Developing a Nutrient Reduction Loss Strategy for Farmland Drainage in the Thames River Basin Planning Meeting
January 27-28, 2016, London, ON

Summary Notes

Attendance

Beverley Alder OMAFRA
David Armitage, OFA
Suzanne Armstrong Christian Farmers Ontario
Mayor Steve Arnold, Cities Initiative
Councillor Bill Bilton, ROMA
Chief Thomas Bressette, Kettle Point First Nation
Councillor Carmen Rogers, Kettle Point First Nation
Tim Brook OMAFRA
Julie Caley Julie Caley Consulting
Ron Campbell, Ontario Agribusiness Association
Dale Cowan, Certified Crop Advisors
Nicola Crawhall, Cities Initiative
Keith Currie, OFA
Gabrielle Ferguson OMAFRA
Natalija Fisher, Environmental Defense
John Fitzgibbon, University of Guelph
Councillor Larry French, Chippewas of the Thames
Raj Gill Freshwater Alliance
Brad Glasman, UTCA
Councillor George Henry, Chippewas of the Thames

Pamela Joosse AgCanada
Bruce Kelly Farm and Foodcare
Don Lobb, LICO
Bill Mayes Drainage Superintendents Association of Ontario
Don McCabe, OFA
Brian McDougall St. Clair Region Conservation Authority
Kevin McKague OMAFRA
Dr. Merrin McRae University of Waterloo
Don Pearson Lower Thames Valley Conservation Authority
Tony Peralta Land Drainage Committee
Keith Reid Agriculture Canada
Mark Reusser, OFA
Dave Richards MNRF
Jenn Richards MNRF
Brett Ruck, DIG
Don Simpson City of London
Sheila Simpson Ontario Trillium Foundation
Sid Vanderveen OMAFRA
Eric Westerberg, DSAO
Jason VanGorp, Land Improvement Contractors of Ontario (LICO)
Wednesday, January 27, 2016

Introductory Remarks
Introductory remarks were delivered by Don McCabe, Chief Bressette and Mayor Arnold.
(see presentation by Don McCabe)

Objectives and Desired Outcomes
Dave Armitage explained the short term and longer term objectives and desired outcomes.
The longer term desired outcome is to develop and implement a voluntary, collaborative nutrient reduction loss strategy for farmland drainage in the Thames River Basin.
The objective of this planning meeting is to seek concurrence on the main elements of such a strategy, and buy-in from the key stakeholders in farmland drainage.

Binational, federal and provincial action on phosphorus
Nicola Crawhall provided an overview of the commitments to reduce phosphorus entering Lake Erie at the binational, federal and provincial level, and how these relate to the strategy being discussed at this meeting.
(see presentation by Nicola Crawhall)

Dissolved Reactive Phosphorus and field drainage research
Dr. Merrin McRae provided an overview of research on field drainage and phosphorus transport.
(see presentation by Dr. McRae)

State of Farmland Drainage in Ontario and other jurisdictions
Bill Mayes and Brett Ruck provided an overview of drainage in Ontario and other jurisdictions.
(see presentations by Bill Mayes, Brett Ruck)

Provincial drainage guidelines and training for drainage superintendents
Sid Vanderveen and Tim Brook provided an overview of OMAFRA training and drainage guidelines.
(see presentations by Sid Vanderveen and Tim Brook)
Thursday, January 28, 2016

Recap from Wednesday

Don McCabe explained that the purpose of Day 2 was to build on the background and knowledge shared from Day 1 and begin to develop the framework for a strategy.

Elements of a Strategy

Nicola Crawhall presented 10 key Questions that were raised through the first day that could serve to frame the discussion of elements of a strategy.

