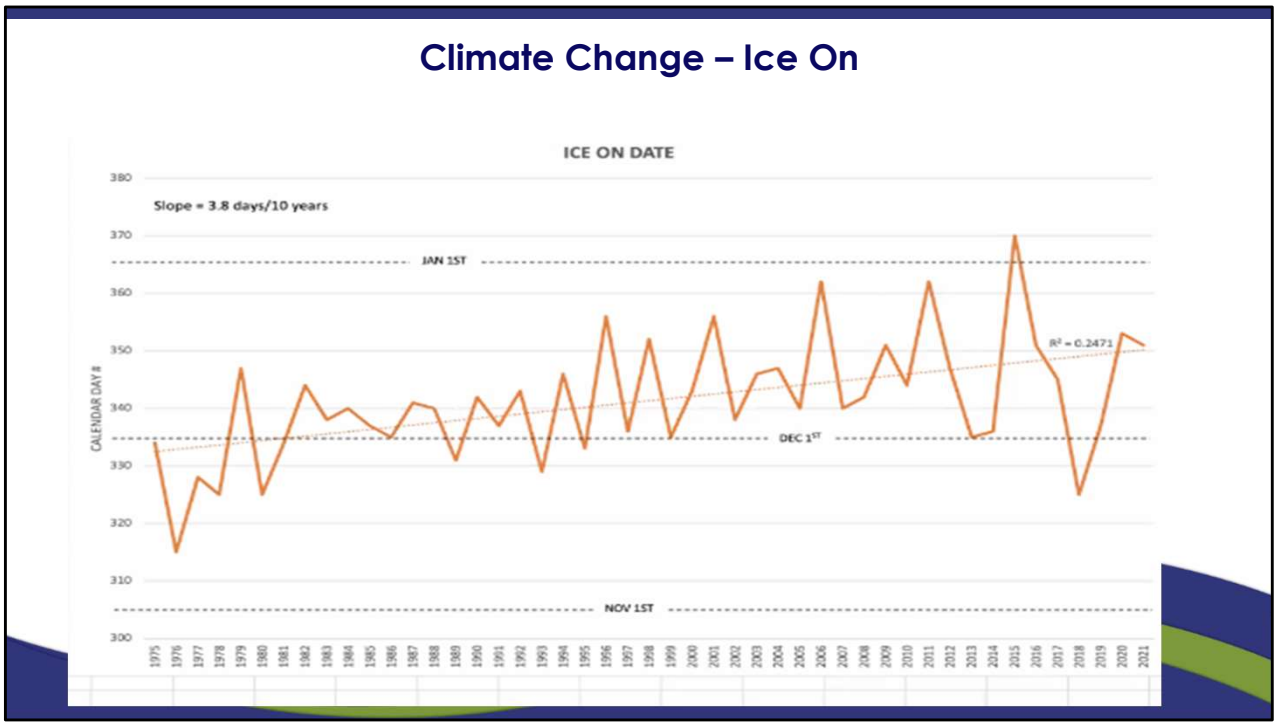
And if you look in our report card you'll see that the frequency of severe storms is also going up.

