Integrated Watershed Management (IWM): What is it?

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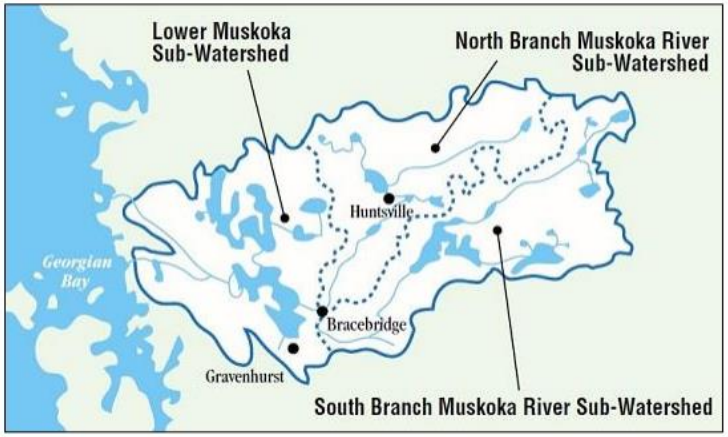
Presentation Outline

- Definitions
- The Water Cycle & Why it's important
- Watershed Drivers & Stressors
- IWM Concepts
- Integration v. Comprehensiveness
- IWM Process
- Integrated Watershed Plan
- Factors for Success
- Governance Approaches
- Outcomes

What is a Watershed?

A watershed is the area that is drained by a river and its tributaries.



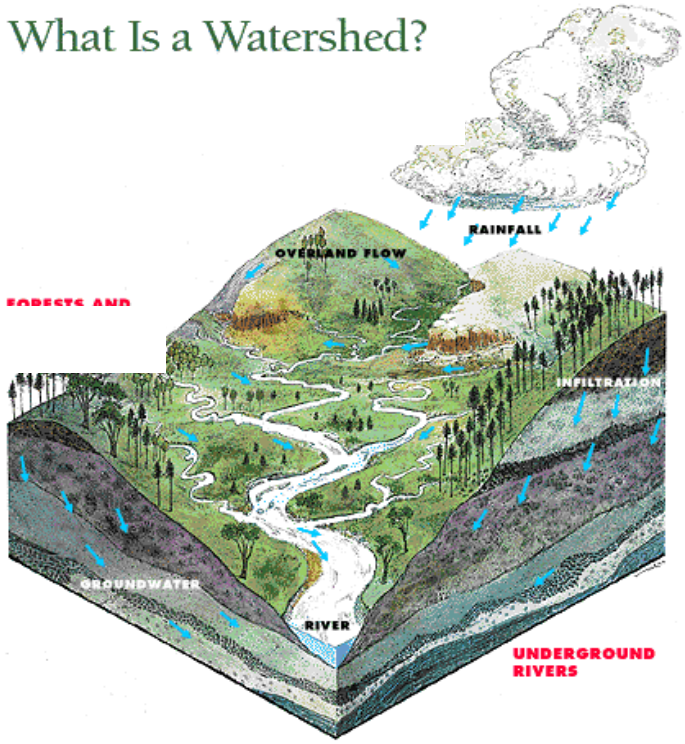
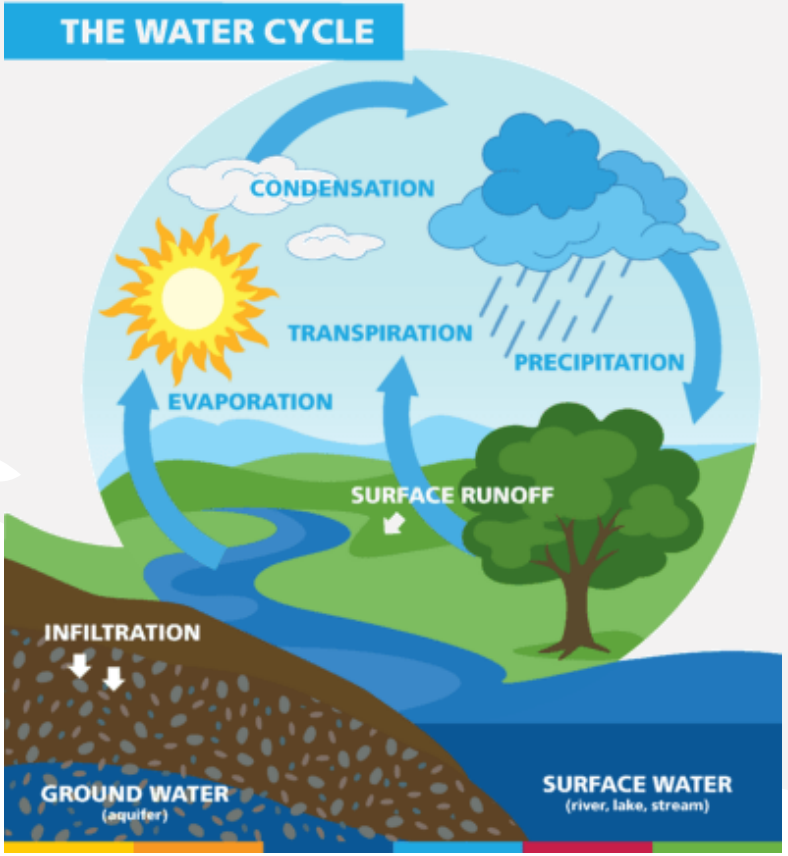


