



**Miistakis  
Institute**

# Working With Nature

*Using Natural Infrastructure to Mitigate Flood and Drought*

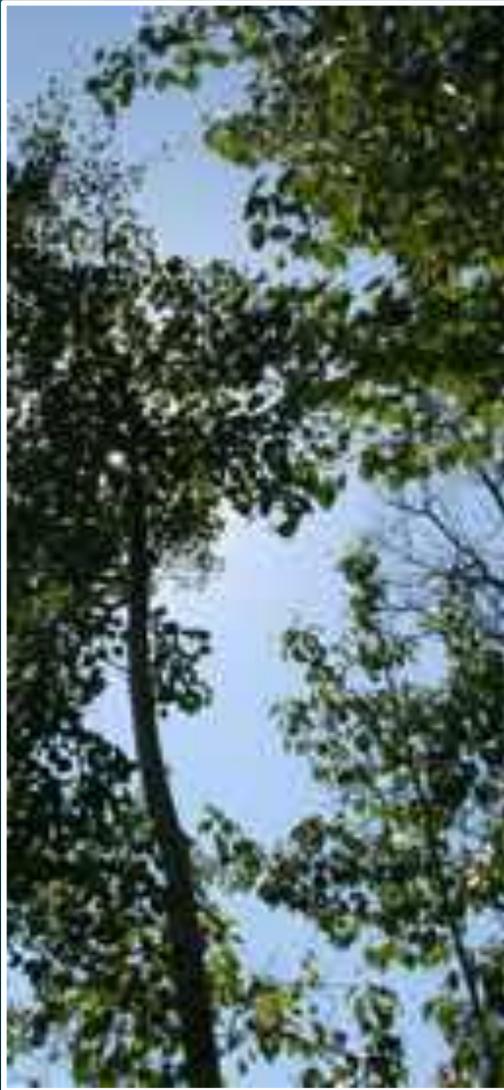
A Orientation to a Municipal Natural  
Infrastructure Toolkit

DECEMBER 5, 2019

*Guy Greenaway, Miistakis Institute*

Innovative Research. Engaged Communities. Healthy Landscapes.

# The Miistakis Institute



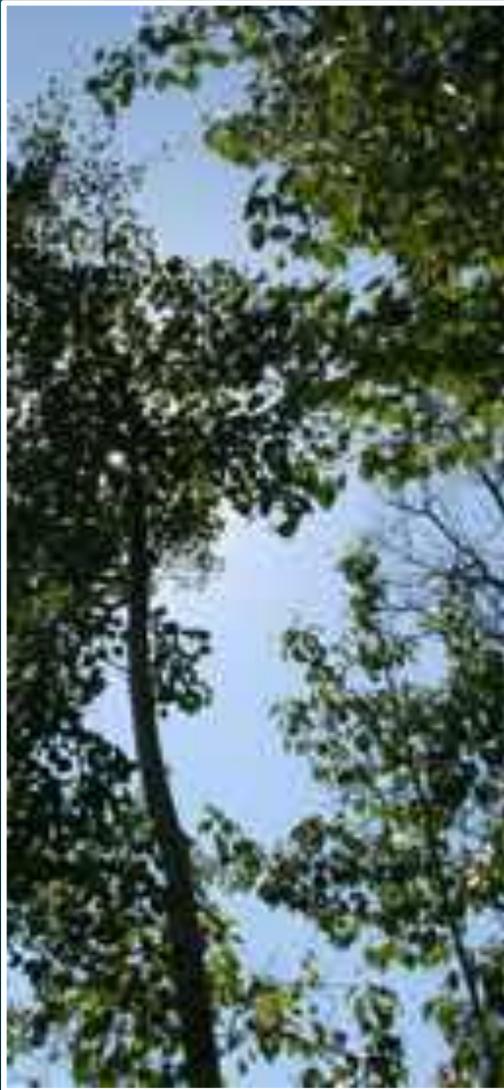
The Miistakis Institute is a not-for-profit, charitable, applied research institute affiliated with Mount Royal University in Calgary, Alberta, Canada

Our goal – *a world where communities have genuine access to the science and research they need to make choices that promote healthy landscapes*

Our work – make innovative research accessible to communities and decision makers