Climate Change - Temperature



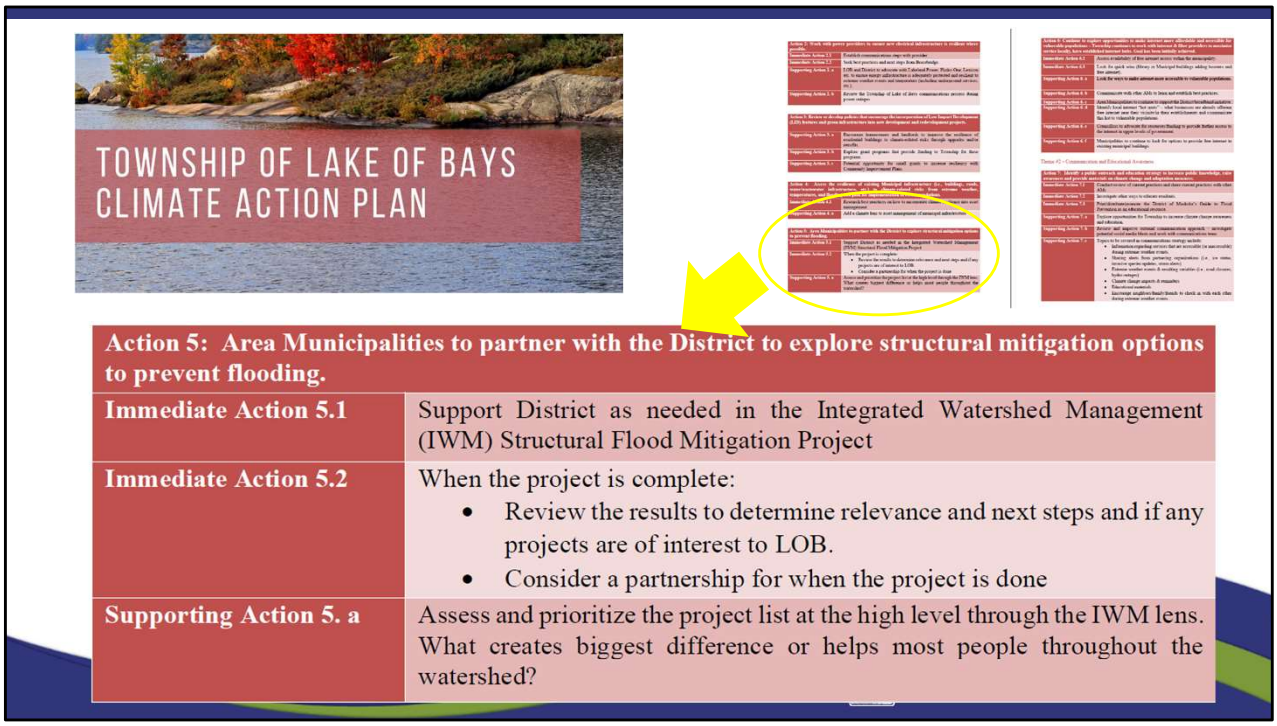
And with respect to temperature – you'll see in the upper graph that in the last 140 years of so, the number of days with maximum temperatures over 20 has gone up and in the lower graph the number of days below 0 is going down – and this is projected to continue or get worse.

Climate Change – Ice On



One of the most in-your-face changes happening in Muskoka is that we have on average about 3 weeks less solid ice cover on our lakes than we did 30 years ago. And we've also seen higher fall temperature patterns.

Last winter we started seeing helicopters carrying building materials to cottage construction sites on the big lakes because they couldn't barge or tow on the ice; and this is also having an effect on snowmobiling with many of the provincial trails crossing lakes in Muskoka.



Action 5: Area Municipalities to partner with the District to explore structural mitigation options to prevent flooding.	
Immediate Action 5.1	Support District as needed in the Integrated Watershed Management (IWM) Structural Flood Mitigation Project
Immediate Action 5.2	When the project is complete: • Review the results to determine relevance and next steps and if any projects are of interest to LOB. • Consider a partnership for when the project is done
Supporting Action 5. a	Assess and prioritize the project list at the high level through the IWM lens. What creates biggest difference or helps most people throughout the watershed?

We've heard from a few individuals that municipalities don't need any watershed strategies because they're developing these rigorous climate action plans. And those plans are a huge step forward for our region, with many great recommendations to make us more resilient, but some of them need coordination across municipalities and the watershed in order to be cost-effective and environmentally sound – so this is another little educational hurdle we have to overcome as we move forward…..

So this is going to be my only ecology slide …… One of the big things that we're missing is that our economy, our wellbeing and the cottage country setting we love are all utterly dependent on very complex ecosystem features, processes and connections.

