Carruthers Creek Watershed Plan: Peer Review #1: 1 March 2016

Agenda

9:30 – 10:00 Networking

10:00 – 12:00 Peer Review panel: short overview of purpose, work plan, timelines for the watershed plan; descriptions of aquatic and terrestrial field studies and water resources engineering work completed in 2015; 2016 work plan

Why we are conducting peer review at this point in the study

- Focus our thinking and improve our study designs as TRCA staff respond to direction from professional colleagues; adaptive management/framework
- Assurance that our field work design is sound after the first year, and ensure that gaps have not been overlooked in the field studies, at a point when they can still be corrected without impacting the overall time line or budget
- Subjecting our work to peer review will establish the technical merits of the plan, as Phase 1 baseline work is the foundation for the Carruthers watershed plan

Peer Review session attendees

TRCA staff: Gary Bowen, Sue Hayes, Maryam Nassar, Angela Wallace, Amy Winterhalt

External reviewers:

- Heather Brooks, Director, Watershed Planning and Natural Heritage, CLOCA
- Dr. Neil Burnett, Business and Technology Development Advisor, Cleantech and Material Sectors, also the Chair of the former Carruthers Watershed Task Force for the 2003 watershed plan
- Jack Imhof, National Biologist, Director of Conservation Ecology, Trout Unlimited Canada
- Dr. Luis Leon, Research Scientist, Science and Technology Branch-Integrated Modelling Section, Environment and Climate Change Canada
- Chris Robinson, Atlantic Salmon Restoration Program Coordinator, Ontario Federation of Anglers and Hunters
- Dr. Amanjot Singh, Ph.D., P.Eng., Water Quality Engineer, CVC

Peer Reviewers contacted by phone or email who could not attend the meeting:

- John Nemeth, Ajax resident, member of former Carruthers Watershed Task Force for the 2003 watershed plan sent regrets and offered to follow-up if his input was required.
- Frank Kenny, Project Manager, Ontario Ministry of Natural Resources (OMNRF), Peterborough Office: A civil engineer at OMNRF who has worked with TRCA and other southern Ontario Conservation Authorities throughout his 30 year career at MNRF. Frank is recognized expert in drought management, flood management, GIS, groundwater and water resources mapping, real time monitoring and geoscience database designs. Frank was asked to review the groundwater studies we are undertaking, and for his advice on evolving GIS systems for water resources management.

Frank and his key staff were both unable to attend the peer review due to prior OMNRF program commitments. In a follow-up phone call, Frank observed that TRCA and the York-Peel-Durham-Toronto Groundwater study (YPDT), are recognised leaders in watershed water resources and he was confident in the approach that was identified for Phase 1. Frank provided us with some examples of leading edge approaches to mapping and information sharing.

- Dr. Mohamed Mohamed, Surface Water Scientist, Environmental Monitoring and Reporting Branch, Ontario Ministry of Environment and Climate Change (MOECC): Dr. Mohamed's expertise is in Nutrient Management. Through MOECC, he is leading a multi-agency agricultural watershed study to understand linkages between the land and the Great Lakes. Mohamed is very familiar with our work in the adjacent Duffins and Rouge watersheds, and as a result had no specific concerns. Further, he has graciously offered his services in subsequent phases of the study, such as when TRCA reports on the water quality conditions in Carruthers watershed. Mohamed would have considered including the Carruthers as one of the research watersheds, however there was too little active agriculture left in the watershed to meet the criteria for a rural watershed.