# Outline



- Why create *Working With Nature (WWN)*?
- How *Working With Nature (WWN)* Evolved
- What is *Working With Nature (WWN)*?
- The *WWN Toolkit*
- Options: Prioritization and Mapping
- Where to Get *Working With Nature*

# Why Create *Working With Nature ?*



# Why We Created *Working With Nature*



## Context

- Responsibility for flood and drought falling to municipalities (disproportionately)
- Natural infrastructure increasingly seen as a key part of the solution, but awareness of it is spotty
- Municipalities have little support for applying 'natural infrastructure' approach

# Why We Created *Working With Nature*



## What is 'Natural Infrastructure'?

Fully Natural	Built / Engineered
<ul style="list-style-type: none"><li>• Rivers</li><li>• Streams</li><li>• Creeks</li><li>• Wetlands</li><li>• Lakes</li><li>• Ponds</li><li>• Riparian areas</li><li>• Wet soils</li><li>• Native vegetation</li><li>• Tree canopy</li><li>• Permeable soils</li><li>• Vegetated channels</li><li>• Natural permeable surfaces</li><li>• River and stream meanders</li><li>• ?</li></ul>	<ul style="list-style-type: none"><li>• Constructed wetlands</li><li>• Stormwater ponds</li><li>• Natural vegetation</li><li>• Green roofs</li><li>• Open curbs</li><li>• Planted medians</li><li>• Vegetated swales</li><li>• Infiltration planters</li><li>• Infiltration galleries</li><li>• Flow through planters</li><li>• Rain gardens</li><li>• Pervious pavements</li><li>• Cisterns and rain barrels</li><li>• ?</li></ul>

# Why We Created *Working With Nature*



## Need

- Decision-support tool for municipalities
- Fits existing municipal processes
- Cross departmental, cross policy
- Beyond just 'discovery' tool
- Simple inexpensive interface
- Real-world tested

# Why We Created *Working With Nature*



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[www.adaptaction.ca](http://www.adaptaction.ca)

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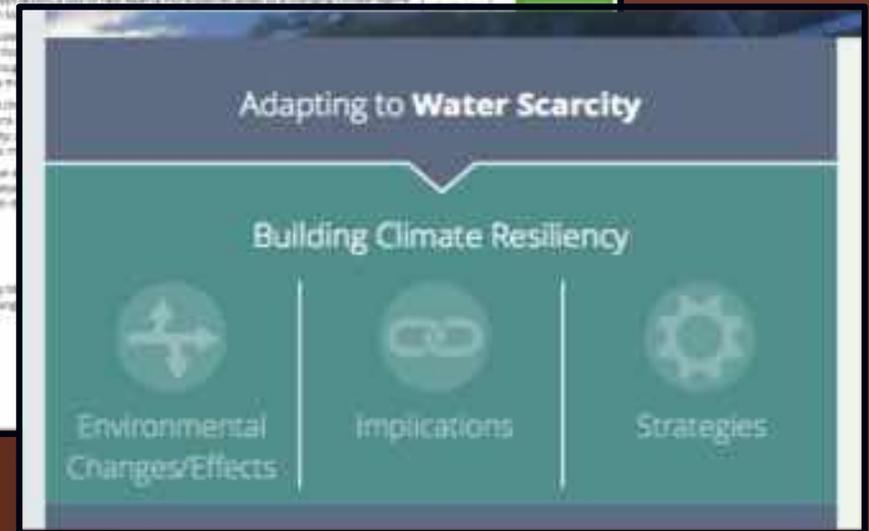
# How WWN Evolved