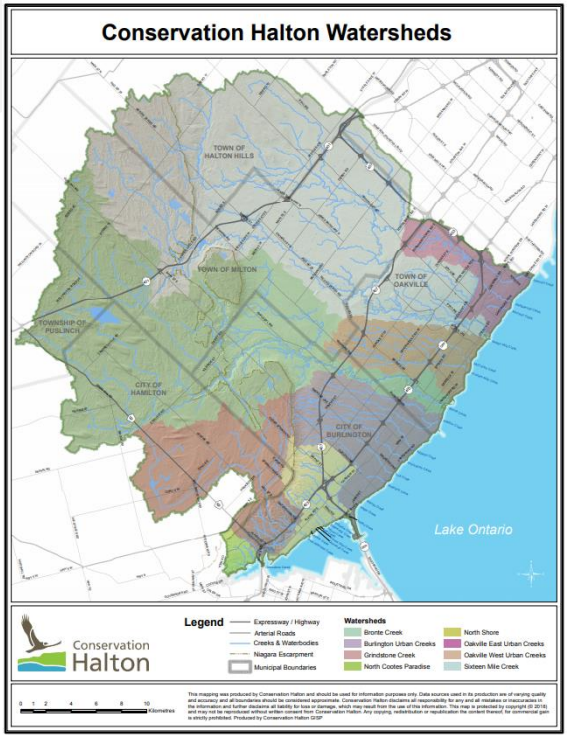
Image Source: Georgia Pacific Corporation
http://www.gp.com/educationalinnature/water/watershed.html

The Water Cycle

Water is vital to our existence and connects all life on earth in a complex system of interactions.