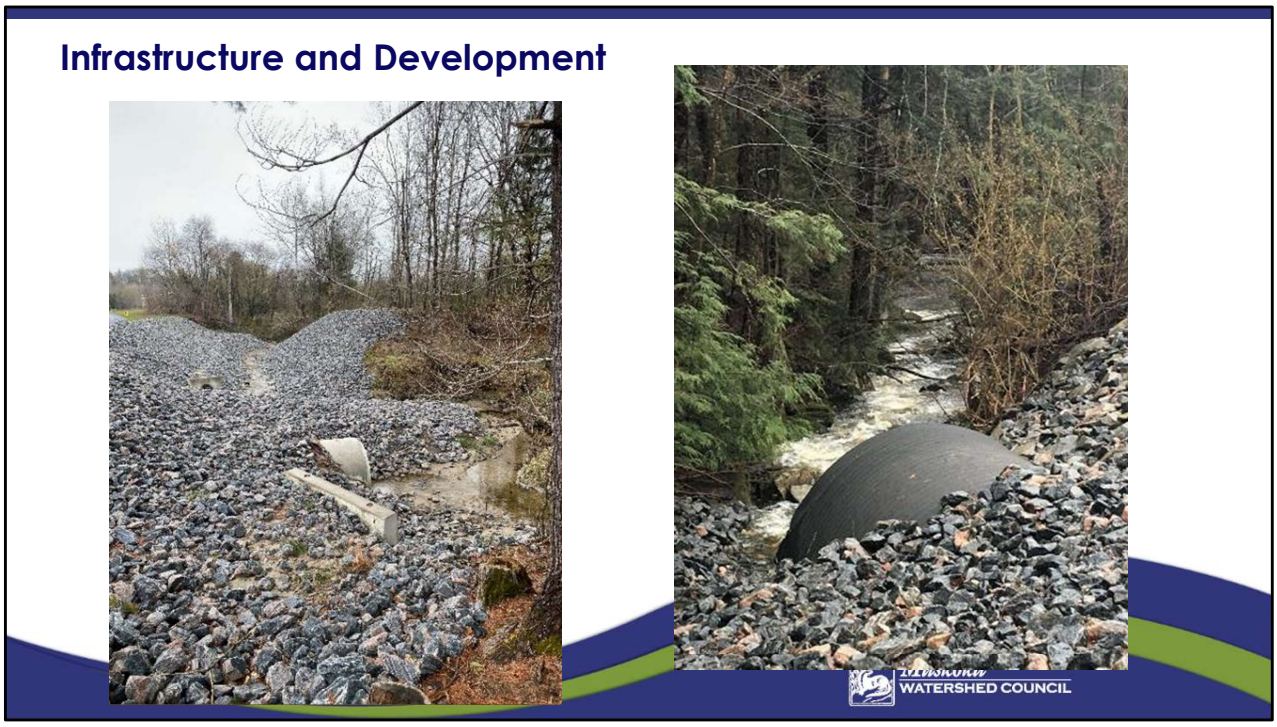
And globally we refer to a watershed as the closest thing we have to an ecosystem unit for local management because it's a landscape area that includes all of the drainage from the headwaters to the mouth along with many other features and functions – everything except for things like big picture weather and air quality.

And many of these ecosystem processes don’t respect the boundaries of 17 municipalities.

And we alter our resources regularly without really knowing enough about their functions in the bigger picture.

But when we make changes to any one component of the watershed ecosystem, those changes are felt in all the other components. One of my first mentors is speaking at a conference here in a couple weeks and he always says ecology isn’t rocket science. Its WAY more complicated.

… and if we don’t understand how the entire system works ….. (next slide)