1. **Scope** – What should the strategies geographic focus be?
2. **Target** – How should the strategy be targeted? Eg. Seasonal, surface vs subsurface, all drainage vs hotspots
3. **BMP validation** – which BMPs are already adopted and how do we validate more BMPs that we want adopted?
4. **Promote BMPs** – how do we promote adoption of BMPs? Eg amongst drainage superintendents, licensed contactors, landowners
5. **Monitoring progress** – How do we monitor phosphorus reduction to demonstrate progress? What further research is needed?
6. **Drainage Design** – what aspects of drainage and innovative technologies could assist us?
7. **Provincial, municipal I policy, and gaps**
8. **Verifying implementation** – How do we validate adoption of BMPs?
9. **Connections between initiatives** – how does our initiative connect with nutrient management and soil management initiatives?
10. **Lessons learned** – what can we learn from other jurisdictions? Lake Simcoe? Other sectors like golf courses?

1. **Scope – What should the geographic focus be?**

The objective of the strategy is to contribute to the reduction of phosphorus (P) loads into the Thames River, so the overall geographic focus is the Thames River Basin, including the Thames River, and its tributaries.

Within this geographic area, this strategy is focused on farmland water management and drainage. This is separate from, but related to the application of fertilizer and manure on farmland.

Options considered
1. To demonstrate impact with regard to the phosphorus target, begin with targeted areas to serve as case studies;
i) Given the timing of the federal and provincial phosphorus reduction plan, expected to be completed by the end of 2016, it was felt that case studies would take too long. There is enough information out there to allow us to get going.
   - There has been considerable work on different field testing, as well as water quality data. (ex PLUARG = Pollution from Land Use Activities Reference Group 1970’s) that could inform the broader strategy.

2. To build on momentum of area that is already targeted by provincial and federal government, address the entire Lake Erie Basin
   - Taking a more holistic view of water, not just in one area or from one source (agricultural) would result in a more comprehensive approach.

3. To bring about change across the board, pitch the strategy province-wide.
   - Progress within the Thames River basin as a result of this strategy should be developed with broader province-wide application in mind.

4. Focus on entire Thames River basin
   - Suggestion to focus on 1st and 2nd order streams which are most impacted; main channel is just moving the water that it has collected from these upper order streams.
   - May focus on nested watersheds, subwatersheds

Challenges identified:

i) In terms of geographic scope, the question of First Nations land was raised, as it is not part of the municipal system of drainage. How do we work with/incorporate indigenous lands in this strategy?
   - First Nations lands may serve as an example of how more natural filtration could reduce phosphorus entering waterways. Sampling could be conducted before and after the river or drain enters First Nations territory.
   - Focus on areas where drainage outlets from agricultural lands drain onto First Nations lands. It is unclear what authority could be used to regulate these outlets.

ii) We need to know the baseline to measure change phosphorus loss reduction, however, this baseline information has not been collected in a systematic way.
   - There are examples of sub watershed (like Norfolk) where Ontario Ministry of Natural Resources and Forestry (MNRF) did sub watershed studies, collected the background baseline data we are discussing needing
   - Engage Ontario Ministry of Environment and Climate Change (MOECC), MNRF, Conservation Authorities (CA’s) for baseline data.
   - MNRF thinks the data needed exists to target in the Thames basin.

ii) We need continuity from what landowners already do.
   - Must be careful to provide equity amongst agriculture community, keep level playing field in South West Ontario agriculture.
   - Must make sure strategy does NOT penalizing people who are doing the right thing already.
It was agreed that:

a) The strategy will use existing research and data rather than undertake new research and case studies.

b) Focus on entire Thames River basin in terms of awareness and education, but given limited resources, put special emphasis on areas that contribute higher loads, possibly in the Lower Thames;

c) Seek information from CA's and federal and provincial agencies with regard to priority areas, where to focus our efforts;

d) As First Nations land is not part of the municipal system, consider how to address connection between drainage system and First Nations lands in this strategy.