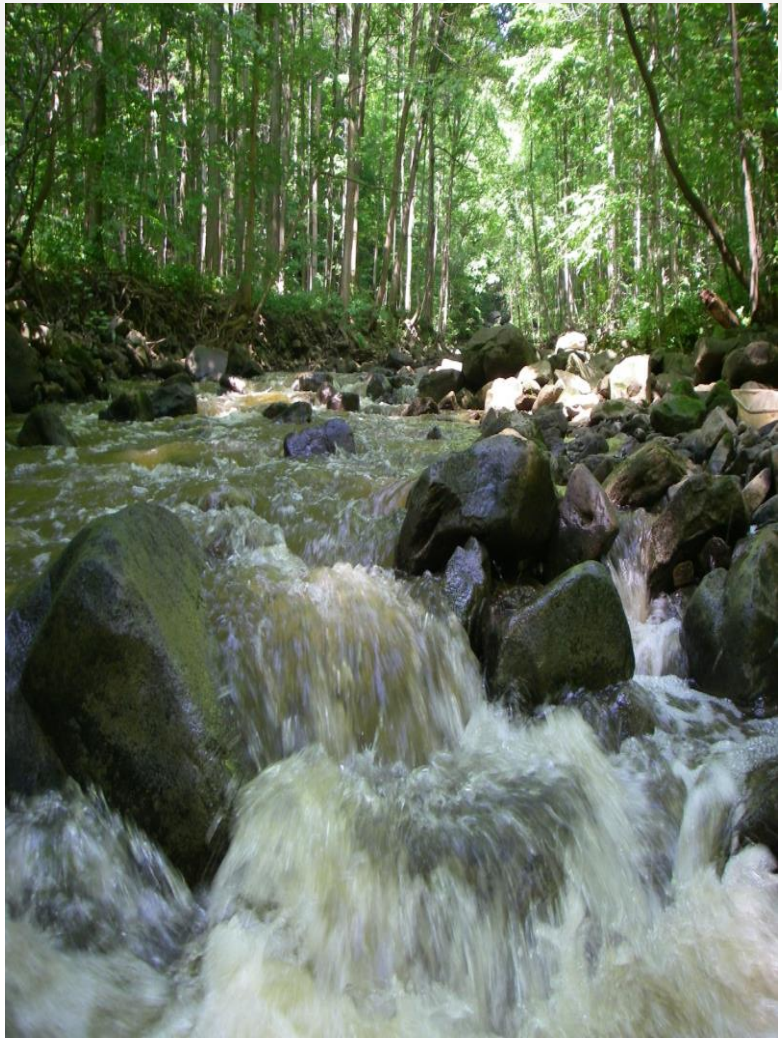
Example: Grindstone Creek Watershed



Objectives

- Identify, understand, and quantify the roles of **natural assets** as a component of **services** such as flood mitigation, storm water management, and water quality control; and
- Determine the **costs and benefits** of the natural assets providing these services in comparison to engineered alternatives and/or long-term **operations and maintenance** for engineered assets (e.g., diversion channels, storm water management ponds).

Example: Grindstone Creek Watershed



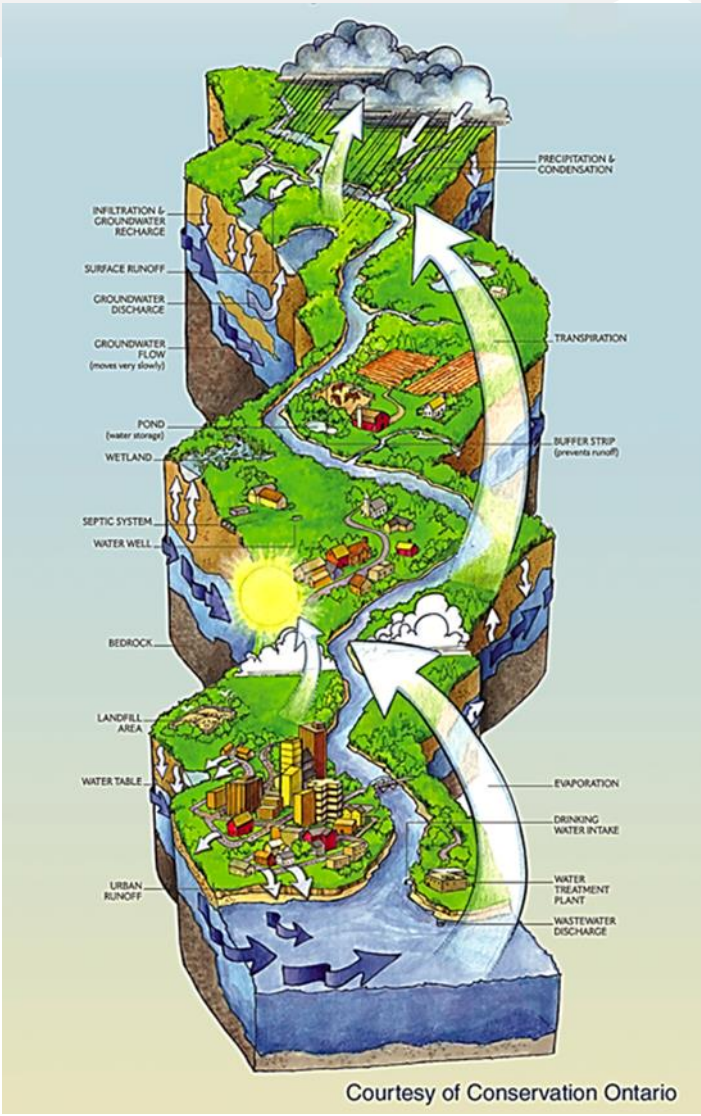
Findings

- Natural assets = **$2 billion** for **stormwater management** (e.g., peak flow reduction and infiltration) to replace with engineered infrastructure – not factoring in maintenance & repair costs
- Natural assets = **$34 million annually** in other benefits including erosion control, carbon storage, and recreation

Managing Watersheds

Watershed management is not so much about managing natural resources, but about managing human activity as it affects those resources –