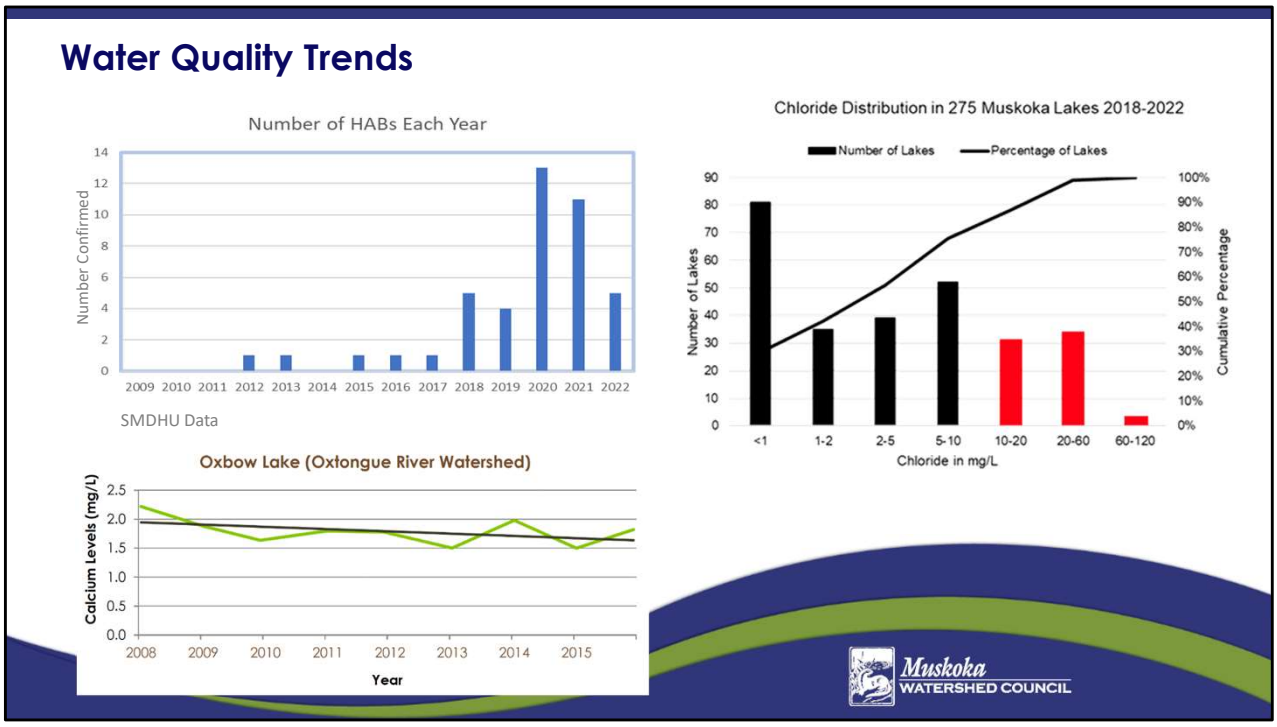


……. We can make decisions we think will fix one aspect while damaging other aspects, or missing huge opportunities to fix multiple problems with the same dollars….

Again, if we don't understand the whole watershed we won't know what infrastructure to build, how big to build it or where – and this is very important to some of our Climate Action plan recommendations.

Local, Single purpose projects are really preventing us from thinking about achieving multiple objectives in the

big picture with every dollar we spend.



So besides those issues, the report card shows some other concerning trends in water quality parameters such as Blue-Green algae blooms, calcium decline which is critical in both our forests and lakes, and impacts from road salt.

The Talk…

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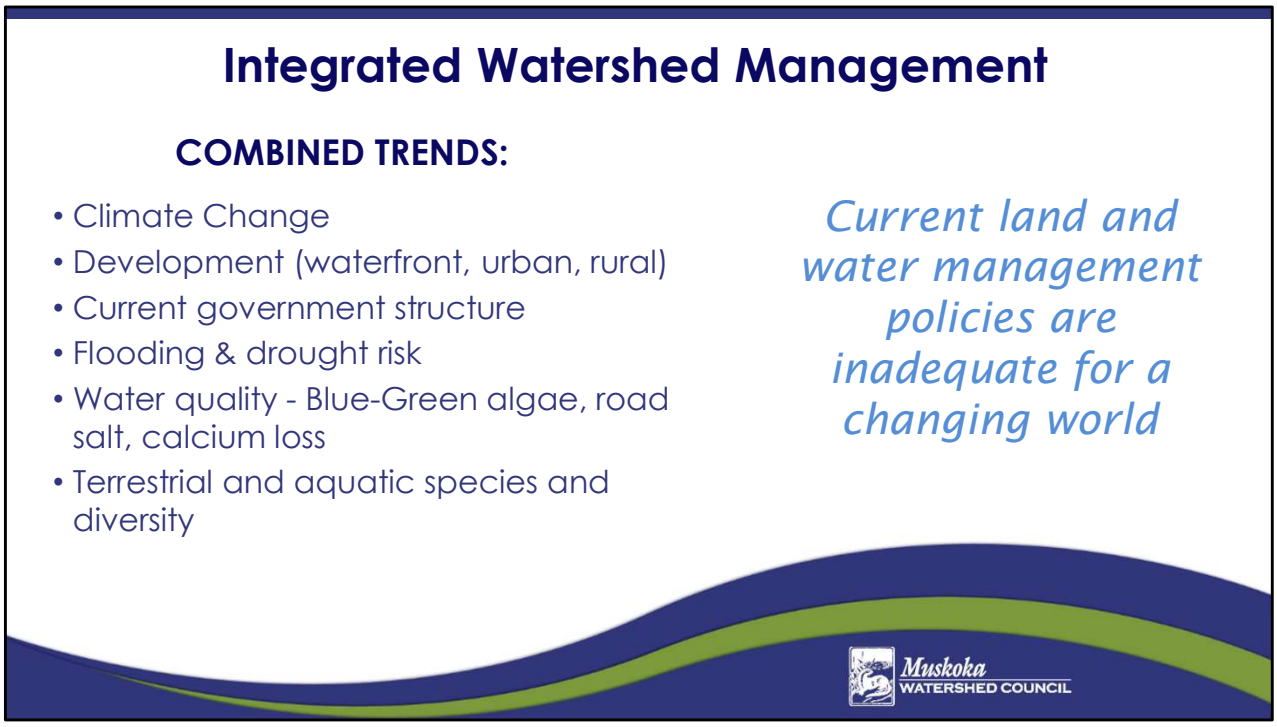
Muskoka WATERSHED COUNCIL



Some trends are obvious and we can measure and monitor what's going on --- but some are aren't, especially when we look at the combined effects of all of them

And The Watershed Council is saying that "current land and water management processes are inadequate for a changing world".