2. **How should the strategy be targeted?** *Eg. Seasonal, surface vs subsurface, all drainage vs hotspots*

Options considered:

i) Target actions to address volume, speed, flow, timing of water running off the land. Research by Dr. McRae indicates that phosphorus from summer runoff is minimal. It is important to:

   o 75% of runoff is during winter/spring snowmelt
   o 80% of P from events is found in surface water (as opposed to subsurface water through tile drainage system)
   o This suggests measures to slow down flow, cover crop, berms, increased infiltration.

ii) Consider stacked BMPs as described by Dr. McRae

Challenges identified:

iii) Targeted actions must take be tailored to existing limited capacity,

   o e.g. knowledgeable technical people who can provide outreach assistance to farmers, landowners, like certified crop advisors, CAs
   o Landowners/farmers only have so much capacity to talk to people, don’t want to talk to 2-3 people about different aspects of the same issue.
   o Tight timeline imposed by government to achieve targets does not give much time to increase capacity.
   o Tight government timeline also leaves little time to secure funding, data collection, implement action, demonstrate progress

iv) Drainage BMPs must be customized to land, climate conditions, crop

   o Drainage BMPs must address changing weather patterns from year to year.
   o Understanding landscape is critical to effective drainage. Satellite images can be used for predictive modelling of the landscape.
   o Understand the soil and P dynamics of different crops

v) Communicate and explain the ‘problem’ to landowners– volume, speed, flow, seasonality of water run off, and then offer possible solutions.
It was agreed that:

- The strategy must recognize the limited capacity on the ground, both in terms of landowner capacity and extension work capacity by crop advisors, CA's.
- The strategy must begin with understanding and explaining the bulk of the problem in terms of volume of water, speed of flow, seasonality.
- BMPs that are recommended should correspond with the problem as identified above. This may involve 5-6 stacked BMPs, but must be customized to crop, landscape, climate.

3. **BMP validation – which BMPs are already adopted and how do we validate more BMPs that we want adopted?**

Options Considered

i) Given that most P is surface water, BMPs being considered should address both drainage and water management on landscape, including preventing P from getting into tile system.

ii) Start with baseline, then demonstrate progress, validating BMPs.

iii) Use existing research sites for BMPs, gather information from various pilot projects.

Challenges

i) Considerable work has been done to test BMPs, eg. Drainage Investment Group (DIG), ALUS, Norfolk County. However, there has been no systematic assessment and validation of drainage BMPs.

ii) Cost of upfront validation is high/expensive (ie. $25,000 to monitor) and will take time to validate (at least one full year in different seasonal conditions).

iii) Social science of why farmers adopt BMPs, motivators to implement is lacking. Assume that it has to do with value/cost, but farmers also do it because it is the right thing to do.

   o Attaching $$ value to BMP in terms of P lost may not be persuasive as it amounts to only .50 - $1.00/acre

   o Productivity and soil health/loss argument can be made over the long term.

It was agreed that

- BMPs must address both water management on landscape as well as drainage, in an integrated way.
- We must be practical – recognize that validation of BMPs is expensive and time consuming.
- Put more resources where we already have monitoring rather than start new validation process, and in actions to reduce P.
• Farmers need to see value of adopting BMPs, e.g. show other benefits to BMPs besides value of lost P – including productivity, soil health/loss; be seen to be contributing to solving a broader (societal) problem.
• Need to demonstrate measurable progress in a transparent way to maintain commitment of farmers to BMPs adopted.

4. **Promote BMPs – how do we promote adoption of BMPs? Eg amongst drainage superintendents, licensed contactors, landowners**

**Options Considered**

i) Define best practices more broadly than changes to the actual drainage system, i.e. best practices in training, education and awareness within chain of those responsible - farmers, drainage superintendents, licensed contractors, municipal councils;

ii) Foster crossover in knowledge and expertise and promote integrated multidisciplinary teams to support farmers, e.g. certified crop advisors, drainage superintendents and engineers, licensed contractors, CAs.

**Challenges**

• While licensed contractors require and receive provincially sponsored training, unlicensed contractors and those who do work on their own land do not; need to reach them.
• Municipality/Council are critical part of this process but often do not have awareness, knowledge of drainage issues.
• Trust is key to spreading best practices, raising awareness.
  o Person delivering message on the ground must be a trusted advisor
  o Landowner champions can spread the message, preferred to government reps..
• Standardized BMPs do not fit all farm situations. Need to be flexible to fit specific circumstances
  o Assess real issue on each farm/site
  o Need matrix of BMP options that allow for customization, eg. Upper Thames CA “Nixon mix”.