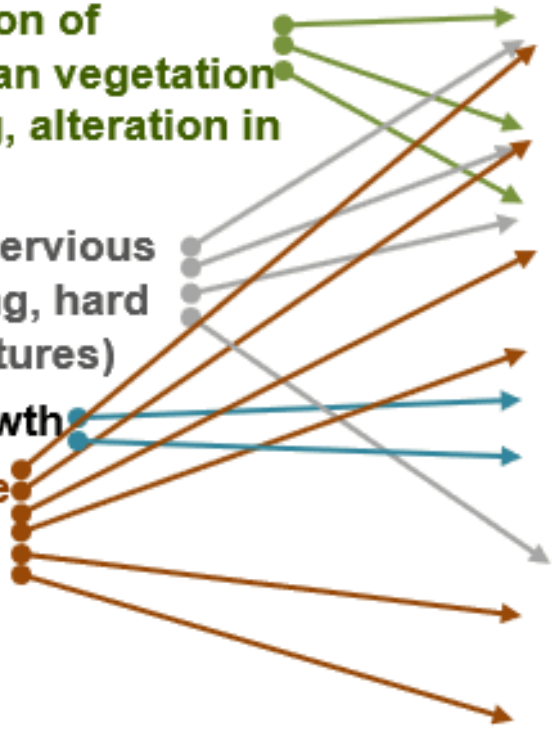
Conservation Ontario



Watershed Stresses & Impacts – It's Complicated

Key Stresses

- Loss/degradation of wetlands/riparian vegetation (removal, filling, alteration in hydrology)
- Increase in impervious surfaces (paving, hard surfaces, structures)
- Population growth
- Climate Change



Key Environmental Impacts

- Variations in river flows (flooding, drought)
- Erosion
- Loss of Habitat (terrestrial/aquatic)
- Invasive Species
- Increased water demand
- Increased demand for open space
- Degraded water quality (sedimentation, contaminants)
- Water-borne diseases & vectors