# How WWN Evolved

## Adapt-Action

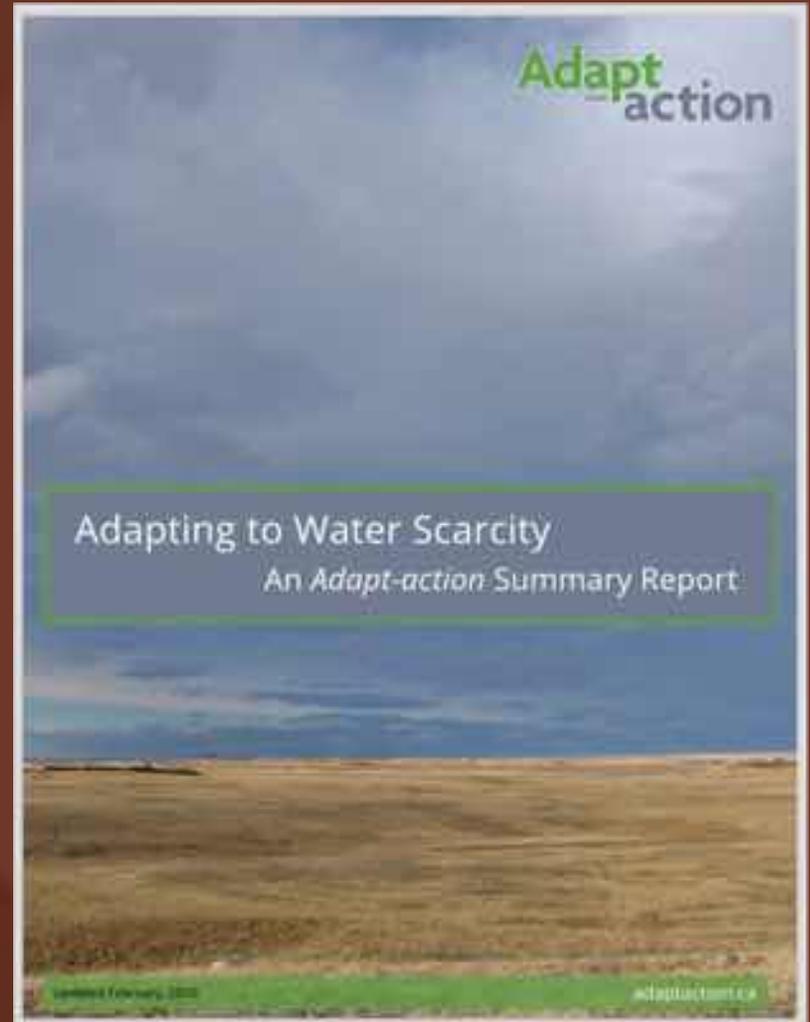
- An online tool to support climate change resiliency in Alberta municipalities
- [www.adaptaction.ca](http://www.adaptaction.ca)



# How WWN Evolved

## Adapt-Action

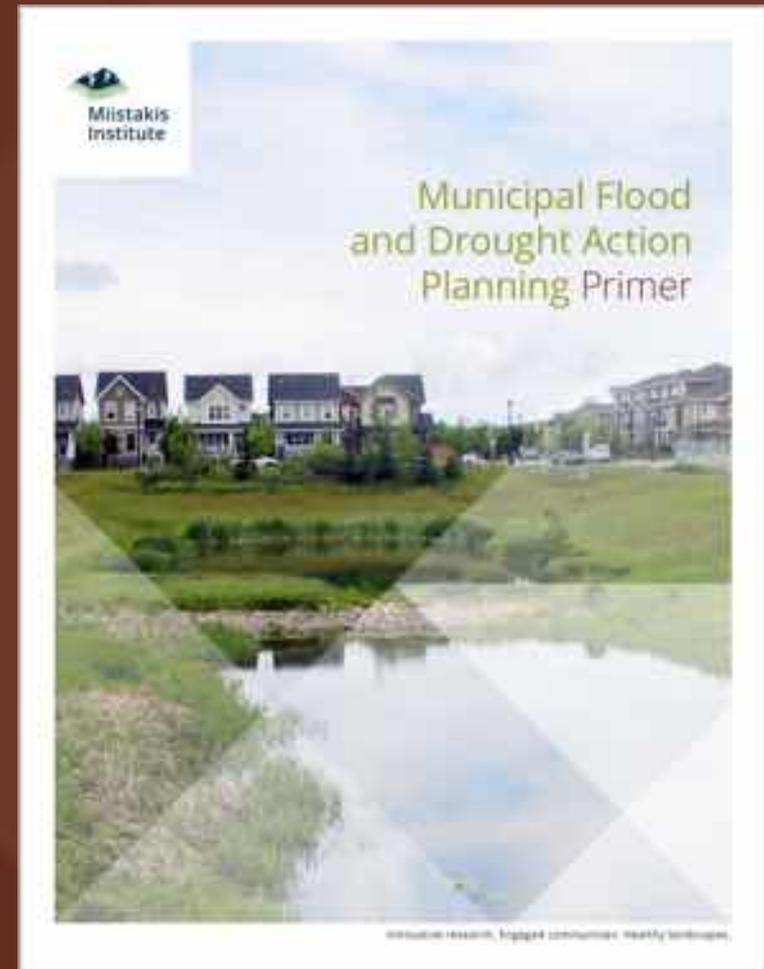
- An online tool to support climate change resiliency in Alberta municipalities
- [www.adaptaction.ca](http://www.adaptaction.ca)
- Stand-alone documents in WWN Resources



