THE CUMULATIVE IMPACTS - HOW TO GET AHEAD OF THE CHANGES

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Ecohealth Solutions

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Commonalities: Desire for a….

- Long life
- Secure life
- Fulfilled Life
- And have a chance to be happy

But Lately….Scared & Frustrated

- Climate Change
- Global Instability
- Loss of Biodiversity
- Over-population
- Food and Water Security
- Contaminants …. Synergisms
- Cumulative development effects
- Political Will…..

I’m mad as hell but what can I do about it?

Focus on the Foundation of

Health, Security
and
Sustainability…

"Healthy Watershed"

Core Issues

1. Healthy living Policies are compartmentalized

   Health, social, economy, …… eventually environment
2. Integrated approaches to measuring watershed states don't exist
3. Integration between professionals is lacking….
4. Results in fear mongering and disenfranchised public

Core Issues

1. Healthy living Policies are compartmentalized
   Health, social, economy, …… eventually environment
2. Integrated approaches to measuring effects to each component are lacking
3. Integration between professionals is lacking….
4. Fear mongering and disenfranchised public

CLIMATE CHANGE

A new way of doing Business

- Health, Social, Agriculture, Environment etc., at the table
- Development of a common vision
  - (e.g., sustainable, healthy community)
- Common solution development
- Collaborative monitoring and reporting
- Understanding of Scales of Effects

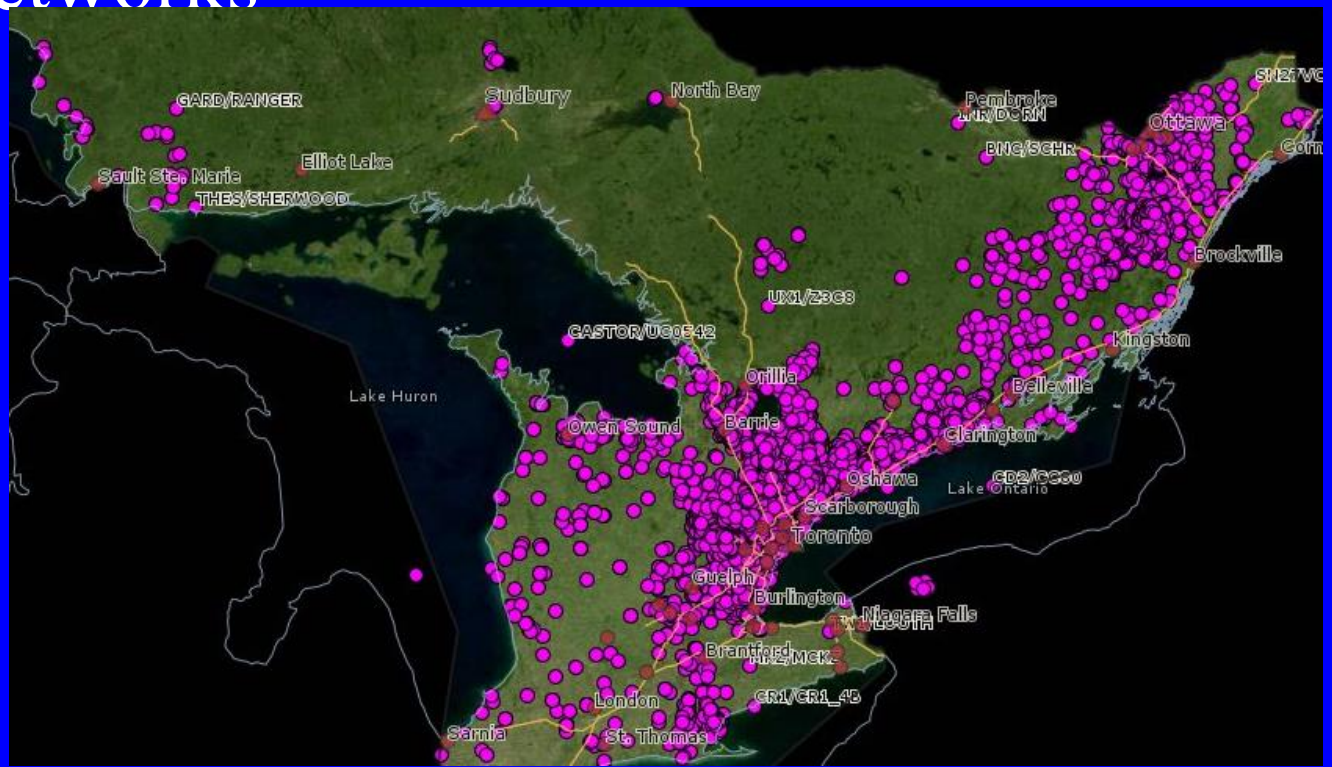
- And…. User Pays Policy to support the process!