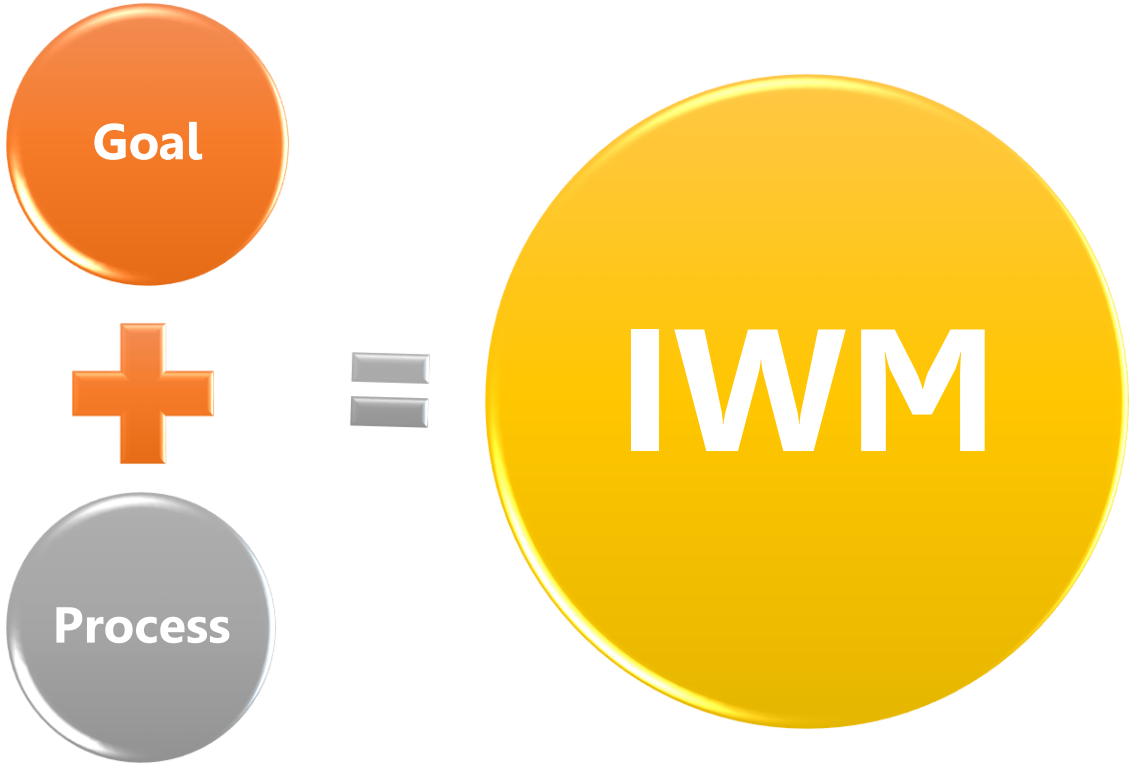
Climate Change Predictions

Scenario	Hazard	Description
Seasonal Changes		• Shorter shoulder seasons, increase in growing days. • Earlier spring freshet. • Warmer winter, hotter summer, and shorter shoulder seasons. • Greater climate variability. • More hospitable to invasive species while adversely affecting native species at risk.
Snowpack Reduction		• Increase in winter temperatures. • Less snowfall, more snowmelt. • More rain on snow events.
Wind		• Increase on average wind speeds and wind gusts. • Longer periods of exposed water due to less lake ice. • Possible higher lake levels.
Dry Conditions		• Average temperature and number of days above 30 degrees increase significantly. • Large increase in evapotranspiration will result in dry conditions.
Heat Stress		• Increase in average temperatures and humidex levels. • Hot days will cause heat stress in people, flora, and fauna. • Stream temperature will increase, especially during low water conditions.
Rainfall		• Increase in rainfall intensities of both short duration, high frequency storms and les frequent large storms. • Increase in bank full, 1-year flows that cause stream erosion.

What is Integrated Watershed Management (IWM)?

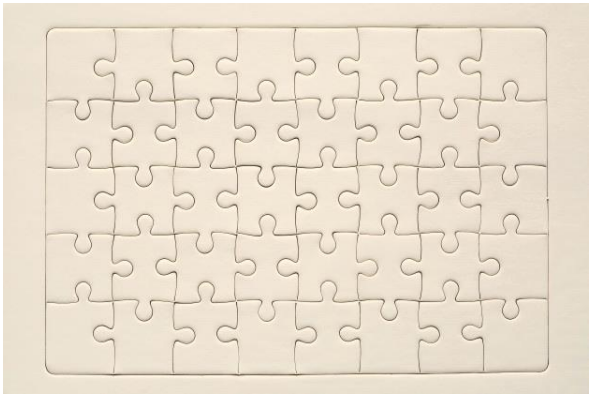
IWM Goal = protection &/or restoration of water & land resources within a watershed to sustain their benefits for human well-being & the ecosystem

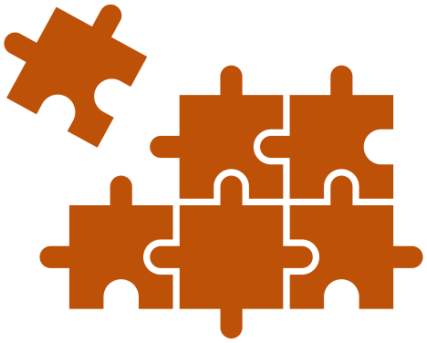
IWM Process = a shared process/approach to collectively achieve a common vision, goals, & on-the-ground results



"IWM is a continuous and adaptive process of managing human activities in an ecosystem, within a defined watershed. IWM involves the integration of environmental, social and economic decisions and activities through an inclusive decision-making process to manage the protection, conservation, restoration and enhancement of aquatic and terrestrial ecosystem features, functions and linkages. Governance is a collaborative approach appropriate to the watershed and issues at hand." (CCME, 2016)