WHAT ARE WE SUGGESTING?

Make land-use, infrastructure, & water management decisions at the watershed scale

So we're suggesting that we need to make land-use, infrastructure and water management decisions at the watershed scale

So here's the formal definition of Integrated Watershed management or IWM...

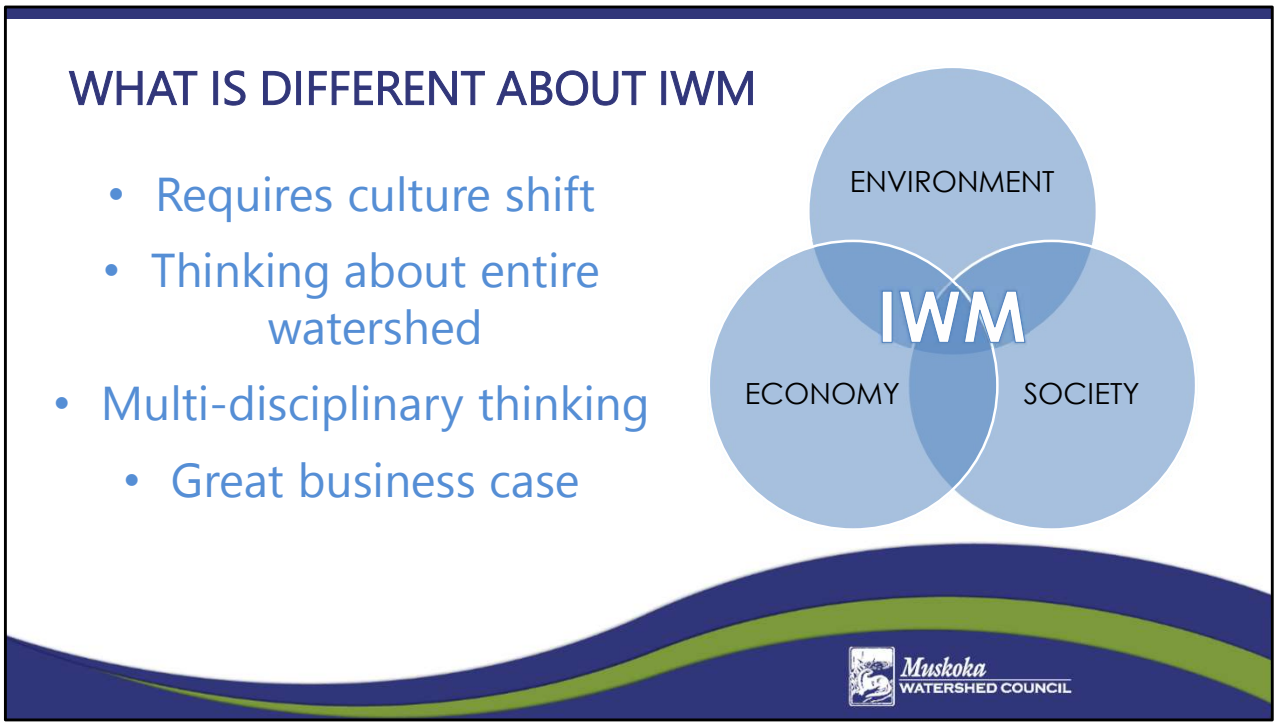
it *is a **[collaborative]** process which promotes the coordinated **[planning,]** development and management of water, land and related resources to maximize the resultant economic and social welfare, paving the way toward sustainable development equitably without compromising the sustainability of vital ecosystems.*

Global Water Partnership (2000)

That’s a mouthful but I’ll try to break it down a bit

And its important to know that IWM is not a panacea that’s going to solve all of our issues for eternity

…but its not new. Its been done in other parts of Ontario, across North America, Europe and even in third world countries, but its never been attempted in the Muskoka River watershed. This is another weird irony about the Muskoka region…..