- Dr. Doug Dodge, Ajax resident, member of former Carruthers Watershed Task Force for the 2003 watershed plan, former OMNRF aquatic expert who pioneered stream and lake assessment monitoring protocols: Doug is a long-time, well-known and respected resident of Ajax. He retired from the MNR in the late 1990s, a world-recognized aquatic expert who pioneered stream and lake assessment monitoring protocols. Doug has volunteered his time to support TRCA watershed and aquatic studies for over 15 years and contributed to the aquatic resources management plan for the Duffins and Carruthers watersheds. Doug was unable to participate in the peer review due to a scheduling conflict. After the peer review session, he was able to tour the watershed with TRCA staff and discuss the Phase 1 work. He expressed confidence in our methodology and offered to help in the future, reviewing the technical write-ups and management recommendations. His immediate recommendation was to investigate stormwater management ponds to determine whether invasive aquatic biota were living in the ponds, and their ecological watershed connections.

Summary of Action items

Action	Who?
Determine how to have TRCA background data serve as a baseline survey of terrestrial and aquatic habitat in the watershed, to measure gains or losses under the GLWQA.	Angela
Determine whether to document game fish (Pacific salmon and Rainbow Trout) and active fisheries (where possible) for this watershed plan, to maximise opportunities and protection under the [federal] *Fisheries Act*	Angela
Ensure that TRCA and CLOCA share ELC (and other) data as discussed	Sue
Follow up with terrestrial ecologist	Sue
Inquire about Highway 407 study with internal road ecology working group	Maryam
Ensure recommendations from this plan are incorporated into other TRCA documents, and the documents of partners, as opportunities arise.	ALL

Question	TRCA response
Hydrogeology – Presented by Gary Bowen	
H Brooks: Has TRCA reviewed the ecologically significant groundwater areas?	Gary: Carruthers watershed doesn't have the sands and gravels of the Oak Ridges Moraine, recharge happens on Class 1 and Class 2 agricultural lands, over a relatively large area. The areas where recharge occurs will be identified, and rates determined.
Aquatics and Surface Water – Presented by Angela Wallace	
J Imhof: Was any of the wet weather sampling done in winter? Work by University Guelph has indicated massive phosphorous loadings in winter from bare fields, more than summer.	Angela, Gary: Sampling was completed in summer. There will also be future winter sampling for tributaries to the Great Lakes in 2018, the International Year of Study for Lake Ontario. Winter water samples were collected for source water studies in 2007 to 2009 and nutrient loads were estimated.
A Singh: Are you developing targets for instream and Lake Ontario loadings?	Gary: Yes, TRCA defines conditions and considers how they will be affected by climate change and land use change. Also, we want to establish current phosphorous loadings and set targets for future reductions.
H Brooks: Is the water quality sampling all chemical, or do you do any *E. coli* sampling?	Angela: TRCA sampling follows the PWQMN (Provincial Water Quality Monitoring Network guidelines). *E. coli* sampling is one of the parameters, others parameters include nutrients, metals, conductivity (a measure of urbanisation), road salt (chlorides in particular).
A Singh: Do most of the tile drains flow in the summer? Is it possible to take water quality samples directly from the tile drains?	Angela: Some of them do. Most tile drains are on private land, TRCA requires landowner permission to access. Sampling tile drains was not included in the budget. Wet weather flow samples will suffice for modelling, but if possible, at least one tile drain sample will be taken, pending landowner permission and budget.
A Singh: Does TRCA intend to develop a water quality model based on the sampling data? Will you deploy a hydrolab to measure increased turbidity, temperature, bacteria levels, which are good parameters for calibrating models and predicting, moving forward?	Gary, Angela: TRCA uses a SWAT (Soil and Water Assessment Tool) model set up by Dr. Luis Leon. The AGNPS (Agricultural Non-Point Source pollution) model was used for the 2003 watershed plan. TRCA does not have a hydrolab instrument for this project, we considered purchasing one, however the budget didn't allow it.
H Brooks: Are the 3 benthic sampling sites [in the TRCA Regional Watershed Monitoring Network] coordinated with water quality sites, are they localised?	Angela: They are co-located [referred to map in presentation]