Integration v. Comprehensiveness





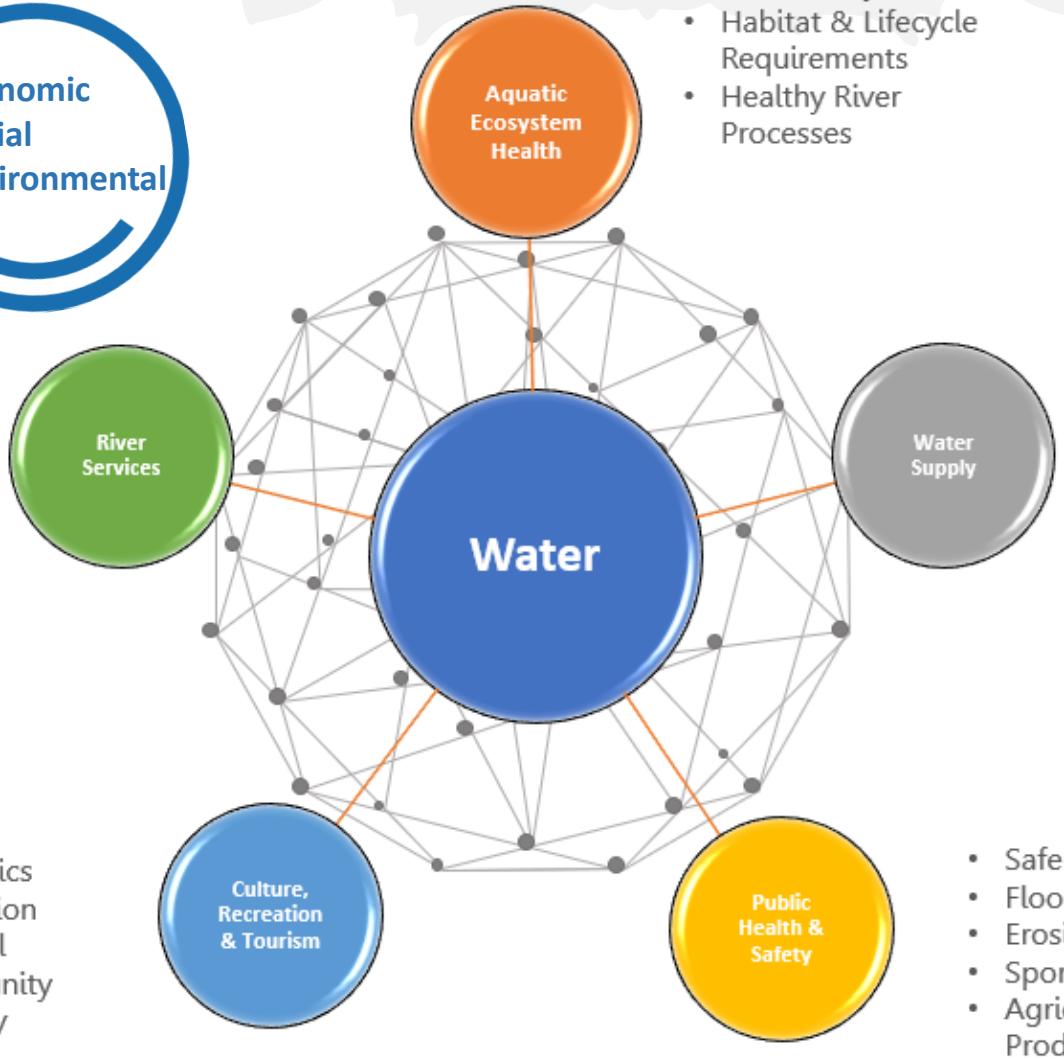
Making a distinction between ‘comprehensive’ and ‘integrated’ approaches is important in determining scope.

Comprehensive = complete; including all or nearly all elements or aspects of something

Integrated = with various parts or aspects linked or coordinated

IWM: Embedded Concepts

Uses, Needs and Value of Water



- Biodiversity
- Habitat & Lifecycle Requirements
- Healthy River Processes

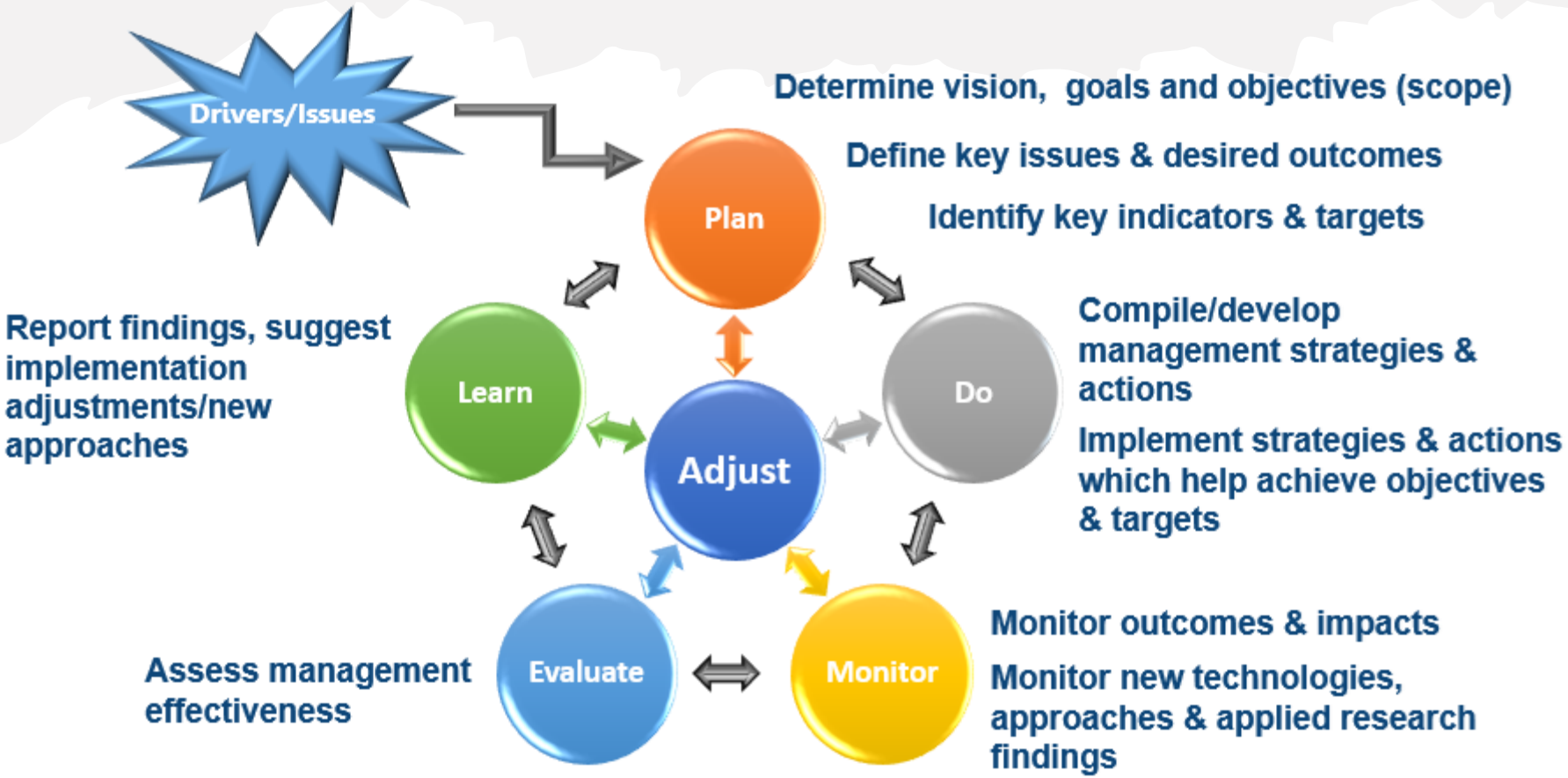
- Wastewater Assimilation
- Stormwater Management
- Hydroelectric Power
- Irrigation
- Commercial Fisheries