# How WWN Evolved

## Municipal Flood and Drought Action Primer

- Rationale for flood and drought mitigation action
- Example data sources
- Report in the WWN Resources



# How WWN Evolved

## WWN Pilot

- *Town of Cochrane* agreed to be pilot partner
- Worked through workshop process, workbook
- Modifications based on feedback



# How WWN Evolved

## WWN Pilot

- Amanda Legros, Planner
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- E: [Amanda.Legros@cochrane.ca](mailto:Amanda.Legros@cochrane.ca)
- W: [www.cochrane.ca](http://www.cochrane.ca)



# What is *Working With Nature*?



# What is *Working With Nature*?



*“Working With Nature is a step-by-step process that municipalities can use to identify their natural infrastructure, then determine actions they should undertake to better employ that infrastructure in mitigating flood and drought risks.”*

# What is *Working With Nature*?

The Working With Nature process consists of five primary components



Each is fleshed out through an easy-to-navigate set of tasks and meetings, then captured in the *Working With Nature Workbook*.

# What is *Working With Nature*?

## The Three 'W's of Working With Nature ...



# What is *Working With Nature*?

## Workshops ...

- ... allow the municipal personnel (the *Natural Infrastructure Team*) to collect and vet information as a group



# What is *Working With Nature*?

Workshops ...

Worksheets ...

- ... capture the individual input of the participants



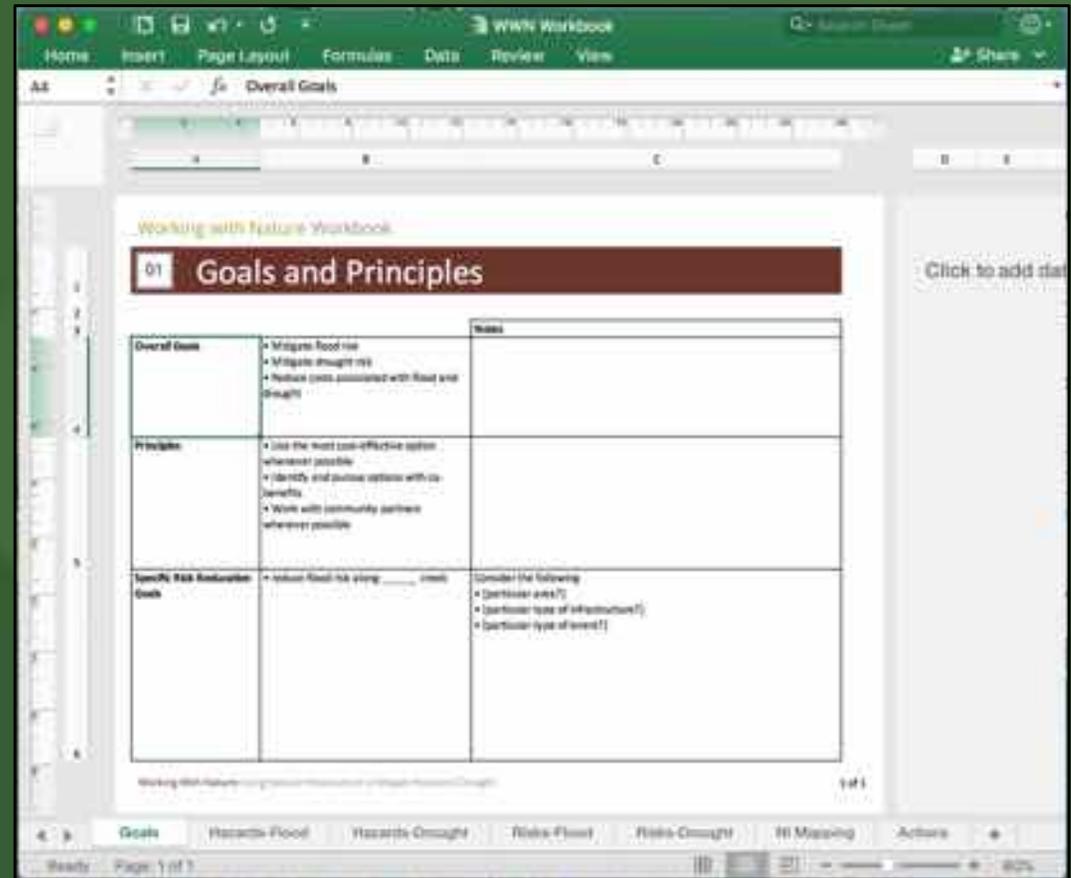
# What is *Working With Nature*?