**It was agreed that:**

• Adoption of BMPs must start with education, awareness raising
  o providing landowner/farmer with information; drainage superintendents need good materials to hand to farmer at first meeting;
  o providing municipal councils with Drainage 101 presentations, materials
  o reaching unlicensed contractors, those who do own drainage on land
• Cross disciplinary teams could benefit farmer- one visit, extensive knowledge and expertise; integration of 4Rs with drainage, water management.
• Care must be taken in the delivery of the message; trusted advisors, landowner champions needed to spread the word about BMPs
• Development of BMP matrix with stackable, customizable BMPs that suit unique situation and source of P on each farm.

5. **Monitoring progress – How do we monitor phosphorus reduction to demonstrate progress? What further research is needed?**

**Options Considered**

i) Given lack of monitoring data and cost of new monitoring, focus on modelling

ii) Some new monitoring is needed to validate modelling

**Challenges**

• Thames R is a non point source – challenge is in determining how actions on small parcels of the landscape add up to measurable reductions in total P loading into the Thames River. (could drainage improvements address 5-10% of P loadings?)

• Have not figured out appropriate wathershed or subwatershed modelling to predict P reductions, but progress has been made in US.

• Lack of monitoring stations along Thames River- quality and quantity stations need to overlap, need to understand current monitoring and gaps.

• Funding for monitoring needs to be long term to show progress

• May not have resources or ability to monitor progress in traditional sense, may need proxy for actual monitored P reduction

**It was agreed that**

• Ideally, would like more monitoring stations to measure progress in reducing P in Thames River;

• Will need modelling of watersheds to predict P reductions related to specific changes on the landscape, to drainage; may learn from US experience, esp. Maumee, Chesapeake Bay.

• In absence of monitoring and modelling, may need proxy metric to measure progress, e.g. number of people trained, number of people certified, etc.

• Need to consult with CA’s, Province, Federal government to identify what monitoring is in place on Thames River.

6. **Drainage Design – what aspects of drainage and innovative technologies could assist us?**

**Options Considered**

i) Approaches to water management and drainage that slow water down, store or increase infiltration should be explored, e.g.Norfolk County.

ii) Reduce direct surface infiltration into tile drainage, allow water to pond around inlet through changes in modified design of inlets, catchment basins
iii) Wetlands, eg. Norfolk County

iv) Testing of outlet treatment and monitoring technology in different climatic conditions
   a. Potential project with Southern Ontario Water Consortium (SOWC)?
   b. Many examples of end of pipe treatment over last 20+years, for Nitrates

v) Header dispersion, in stream modifications (2 stage channels) for sedimentation

vi) Pond infiltration, need cover crops up the system.

**Challenges**

i) Private land vs lands with communal drainage system
   a. Advanced drainage course – inlets/controlled drainage/shallow drainage – could incorporate into private land systems?
   • Difficulty in getting company feedback/interest in testing new technologies on agricultural land. Many end of pipe treatment tests have gone on, volumes are low so companies not interested and most have focused on treatment for nitrogen.

ii) Modified surface inlets – how long can water be ponded? Should modifications be seasonal? Ie. Allow ponding in non-growing season.

vii) Wetlands of limited value during peak flow volumes, go straight through with no treatment.

It was agreed that

• Compile information from those doing work in this area, eg. CA’s, OMAFRA, Farmers, U of Guelph
• Drain design and new technologies to treat end of pipe exist and should be further explored
• Learn from Norfolk County’s successful experience in implementing drain re-design and new design incorporating wetland and buffer features
• Keep in touch with SOWC re. technology company interest in end of pipe treatment technology

7. **Do we have the right Provincial/municipal policy/ permitting instruments/ authority now and if not, where are the gaps?**

**Options Considered**

i) *Drainage Act* is open to interpretation, has flexibility to include incorporation of BMPs in drain design, so considered a good instrument, however has drawbacks.

i) Assess and charge future maintenance according to how “good” your management practices are – benefit would be evaluated and applied in the assessment (VanBuren County, Michigan)

ii) Streamlining existing legislation is preferred over new or more legislation/regulation, Better regulation NOT more