Baby Steps…..

- Innovative Building and Sewage management
- Low Impact Development
- Municipal storm Levies

Baby Steps…..

- Large Standardized Datasets on streams … (including headwaters) coming on Land
- SMART Networks



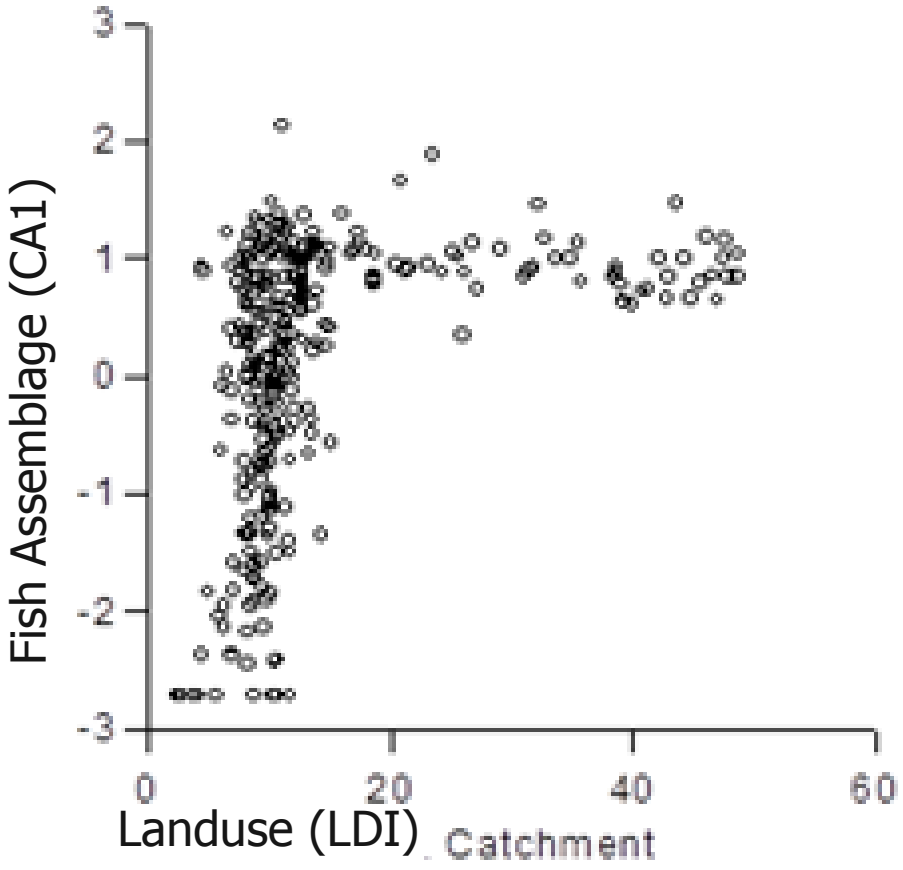
Baby Steps…..