Question	TRCA response
J Imhof: Are you using other benthic metrics like EPT, etc? [EPT is an index of water quality based on the abundance of three pollution-sensitive orders of macroinvertebrates relative to the abundance of a hardy species of macroinvertebrate. It is calculated as the sum of the number of *Ephemeroptera*, *Plecoptera*, and *Trichoptera* divided by the total number of midges (*Diptera*: *Chironomid*)]	Angela: Yes. A TRCA taxonomist identifies the samples to the level of genus/species, so all common benthic invertebrate metrics will be possible.
C Robinson: Are there any impassable barriers [in Carruthers Creek]?	Angela: The instream barrier survey will be done in summer 2016.
J Imhof: Have you checked "Fishworks" for all the potential barriers? They have developed algorithms and hydrologic models to determine barriers.	Angela: TRCA plans to do this in 2016 as part of the barrier survey. We are aware of Fishworks, it mainly tracks major barriers.
C Robinson: Will TRCA or Durham Region consider higher level policy, such as the federal GLWQA (Great Lakes Water Quality Agreement), in the watershed plan? Under the GLWQA, a baseline habitat survey for the Great Lakes will be completed to make high level recommendations on tools and approaches for net habitat gain. This survey will only include open waters, shorelines, and coastal wetlands, up to river mouths. Tributaries, inland lakes/ponds, and upland terrestrial habitat is excluded, mainly due to the high level (primarily remote sensing) approach recommended and the practicality of what can be done across jurisdictions. With only the lakes being surveyed, funding will be directed to habitat work related to measurable gains on the lakes (even though CAs survey inland areas). TRCA should explicitly state that their background data forms a baseline survey of terrestrial and aquatic habitat in the watershed, and can be used to measure gains or losses--ideally the gains called for under the GLWQA--to position the watershed for funding opportunities, despite being outside the "official" baseline habitat survey for the Great Lakes.	Gary: TRCA will consider the GLWQA, and other policy such as, but not limited to, the provincial *Great Lakes Protection Act* and the federal *Nearshore Framework.* TRCA regularly works with Great Lakes partners and intends to continue emphasising linkages between the watershed and Great Lakes. **ACTION Angela: follow-up on the technical specifics in future phases of the study.**

Question	TRCA response
C Robinson: TRCA should ensure that game fish (Pacific salmon and Rainbow Trout) and active fisheries (where possible) are documented for this watershed plan, to maximise opportunities and protection under the [federal] *Fisheries Act,* which recognises fish habitat only as related to fisheries. Documenting the wild production these game fish will also tie the watershed plan to Lake Ontario Fish Community Objectives and the Province's stocking plan, which recognizes the contribution of wild fish to those fisheries. The Duffins Creek to Barnumhouse Creek stretch of rivers [which includes Carruthers Creek] is probably contributing the bulk of wild Pacifics to Lake Ontario.	Gary: good points, worth looking into. There are also opportunities for community engagement through recreational fishing activities, although salmonid population may be limited in Carruthers Creek. **ACTION Angela: follow-up on the technical specifics in future phases of the study.**
Water Resources Engineering – Presented by Amy Winterhalt	
J Imhof: Will you survey the original pins [from the previous geomorphic study]?	Amy: Yes. TRCA's intention with the 2009 work was to find the original pins, however in some cases it wasn't possible. We will try again in 2016, we cannot verify that until staff are out in the field.
H Brooks: The vast majority of the new points for geomorphic study were focused on the urbanising and future urban area (north of Taunton), why are there no sites located within the older urbanized area?	Amy: TRCA has a site close to Kingston Road, which was the farthest downstream site selected by the consultant in 2000 to be representative of the lower reach of Carruthers Creek. Our proposed work plan focuses on going back to the 10 sites where we have existing monitoring data, including this site. However, our work plan for 2016 includes a fluvial geomorphologist review of the previous work and a gap analysis. As part of the gap analysis, we can ask if the original 10 sites are still appropriate for our baseline characterisations.
Terrestrial – Presented by Sue Hayes	
N Burnett: Does TRCA have any rights to access private lands for inventory?	Gary: No, we rely solely on willing land owners. There are ma***n***y challenges. Sometimes tenants do not forward our request to the landlord, or landowners themselves do not take the time to respond to us. Fortunately, We have an adequate number of sites to work with for the purposes of this study.