**Challenges**

i) Drainage Act is enabling not permitting
• Drainage Act = communal, Tile Drain Act = subsurface

ii) Drainage Act does not control connections into the drains
  o Permitting exists around drain outlet but diffuse authority – Department of
    Fisheries and Oceans (DFO), CA erosion (both focus on sediment) and MNRF
  • CA permitting exists but application varies widely from CA to CA, little
    consistency across province.

iii) Drainage Act does not have a water quality component; it used to but was seen as
don’t SET the width, might need more or less to achieve P loss goal and likely different
on each site (many variables)

iv) Municipality’s discretionary authority under the Municipal Act is poorly understood by
Councils.

It was agreed that

iii) Explore how to better oversee connections from drain/outlet to drain/watercourse – e.g.
  permitting from municipality, rationalize existing authority across multiple agencies

iv) Explore how water quality considerations can be introduced into existing drainage
  instruments

v) Explore municipality’s discretionary authority, inform municipal councils;

vi) Identify situations where features should be mandatory in municipal by-laws, eg.
  Leamington has a policy that must install buffers on new drains as part of drain design

vii) Explore penalty or reward in Engineer assessment for poor practices/good practices

viii) Streamlining existing legislation is preferred over new or more legislation/regulation.

8. Verifying implementation – How do we validate adoption of BMPs?

Options Considered

i) Certification modelled on 4Rs certification in US and to be introduced in Ontario through
  OABA and certified crop advisors/nutrient management advisor

ii) Limited certification for tile drain contractors associated with extra training that could be
  reflected on their licenses.

iii) Certification for professionals advising farmers, recognized by farmer as someone who
  bring expertise, knowledge of improved water management, drainage. E.g. PFRA – former
  federal program

iv) Certification of land parcels with water management/drainage practices that meet
  verifiable standard

v) Reward adoption of BMPs with farm tax rebate, $/acre, crowd sourcing

vi) Use remote imagery to verify that BMPs have been adopted, maintained.
Challenges
i) Measure progress – will likely need a “proxy”, e.g. # of contractors certified, # acres/miles farmed/designed under certification
ii) Critical to be able to verify practices have been maintained over time.

It was agreed that
i) 4Rs certification in US is ‘high end’ version of certification, could have similar or integrated program/certification for drain contractors and engineers
ii) Validation must demonstrate that BMPs have been adopted and maintained over time.
iii) Measuring progress – will likely need a “proxy”

9. **Connections between initiatives – how does our initiative connect with nutrient management and soil management initiatives?**

Options Considered
i) Need for integration of programs aimed at reducing P loss on farmland
ii) OABA and Certified Crop Advisors are developing 4Rs certification for Ontario
iii) Next Generation Environmental Farm Plan (EFP) – Sustainability Plans, integrates business plan and environment in the plan.
iv) Nutrient Management plans contribute to P loss reduction.

Challenges
i) Need to target existing not just new engineered drains
ii) Timing and scope of various initiatives vary, difficulty in ‘lining up’ programs to make sense to farmer.

It was agreed that
i) As 4Rs certification, sustainability plans and drainage strategy are developed and implemented, ensure that all are integrated, particularly for farmers who want to participate.
ii) Ensure that drainage strategy does not duplicate existing programs or requirements, like nutrient management plans.

10. **Lessons learned – what can we learn from other jurisdictions? Lake Simcoe? Other sectors like golf courses?**

Options Considered
A number of examples of phosphorus reduction or comparable initiatives in Ontario and other jurisdictions were identified, including:
• Chesapeake Bay (rule based – 30+yrs)
• Maumee River Basin, Ohio (similarities/differences)
• PEI (shell fish industry issue and solution)
• Wisconsin/lower Wisconsin (watershed based nutrient management)
• US Hidleburgh, discovery farms
• Ontario Water Quality programs
  o RAPs/AOCs/LAMPs
  o CAs
  o GLASI
  o PLUARG/SWEEP/CURB/Healthy Futures
• Norfolk County Drainage Projects (MNRF) (wetland drain restoration/sediment traps)
• Lake Simcoe
• Holland Marsh
• WEBs (watershed evaluation of BMPs) – Ag Canada
• WEBE – OMAFRA (COA)
• Environmental Defense Canada – idea of bottled water “fee”
• Manitoba Lake Winnipeg
• Oldman River Basin (Alberta)
• Southern Quebec
• Golf Course Sector

It was agreed that
  i) Relevant Information from above list will be compiled to learn from these experiences.