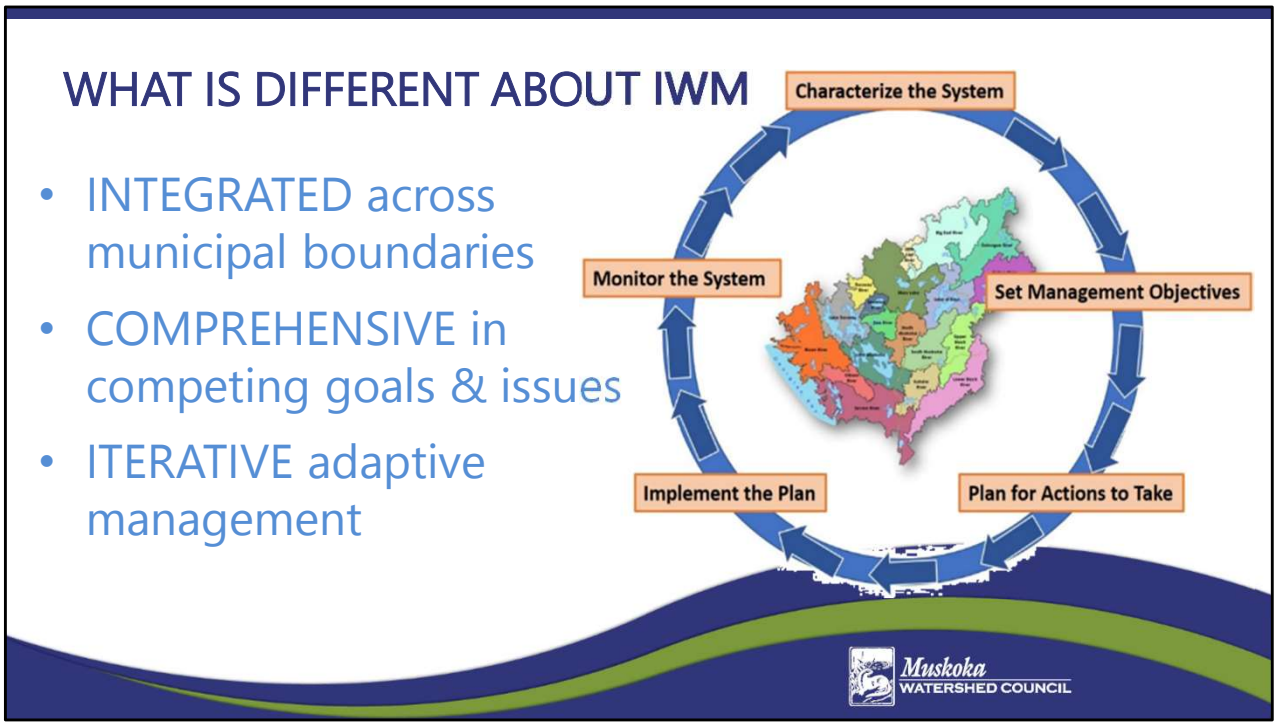


It really gives us ways to incorporate community and economic needs into environmental management and vice versa.

- IWM represents a culture shift toward
- thinking about the whole watershed
- thinking about multi-disciplinary goals
- and in a business context
- and also in governance – but without adding new

layers of bureaucracy

When you think of the costs for flood recovery which might approach $1B on whole, combined with rising insurance and infrastructure costs, we can realize some major cost savings



I don't want do dive too deep into the nuts and bolts but we should look at the major steps that most watershed management strategies have.

This cycle allows for the preparation of a watershed management report that includes goals and coordinated actions that municipalities and stakeholders can adopt in their own parts of the watershed.

At the top is Characterization which is information gathering and learning how the watershed really works. There's been a lot of recent activity in our watershed on

that and I'll talk about it in a minute.

Moving around the loop we'll have a lot work looking at the vulnerabilities of the watershed and what major objectives we can all share, especially ones that take aim at the most urgent issues we can all rally around. We can look at potential future scenarios and see how they might play out depending on what actions we take.

From there we would plan more specific goals or actions that can be taken by municipalities, business sectors and communities in their own corners of the watershed.

And then there would be some implementation and evaluation so we can adjust the process.

Because the IWM framework is an iterative loop, we don't have to solve all of our problems at once. We can address some problems within our current resources and then expand the process later… But even for small, isolated problems or projects, we can develop and use multi-disciplinary watershed-base goals and guidelines

So that's kind of messy to wrap your head around I know but I'll try to show a few examples of the difference from what we do now…..

Instead of one-off problems at a local scale while simply minimizing impacts, a watershed plan would give us ideas about multi-disciplinary and larger scale goals to work into projects. So many infrastructure projects could include design goals for whole tributary systems like using water for habitat and water quality treatment and flood storage instead of just a drainage problem that threatens a road.

To put this another way, what we usually do is protect what we see as important, and attempt to minimize impacts so there's always an impact and an opportunity

lost. This is known as incremental degradation – And what we're trying to move toward is that all of our land-use decisions will contribute to the watershed we want 50 years from now and 7 Generations from now.