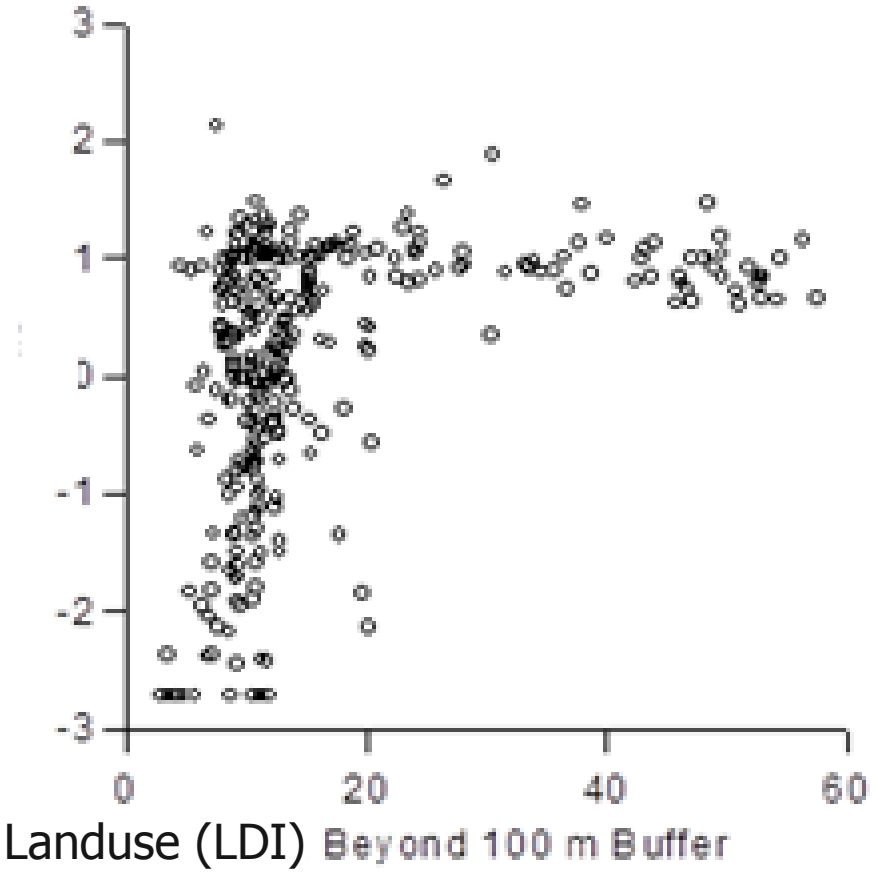
- Large Standardized Datasets on streams … (including headwaters)
- SMART Networks
- Knowledge
- Lots of Predictive models

So We're Done, Right?

Land use influence on fish

R^2 = 0.41 for both!!!



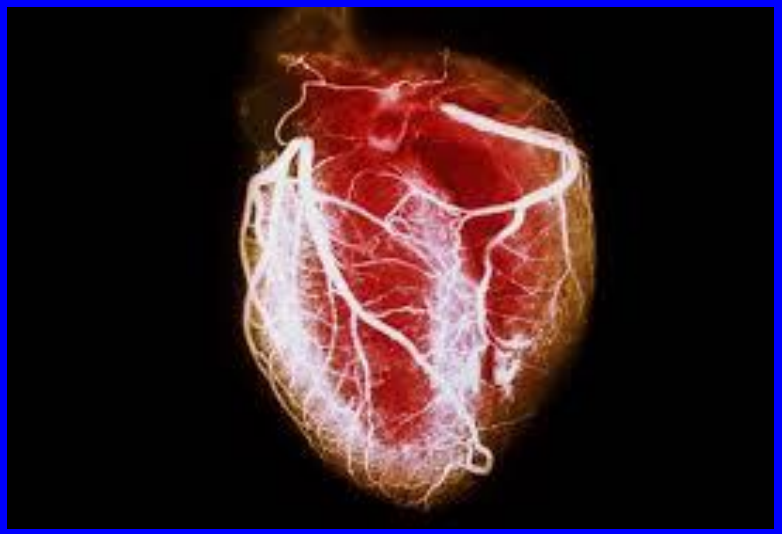


Not Yet…..

- Historic Focus Predictive Models - “Fishy Waters & Outlets” (30% solution)
- Degradation Continues ….
- Science points to the Non-fishy HEADWATERS
- Which have historically not been managed!
- And… even where managed Agriculture is NOT

They are really important….