- Residential
- Industrial
- Commercial
- Agricultural

- Aesthetics
- Recreation
- Spiritual
- Community Amenity

- Safe Drinking Water
- Flooding
- Erosion
- Sports Fishery
- Agricultural Food Production

The IWM Process



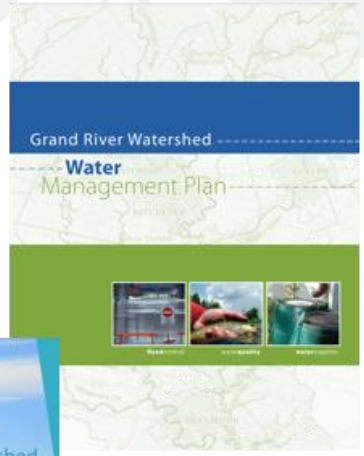
The process is NOT consecutive; different aspects can be worked on concurrently

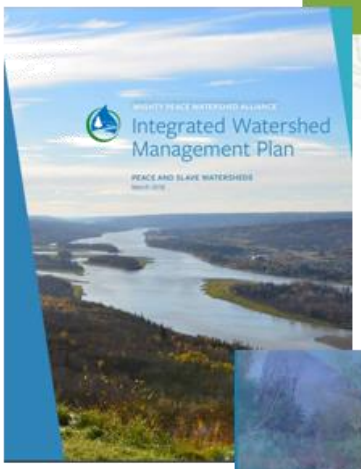
Integrated Watershed Management Plan

An Integrated Watershed Management Plan (IWMP) is a guiding document for use by stakeholders, which sets out the collective watershed vision, goals, objectives, and targets for addressing key issues and includes strategies and actions, agreed to either collectively or singularly for managing activities, monitoring results, and updating the plan.

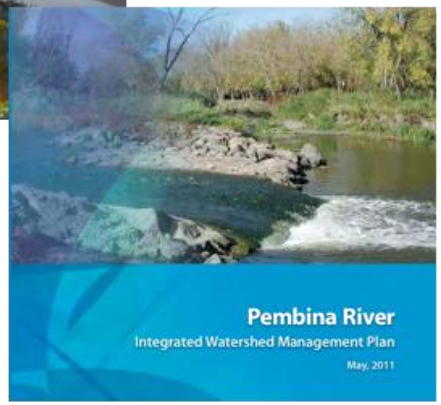
Value Added

Grand River Conservation Authority, Ontario





Mighty Peace Watershed Alliance, Alberta



Pembina River Integrated Watershed Management Plan, Manitoba

- The whole is greater than the sum of its parts
- The parts address cross boundary issues & opportunities that are specific to the watershed
- Implementation is shared among partner agencies & stakeholders within respective mandates; not another level of bureaucracy
- People working together towards a common goal produces:
  - focused & coordinated efforts,
  - builds on existing strengths,
  - reduces duplication, pools human & financial resources, and
  - effects change on-the-ground