Urban & Waterfront development

Muskoka WATERSHED COUNCIL

And we could include lakewide ecological targets into local site plans rather than managing encroachments and impacts.

And when we need to build housing, we consider local land-uses, road patterns, servicing, but we could also consider the more ecologically strategic locations in the watershed context along with climate resiliency.

Forests

Muskoka WATERSHED COUNCIL

If a chunk of forest is altered for timber management, land development or from climate impacts or calcium loss, that alteration will change the form or flow in headwater tributaries, along with wildlife habitats and water quality effects locally and elsewhere in the watershed.

But if we understand how to anticipate that trickle down effect we'll find better ways or locations to manage those resources for economic and ecological gains rather than minimal losses with each notch.

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Muskoka WATERSHED COUNCIL

MECP funded IWM projects (from MWAG 2021-22)

Water Management	Natural Features & Policy	Monitoring & Research
Baseline watershed hydrology model	Natural Capital Inventory	**Muskoka R. Sedimentation Study (Town of Bracebridge)**
MRWMP adjustments study	Land Use Policy Review	Water Quality Indicators
Examine local structural mitigation measures	**Governance Study (MWC)**	**Forest experimental management (Westwind)**
Floodplain mapping	Public Access Inventory	**ASHMuskoka supplemental funding (Friends of the Muskoka Watershed)**
Scoping for MRWMP review		Watershed Health Indicators
Examine watershed scale flood mitigation options		Shoreline Erosion Inventory

12 projects by District of Muskoka

3 projects by non-profits

1 project by local municipality

Muskoka WATERSHED COUNCIL

Between 2018 and late 2023 the Province initiated and funded the Muskoka River Watershed Conservation and Management Initiative which provided $5M for projects to bring together information on our watershed.

Funding for 12 of those was provided to the District of Muskoka while 3 others were done by NGOs and 1 was done by the Town of Bracebridge.

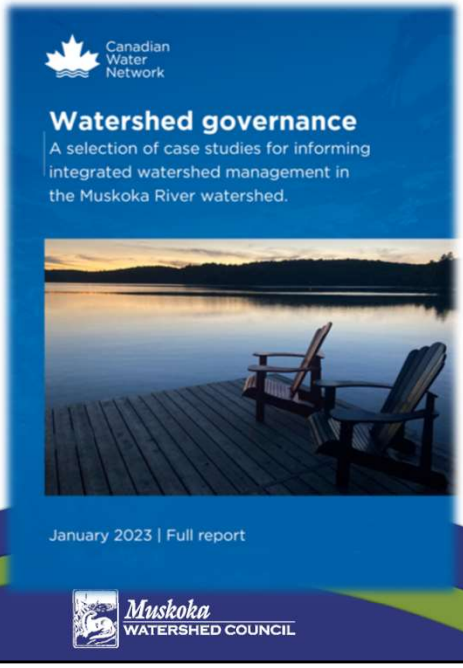
But there's a couple things missing in here. One is that we're very lucky to be in a region with a super active citizen science community with many monitoring projects and studies that need to be added into this mix (though I

know some were used in the 16 projects too).

And the other thing is that nothing in this table represents a watershed plan or an IWM strategy. These are all separate projects to help characterize the watershed so we can come together and start on a watershed strategy.

MWC HAS ALREADY STARTED

- Informing watershed partners
- Building community support
- Collaborating to set priorities
- Generating political will



One of the 16 studies looked at successful watershed programs

So we know we're just starting down a long, messy road that begins with education and building consensus.

We've learned that we need our big decision makers to get involved with a decision making framework and some money to scope out a watershed plan…… but for many of them we need an informed community of constituents who are demanding it so that's where you come in hopefully.