- Arterioles …… Headwaters

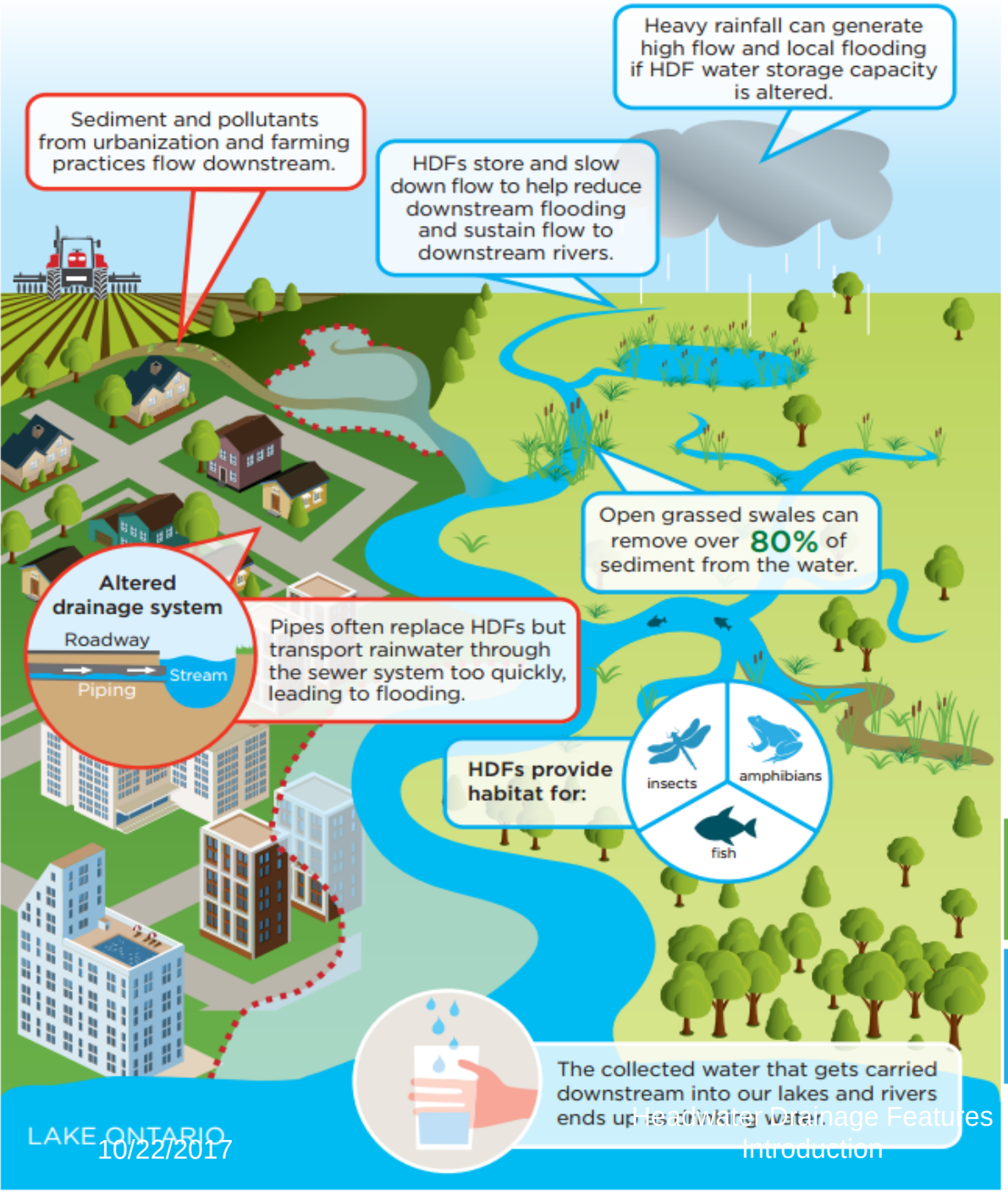


Transport of fluids, nutrients, chemicals, biota

Headwaters are complicated!

More complicated than arteries

- Variable & hard to measure
- Processes are easily impacted
- Everywhere and difficult to define
  (i.e. size matters…)
- They “get no Respect”



What is a Headwater Drainage Feature (HDF)?

HDFs are more important than you think!

HDFs are located across the landscape and are the small stream, swale and wetland features that capture water and transport it to larger streams and rivers. They do not necessarily flow all the time, but may flow after rainfall or snowmelt.

When left in their natural state, these features have many functions like helping to reduce stream flooding, purifying water, and providing food and habitat for fish and wildlife.

However, they can be altered by people through activities like piping, ditching, and channelizing, which reduce or eliminate these functions. This especially becomes a problem when many HDFs are altered in one watershed.

What can you do?

Leave HDFs in their natural, undisturbed state. Leave vegetation within and around them, maintain existing drainage flow, and keep livestock away.