Question	TRCA response
H Brooks: Where TRCA cannot access land for field work, do you conduct a desktop ELC (Ecological Land Classification) exercise [using GIS]? In either case, do you look 500 m to 1 km beyond the watershed boundaries, for connections?	Sue, Gary: TRCA will be close to having detailed ELC data for 80% of the watershed by the end of the 2016 field season. We will be in a good position to characterise the watershed from our actual field inventories. We don't confine ourselves to the watershed boundary. If species are able to move and not confined to one patch of habitat, the genetics of the metapopulations are more sustainable in the long-term. We should share data with CLOCA data along the edge, we will make our work available for Lynde Creek. There was follow-up discussion re TRCA conducting inventory work in nearby Audley Woods, a CLOCA property in neighbouring Lynde Creek watershed. Sue's team determined that surveying Audley Woods would not substantially benefit the terrestrial inventory for this watershed plan. However, there is interest in sharing existing ELC data. **ACTION Sue: ensure that TRCA and CLOCA share data**
H Brooks: In the terrestrial work, are you looking at trying to identify core habitat areas?	Sue: Not at this time. It was suggested that TRCA follow-up with a local private consultant working in the watershed for further feedback on our methodology. **ACTION: Sue to follow up with terrestrial ecologist**
J Imhof: TRCA should look at longitudinal connectivity and lateral connections. If groundwater discharge characteristics are also considered, the integration between the aquatic connectivity and the terrestrial, and the nutrient loadings and transport of materials builds a better picture of the watershed.	Gary: Valid observation. TRCA's intent is for modelling efforts to explore the interrelationships between hydrology, hydrogeology, terrestrial ecology, water quality, etc. and the knowledge base of staff conducting the surveys be described for 2016 and 2016 will be considered in determining linkages / connections.
Maryam: Should we integrate TRCA's internal road ecology work into our terrestrial work for the watershed plan, since the 407 is a major barrier?	Sue: TRCA's Research and Development group are working to validate their connectivity model. Actual inventory work, i.e., road mortality surveys, would be done by the ecology group. **ACTION Maryam: coordinate with TRCA R+D group**

Question	TRCA response
Other comments and questions	
N Burnett: What do you expect of the community engagement? H Brooks: It's very important to get the message across to all the stakeholders that this watershed plan is developed with the best information TRCA has at the time, however more detailed study and work on a site-specific basis, such as when a development application comes in, will be needed because change is constantly happening on the ground.	Gary: This peer review is one part of the community engagement, as is consultation with the municipalities of Ajax and Pickering. Maryam: We will not be ready to go to the public with results until 2017, after the 2016 technical work has been wrapped up. We have a draft plan for community engagement which involves social media, public open houses and events, speaking engagements to community groups, and media outreach.
A Singh: Will the management scenarios include climate change scenarios?	Gary: Yes, the variables will include land use as well as other forces, such as climate, which drive the models.
J Imhof: Who will do the synthesis after the characterisation? This will help to create the conceptual model for linkages and inform the next step--to model development for the scenarios. It also helps the public outreach, the model can help to explain to people how things work and to understand the implications of different changes on different aspects of the environment, on flows, flood forecasting, terrestrial ecology, biodiversity. It's a tool as much for professionals as it is for outreach.	Gary: Good points and are all key components of our work planned for 2017 to 2018. There will be opportunity to discuss in more detail at future phases of the study.
Amy: We should ensure our recommendations from this plan are rolled into other TRCA documents, and the documents of partners like CVC, for low impact development.	All agreed. **ACTION all staff: follow up with partners and others during and after the watershed plan, as opportunities arise.**