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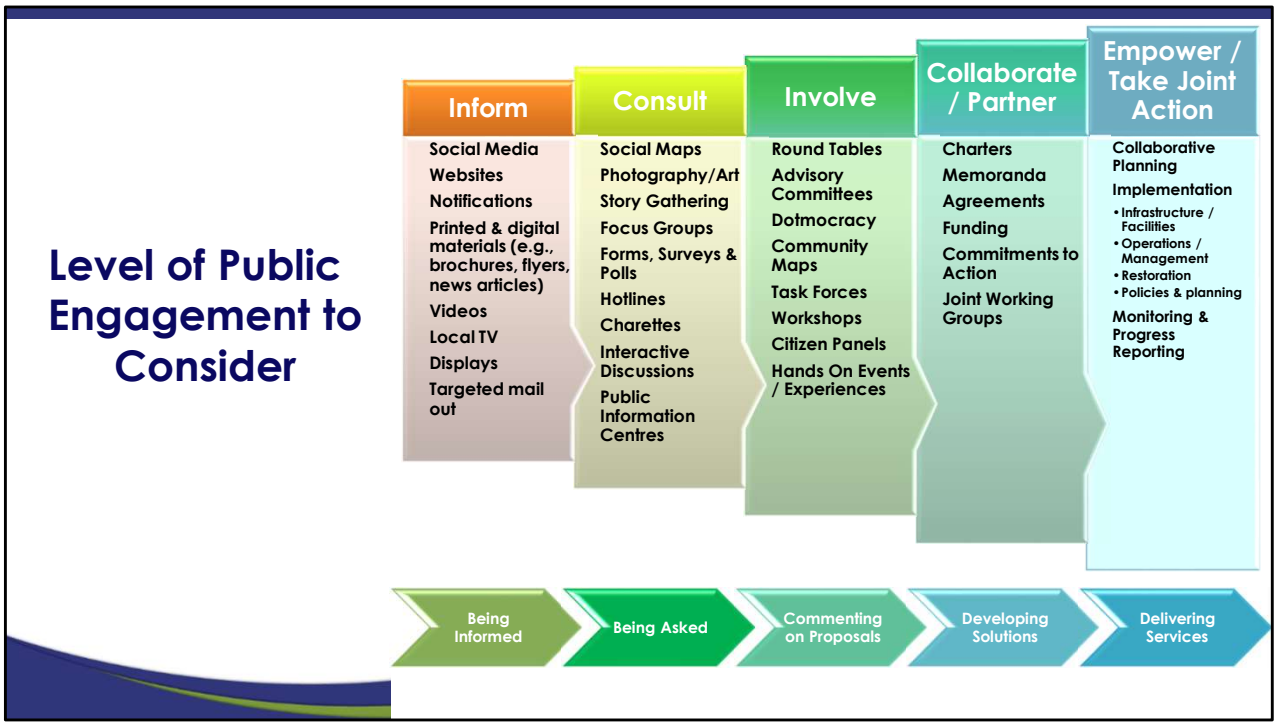
Muskoka WATERSHED COUNCIL

Now that we've collected a bunch of information **to start characterize the system,** what do we do now ?



Most if not all watershed plans in Ontario have been driven or facilitated by conservation authorities but the Muskoka river watershed doesn't have a conservation authority nor any single government body dedicated to the watershed. The District covers about 75% of the area, but only has 6 out of 13 municipalities.

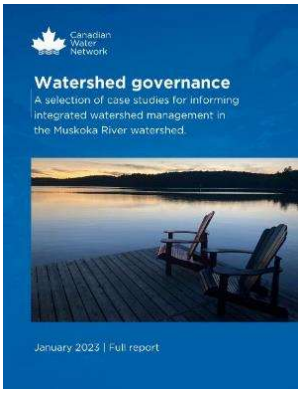
And many in this region have opposed the idea of a conservation authority or anything that might add a new layer of bureaucracy …. and rather than have IWM brought in as a top-down regulatory process with stakeholders consulted along the way, MWC started it in

2018 as a community-driven initiative aimed ultimately at getting all government and stakeholder groups and First Nations together to develop some kind of charter or partnership.

And in fact, the first watershed agency in Canada was established on the Grand River in 1932, not by government, but by the local business community demanding watershed action on droughts, flooding, water quality problems…..

So our current stance is to lead a strongly collaborative process until decisions can be made on a governance structure and funding model which may take several years.

Collaborative IWM outside Ontario



For our case study project, which was one of the 16 funded by the Province, we went outside of Ontario to look at success stories using models that are different from Ontario's, elsewhere on the continent.

And from the case studies we know there's a number of ways that collaborative partnerships can succeed with shared goals for managing the watershed.

And you'll see one case there in Ontario which looked at how our own legislative framework can be used for municipal partnerships.

So just to repeat something I said earlier, what we're trying to move toward is that all of our land-use decisions will contribute to the watershed we want 50 years from and 7 Generations from now.

We're starting with a

- **Collaborative community-driven process**
- **Its messy and it takes a long time**
- **It's a culture change**
- **There's something in it for you**

- **We need you as collaborative partners**

Muskoka
WATERSHED COUNCIL

Thank you!

Learn more at
www.muskokawatershed.org