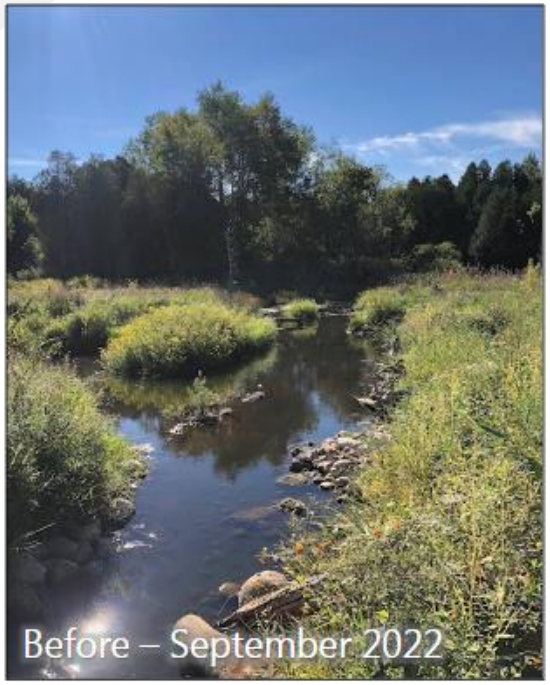
Implementation

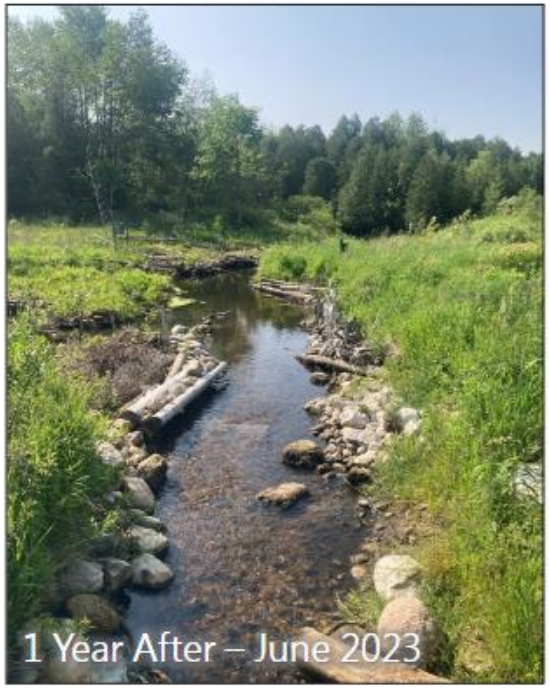
Wetland Creation and Riparian Planting

Property used to flood up to the barn, but since riparian planting has established, it no longer floods.
During 5-Year photo monitoring, a Snapping Turtle was spotted laying its eggs within the horse area. A nest protector was put over top in June and taken off in September.

Implementation

Channel Narrowing and Dam Removal





Channel narrowing efforts responding well. Landowner has been active in the creek helping the sediment mats along by throwing muck from the creek onto them.

Implementation

Urban Naturalization

Landowner is very proud of her front native plant garden and wants to re-do her entire backyard using native landscaping.

Success Factors

How people influence and collectively make decisions about common interests, both formal and informal – and how those decisions are held to account.

Collaboration is required because no single actor, public or private, has the competence [or capacity] to unilaterally address complex problems (Stoker 1998).

Governance Approaches

- Mix of top-down, bottom-up governance models, building on a participatory approach
- Centralized; de-centralized or blended decision making

Types of Partnerships

Examples of Three Partnership Models		
Cooperative Model	**Collaborative Model**	**Integrated Model**
Each partner: • maintains its own decision-making responsibility • remains autonomous • retains own identity • has own staff & budget • has full responsibility for its actions	Each partner: • shares decision-making responsibility & authority • has particular roles and responsibilities • is accountable to the other • contributes resources • surrenders some measure of its autonomy	Each partner: • transfers decision-making authority to a new structure/new entity • integrates its resources with other partners • administers according to common policies and procedures • surrenders a considerable amount of its autonomy
Decision Making • by consensus • agreement not necessary in all cases	**Decision Making** • by consensus • agreement necessary	**Decision Making** • by vote if necessary • agreement necessary

If done well, IWM provides…