**Interest of Stakeholders in participating in development of Strategy**

OFA and GLSLCI have agreed to form a steering committee to lead and coordinate the input of stakeholders into the development of a strategy to reduce phosphorus loss from farmland through water management and drainage.

The Steering committee (OFA, GLSLCI) will set up an advisory committee. All present indicated support in continuing to be engaged in the process.

Suggestions of organizations that should be at the table included:
Drainage and First Nations territory

The challenge of drainage on First Nations territory was discussed further. Representatives summarized their situation in the Thames River watershed.

- First Nations do not have the resources to maintain their own drainage systems
  - 10-20 yr drain cleanout – would like to clean their drains out and to know what is in the sediment that has collected in those drains. They feel there is a connection to the health concerns in their community (including increased cancer rates)
- Chippewas have Ranger Program that can monitor water quality, interest in monitoring drainage water entering and leaving First nations Territory.
- First Nations territory around Thames includes 3,000 to 4,000 arable acres, much of it leased to surrounding farmers as younger 1st nations community members are not showing interest in farming.
- Drainage from outside of First Nations territory into First Nations territory is a concern, but authority to remedy is unclear.

It was agreed that:
This strategy is focused on farmland drainage. To the extent that farmland drainage is affecting First Nations land, it should be part of the strategy.
The strategy will explore the outlets of tile drainage or ditches that reach into First Nations territory and the authority to have these outlets moved off of First Nations territory.

**Funding the Strategy**

**Presentation from Trillium Foundation**

www.OTF.ca

Sheila Simpson of Trillium Foundation provided an overview of OTF’s different funding programs.

i) “Seed” $ up to $75,000 – intake April
ii) “Capital” $ up to $150,000 – intake April
iii) “Grow” $ up to $250,000/yr (over 3yrs) – scaling up something that is proven to work - intake June/July
iv) “Collective Impact” $ up to $500,000/yr - intake ongoing (no deadline)

Funding decisions are made by boards of local volunteers and a Provincial level board. Board members are appointed through the Provincial public appointment secretariat.

**Other potential funding sources**

- Growing Forward 2 (GF2) – through the Agriculture Adaptation Council (AAC) Keith Reid will get contact info
  - And GLASI
- COA (leverage existing)
  - Projects
  - Research funds
- Southern Ontario Water Consortium (SOWC)
- RBC Bluewater
- TD Friends of the Environment
- Winrock Fund
- MOSAIC
- Greenbelt (do fund projects outside the GB)
- McConnell
- Salamander
- Metcalf
- Community Foundations
- Science Foundations
  - NSERC
  - Canadian Science Institute
  - Canadian water network now SOWC
- FCM – green fund
- US foundations – Mott
• Federal Infrastructure $$
  o Green Infrastructure for climate change resiliency (capital for small projects)
• Insurance industry – reduce risk (connect to climate change/flooding/risk of water issues)
• Enbridge Carbon research fund
• Union Gas
• Shell Canada
• GL Community Guardian Fund
• Environment Canada
  o Habitat Stewardship Fund
  o Wetland Stewardship Fund
• Sustain our Great Lakes
• Potential bottled water bottle tax fund (EDC)
• Neptus

Next Steps

Nicola Crawhall outlined the following next steps
• Developing a voluntary drainage strategy could take 6 months to a year, with implementation over several years.
• OFA and Cities Initiative will seek funding to begin development of the strategy
• OFA and Cities Initiative will be back in touch with all participants to invite them to join advisory committee to help develop the strategy.
• Advisory committee process over next 6 months will involve bi-weekly calls to build strategy.
• Proceeding with strategy is subject to funding.
• Proceedings and presentations from this planning workshop will be circulated to participants.