Maintain the vegetation surrounding the streams to improve the quality of water and food carried downstream and to remove nutrients and sediment.

50% - 80%
of the river's length is constituted by Headwaters streams

Flood vulnerable area

Toronto and Region Conservation for The Living City

Since 2007…
Headwater Steering Group

- Developing Local Policy
- Coordinating Monitoring
- Education
- Advocacy
- Conducting Research

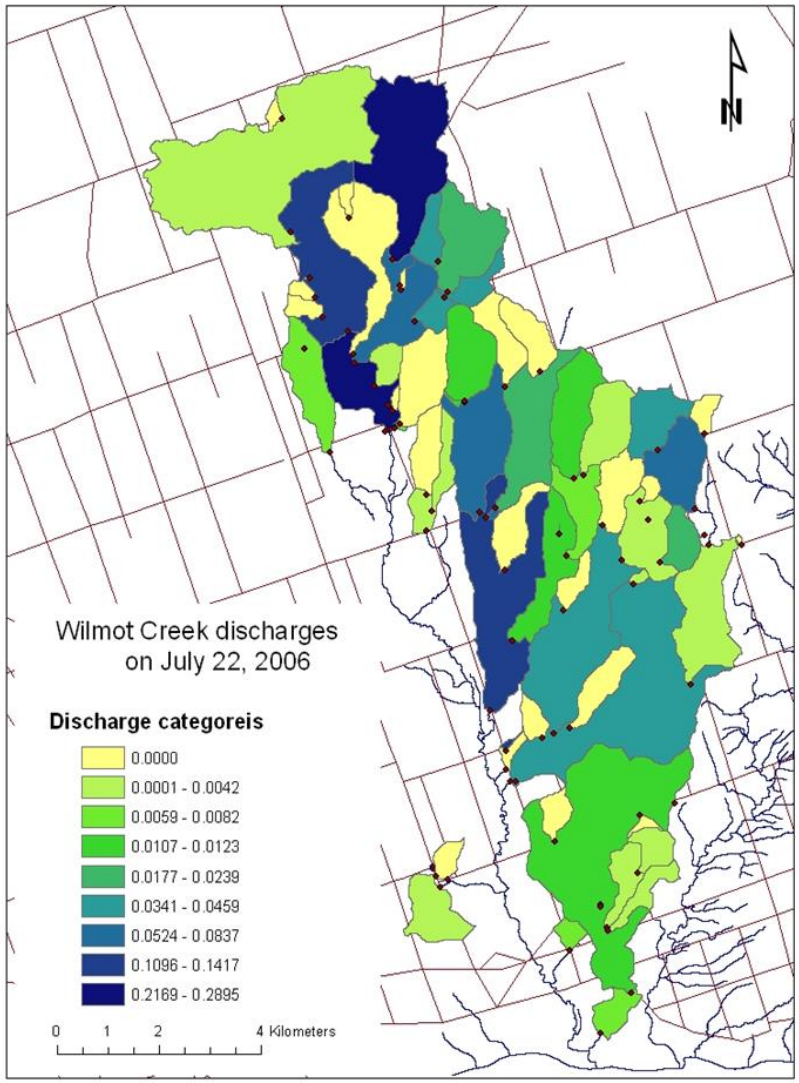
https://trca.ca/conservation/environmental-monitoring/headwater-study//