Workshops ...

Worksheets ...

The Workbook ...

- ... is the starting point and the 'final' product; the work of the participants populates the *WWN Workbook*



# What is *Working With Nature*?

**Getting  
Started**

**1**  
**Goals and  
Principles**

**2**  
**Hazards  
and Risks**

**3**  
**Natural  
Infrastructure**

**4**  
**Actions**

**5**  
**Policy  
Development**



# What is *Working With Nature*?

## Starts the process by:

- Establishing senior leadership support
- Identifying a *Natural Infrastructure Team* and Team Leader
- Diving in to the *Working With Nature* materials

The image shows the cover of a guide titled "Getting Started". The text is centered on a light-colored background with a thin border. The words "Getting" and "Started" are stacked vertically in a large, bold, black serif font.

**Getting  
Started**

# What is *Working With Nature*?

**Gets participants to articulate:**

- What they hope their efforts will lead to (Goals)
- How they plan to operate in the course of getting there (Principles)



# What is *Working With Nature*?

**Gets participants to articulate:**

- Hazards (the bad situations they are worried about)
- Risks (the losses that they would expect if those bad situations happened)



# What is *Working With Nature*?

## Gets participants to:

- Identify, map, and catalogue the actual natural infrastructure assets in their community
- Includes fully natural and built/engineered features



# What is *Working With Nature?*

## Gets participants to:

- Identify and detail Actions that the municipality will take to better employ natural infrastructure.
- Prioritize the Actions



# What is *Working With Nature*?

## Gets participants to:

- Take final step from completed workbook, to policy
- Determine best form for the Plan to take within the context of the municipality