Key Findings: Headwaters build Resilience

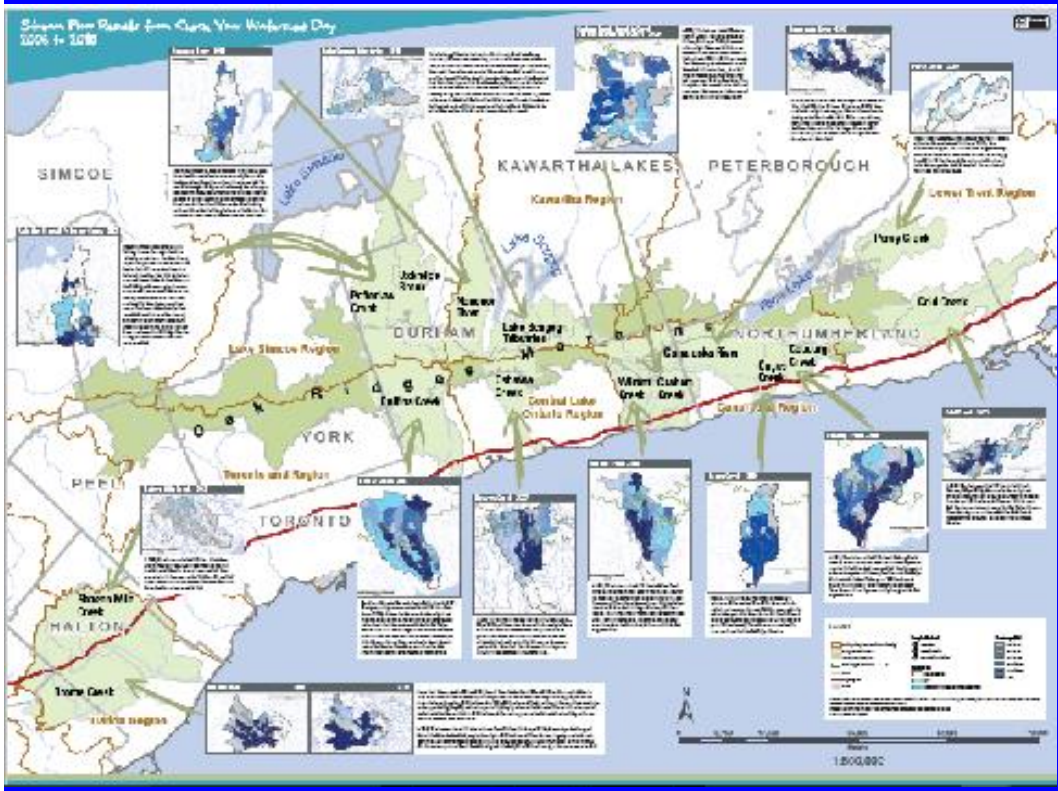
- Severe storms
- Drought
- Water Quality
- Biodiversity
- Healthy floodplains
- Outdoor opportunities
- Wildlife corridors
- Soil management

"Now *THAT'S* ecosystem resilience."

Learning Much about Flows



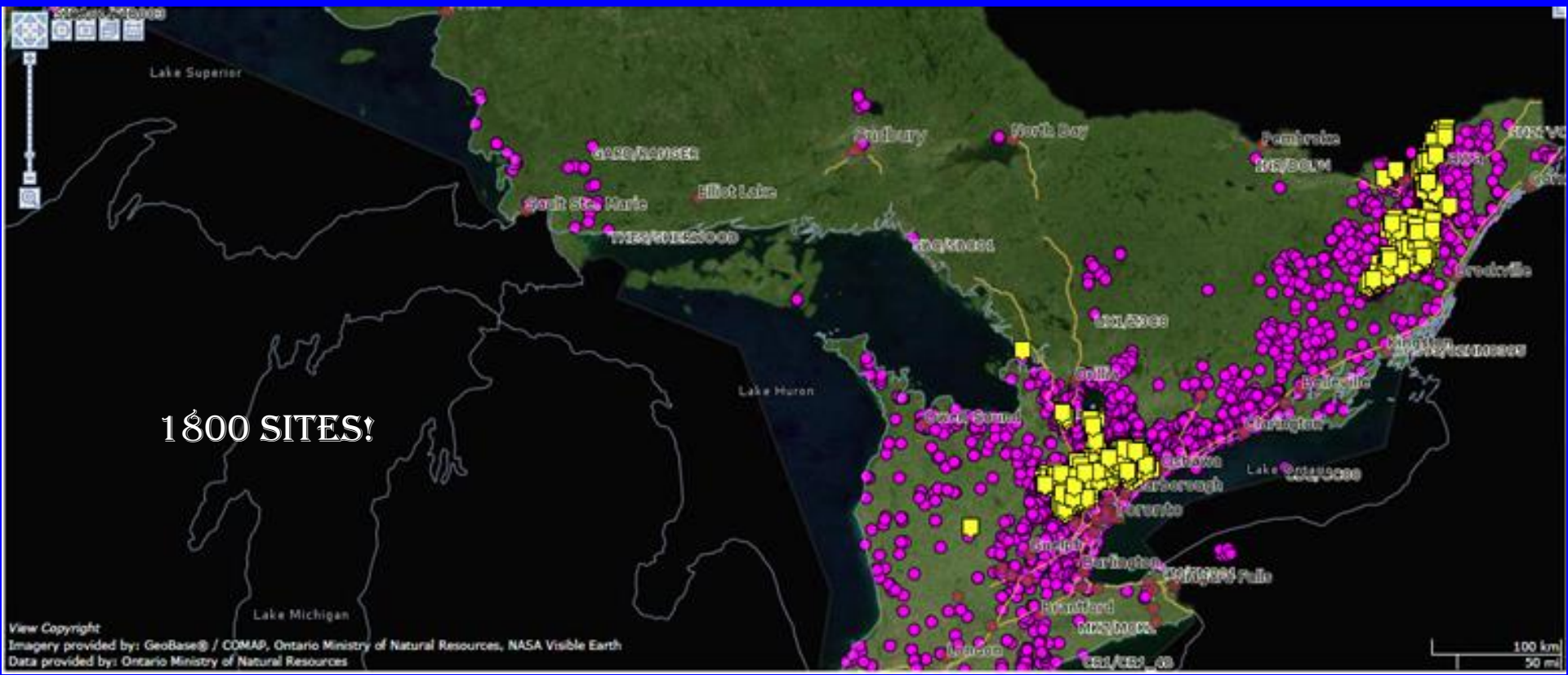
- Check your Watershed Day
- Citizen Science Surveys!