# What is *Working With Nature*?

## Components and Workshops/Meetings



# What is *Working With Nature?*

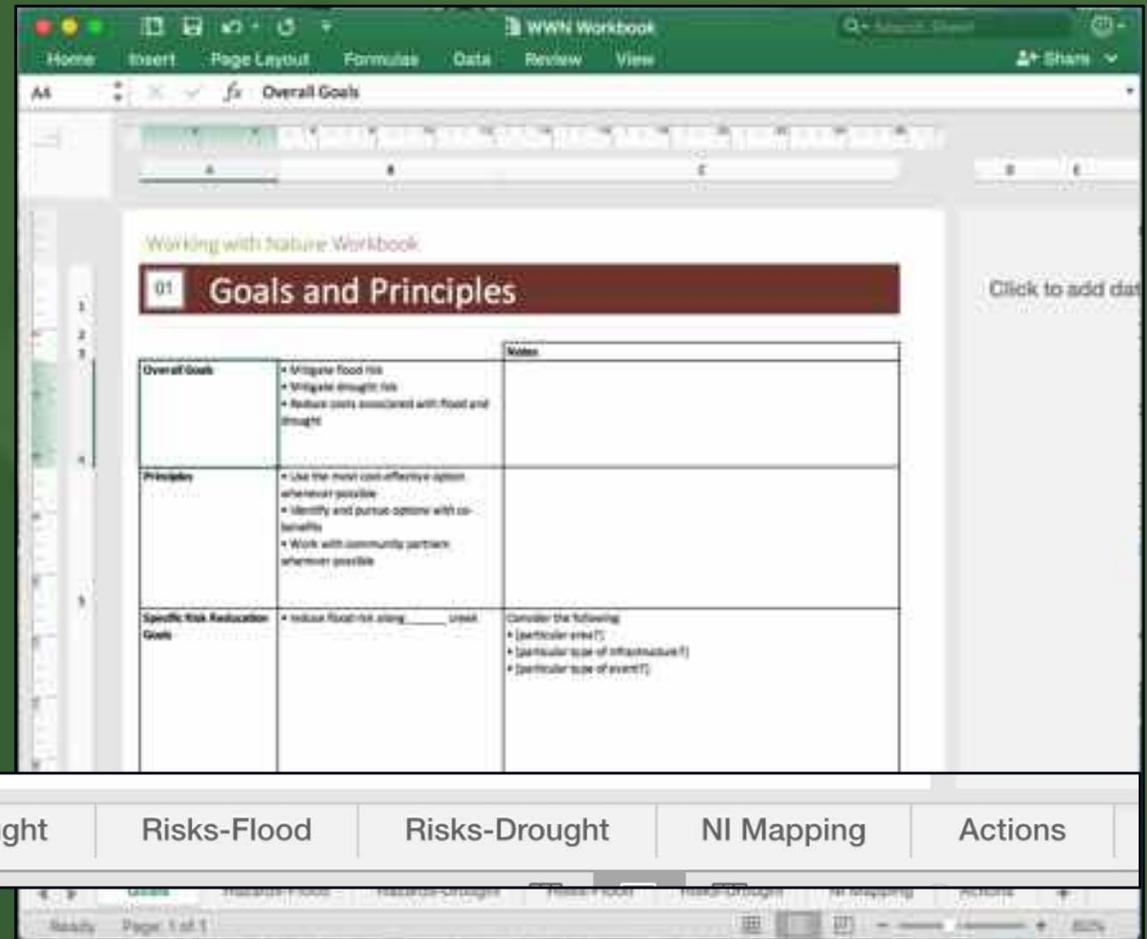
## WWN Task Sequence



# What is *Working With Nature*?

## The WWN Workbook

- MS Excel workbook
- Simple, pre-formatted
- One 'tab' per primary Component



# The *WWN* Toolkit



# The WWN Toolkit



**Getting  
Started**

**Workbook**

**Workshop  
#1**

**Workshop  
#2**

**Prioritization**

**Policy  
Development**



# The WWN Toolkit

## Getting Started

- What is WWN
- Components, requirements, sequence
- Resources

## Workbook

- MS Excel workbook
- Tabs for each Component
- Workbook tips

## Workshop #1

- Suggested approach and agenda
- Worksheets
- InfoSheets

## Workshop #2

- Suggested approach and agenda
- Worksheets
- InfoSheets

## Prioritization

- Instructions
- Prioritization, criteria weighting, and Action averaging tools

## Policy Development

- Suggested approach and agenda
- Moving Forward options

# Options: WWN Prioritization



# Options: WWN Prioritization

## Two Approaches

- Simple 1 - 4 prioritization in the WWN Workbook
- Rank-order calculation using MS Excel spreadsheets



# Options: WWN Prioritization

## WWN Rank-Order Prioritization

- Facilitated by Team Leader
- After 'Actions' workshop
- Results in a relative ranking of all Actions

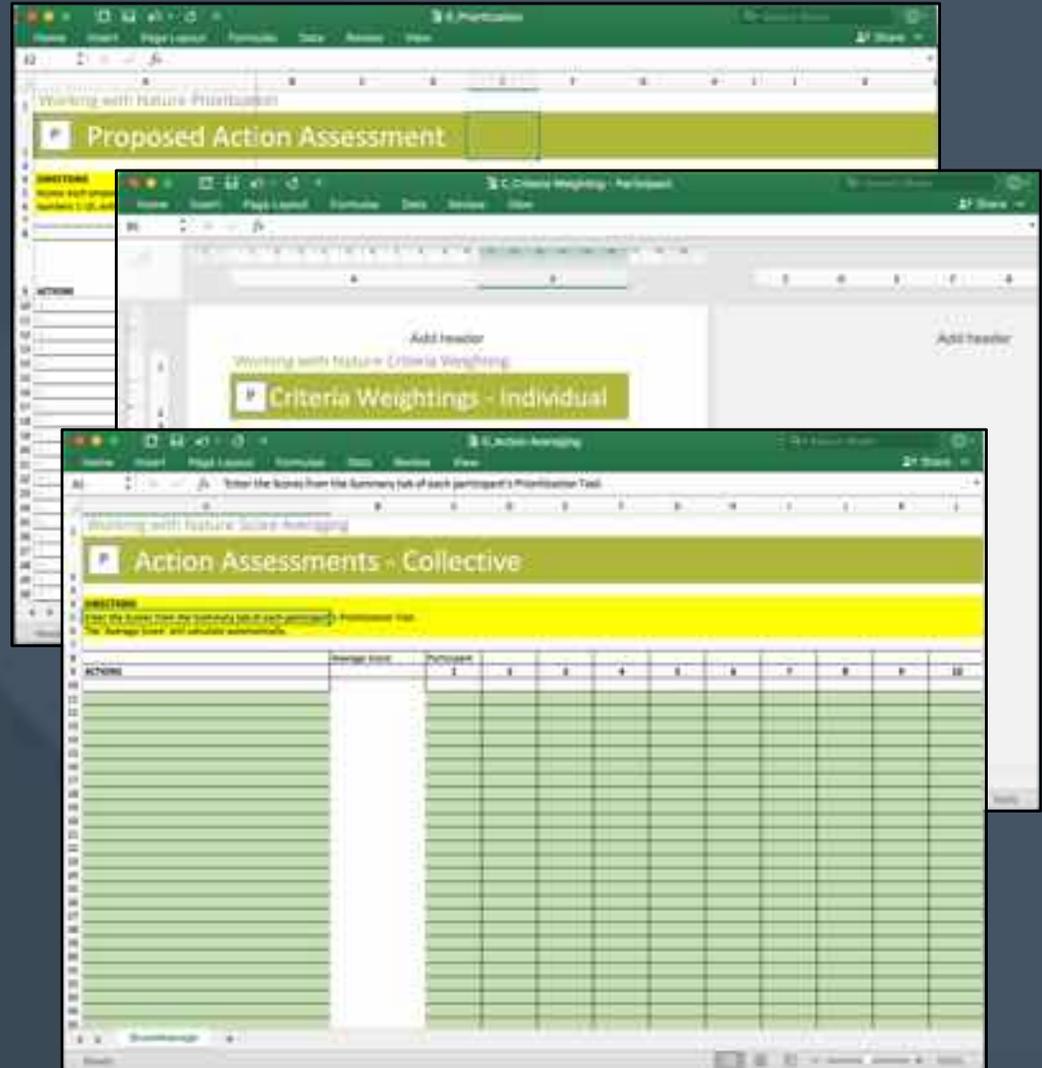


# Options: WWN Prioritization

**Prioritization  
Tool**

**Criteria  
Weighting Tool**

**Action Score  
Averaging Tool**



# Options: Natural Infrastructure Mapping



# Natural Infrastructure Mapping



# Natural Infrastructure Mapping



## Challenges

- What is meant by natural infrastructure asset
- Existing and potential?
- Municipal and private land?
- For flood and drought only?
- Data limitations

# Natural Infrastructure Mapping



## Opportunities

- Clarity – for both planning and communications
- Identify multiple benefits from natural infrastructure assets
- Municipalities structured to consider ‘assets’
- Much data does exist
- Existing examples provide case support

# Natural Infrastructure Mapping



## Next Steps

- To develop a *Municipal Natural Infrastructure GIS Methodology*
- This would be a method for 'cross-walking' existing GIS data into a 'natural infrastructure' layer
- Miistakis has applied for funding, and is waiting to hear