Headwater Sampling Protocol

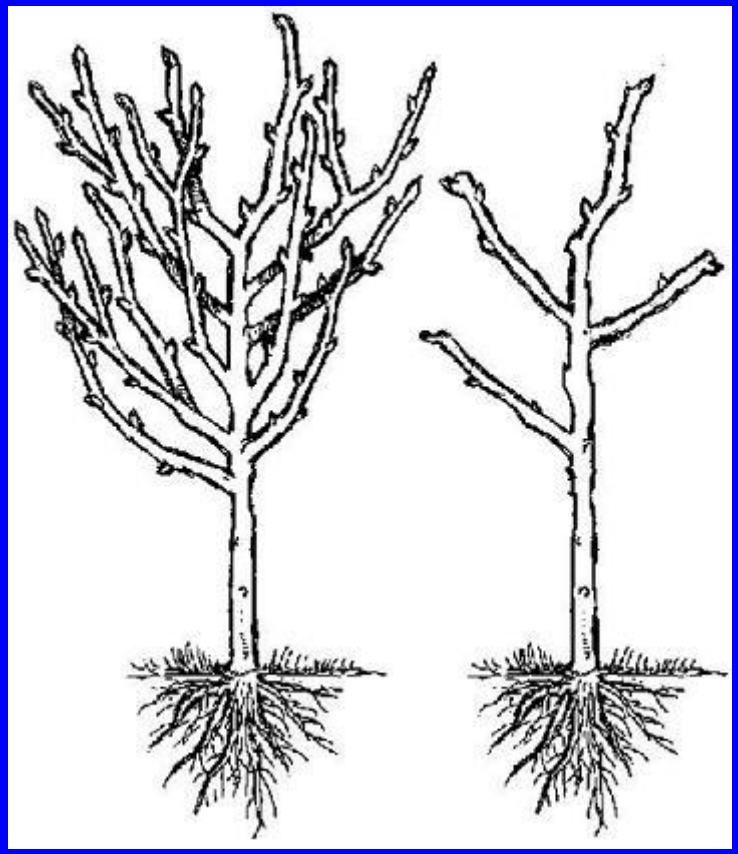
- Flows, sediment, condition. Feature type…

(Google Headwater Steering Committee)



Ongoing work: Trim the Tribs…

- Which tribs are most important to ecosystem integrity
- Which and How many tribs can be pruned



Discussion Paper:
Cumulative effects from alteration of headwater drainage features and the loss of ecosystem integrity of river networks