# Where to Get *Working With Nature*

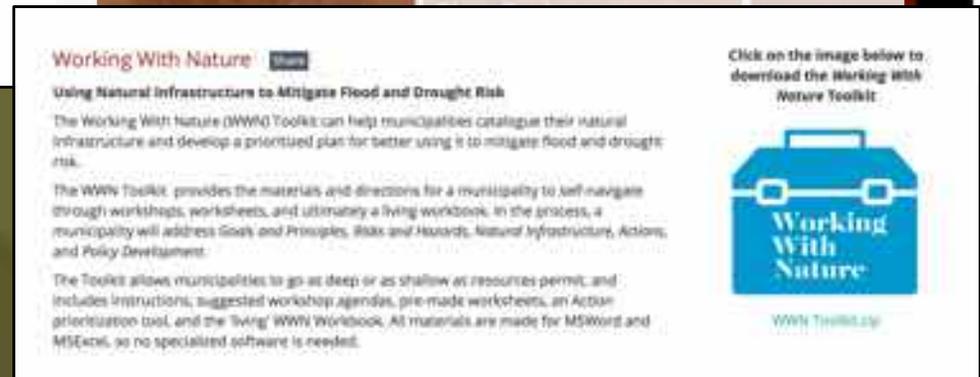
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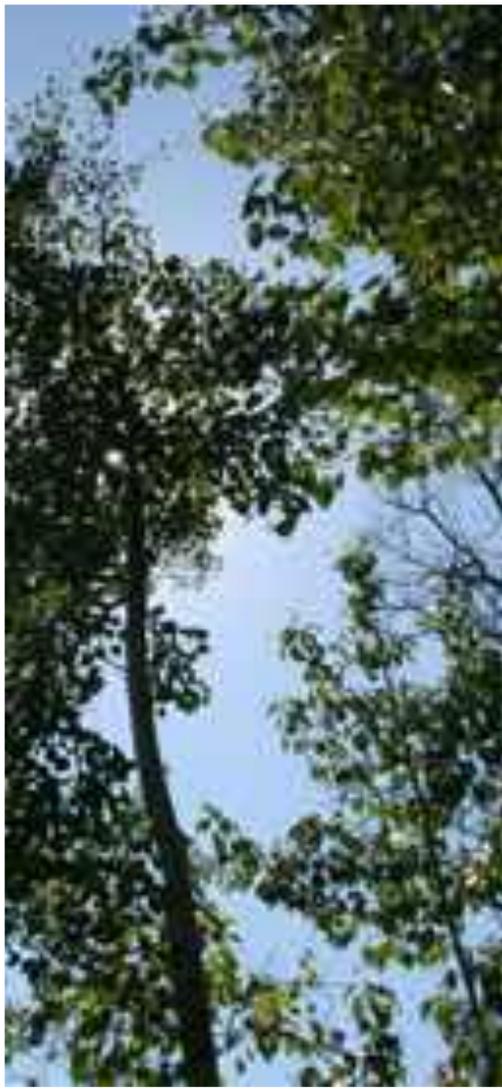
# Where to Get WWN

- Miistakis Institute web page ([www.rockies.ca](http://www.rockies.ca))
- “Municipalities and Conservation”
- “Working With Nature”
- Download *WWN Toolkit* zip file
- No cost, no registration



[www.rockies.ca/wwn](http://www.rockies.ca/wwn)

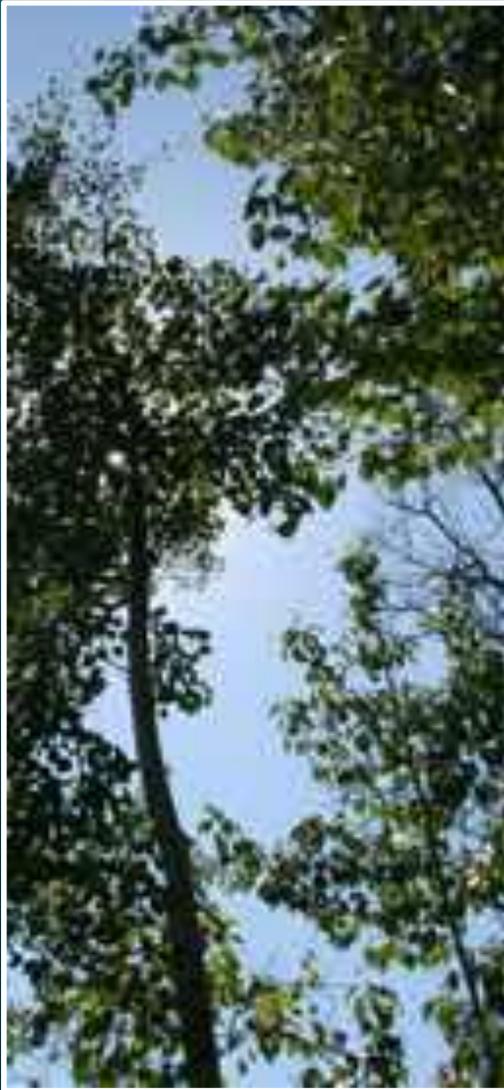
# Our thanks to the *Working With Nature* funder



Watershed Resiliency and Restoration Program



# Our thanks to the *Working With Nature* pilot partner



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