LDI Ratings

Fish community unimpaired

Below the threshold (9) but 50 % of HDF above threshold,

Ongoing Activities

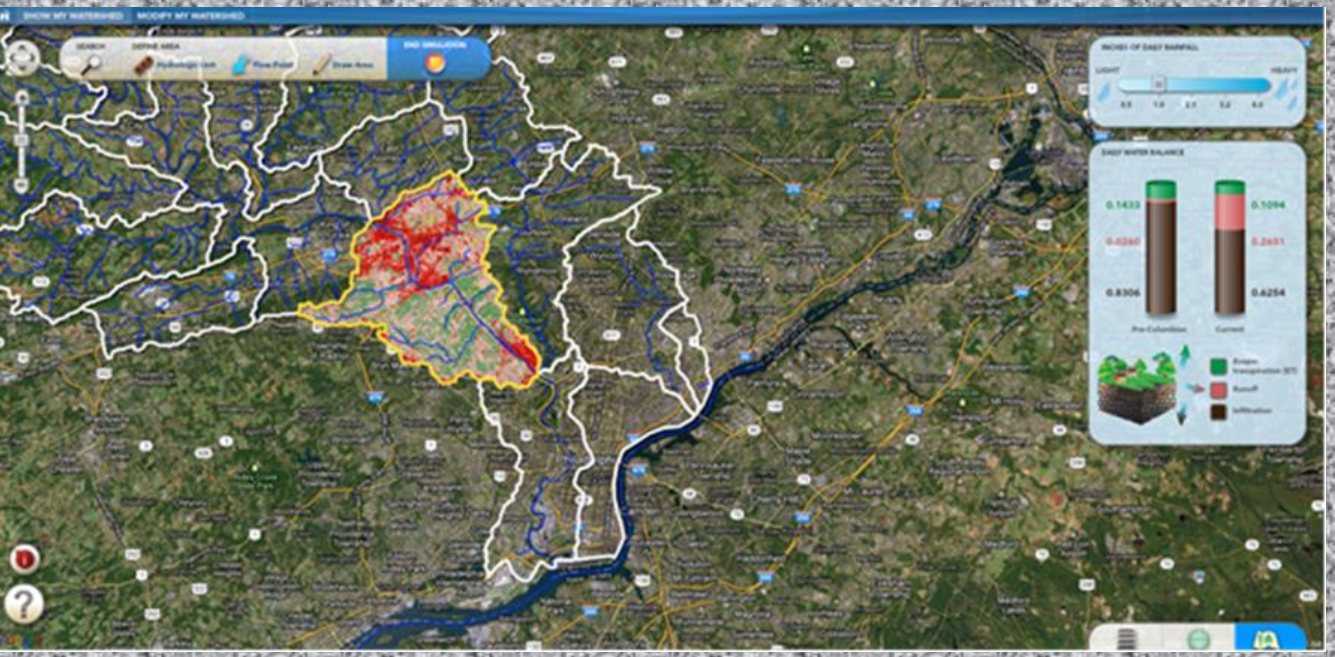
- Continuing to build cumulative effects models to predict change
- Building Ecohealth networks
- Continuing collaborative monitoring
- Decision support Systems

CANWET4 Decision Support System

Home | Safe to Drink | Safe to Swim | Safe to Eat Fish | Ecosystem Health | Human Health | Predictive Tools

Zoom into your community watershed on the map below. Next choose an indicator that you would like to see the state of and the available data, or click on the predictive tools box to access models that enable you to evaluate how some Indicators are expected to change in response to changes that you might make on your property.

- Water Quality
- Terrestrial Systems
- Stream Animals
- Water Quantity
- Green Space
- Food Availability



Imagine!

- Integrated Ecohealth Monitoring…. Including GIS!
- Collective access to information
- Collaborative analysis (Report Card Tool) to help implement models in decisions
- Communication/engagement strategy (e.g., report cards)
  - Identify barriers to uptake
- A User Pays Implementation Strategy! (for all users in a watershed…)

A Common Vision is the most powerful human force!

- Sustainable Communities
- Sustainable Food
- Climate Adaptation
- Community Planning
- Healthy Living…..
- Empowered!

OH YEAH…. HEALTHY ENVIRONMENT!

What Can you Do

- Improve property and promote a watershed wide storm water[1] levee for your area…
- Organize Citizen based watershed surveys
  - Water Rangers … Flows, Temperature, benthos etc.,
- Spread the word…. To everyone

1: Eventually an Ecohealth levee….

Thank you

Contact me at

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Check out:

http://www.trca.on.ca/the-living-city/water-flood-management/headwater-study.dot

or

http://trca.on.ca/the-living-city/monitoring/ontario-stream-assessment-protocol.dot