

# For 3456 / 3457 – Lab Session #5 – GIS Mapping for St. Stephen

With Focus On Billy Weston Brook Watershed - February 8<sup>th</sup> & 10<sup>th</sup>, 2017

Looking at the effects of climate change, seasonal flooding on residential construction, forestry activities, road networks and drainage infrastructure



**What you're going to be looking at in this GIS exercise...**

**An absolute MULTITUDE of mapping items!**

- Focusing on Billy Weston Brook (BWBW) watershed, and its hydrological flow network
- Calculating areas / perimeters for mapped surface sinks, waterbodies, and mapped / unmapped stream channels.
- Delineating and quantifying the areas / zones of potential residential / commercial flooding, and suggesting ways that this could be mitigated.
- Relating upstream anthropogenic activities to downstream impacts
- Determine constriction points and key areas where drainage infrastructure failure would lead to serious road network / transportation breakdown.
- Delineate and calculate the approximate total area of wetlands (by type) within BWB watershed, and discussing impacts on future water retention.



## Questions to answer and incorporate into your GIS report:

1. Describe BWBW in terms of total drainage area, wetland area (by class), general landuse, % road coverage, residential vs. agriculture vs. forestry use...etc.)
2. How many stream / brook crossings (mapped vs. unmapped culvert crossings) are there in BWBW, in relation to the current and future road networks? Provide an assessment of potential flooding / washout risk in relation to currently installed culverts.
3. Determine the upland : lowland ratio for BWBW.
4. Identify the mapped surface sink locations, calculate storage volume, and describe their importance for continued monitoring within BWBW.
5. Discuss any major issues / concerns you would have as a land manager in relation to the proposed (future) development of forestry and residential development activities with BWBW.
6. Focusing on the proposed forestry and residential development areas, should there be design / layout changes? Choose any two proposed areas and discuss what the future watershed impacts would / could be if development continues without revision.
7. In terms of land trafficability, what % of the forested portion of BWBW would be considered "non-operable" following a prolonged / extreme rainfall event?
8. Within the proposed forest management harvest areas, and using your "machine specs" and "cone index" data layer, describe / quantify / map out the potential "rutting risk" at both 4ha DT, and 1ha DT.
9. Describe the importance and role of designated wetlands in terms of water storage capacity, and their function as a resevoir inflow / outflow of surface / groundwater. What is the difference between "provincially significant wetlands" and non-designated wetlands?
10. Compare the current provincially mapped streams data layer to the wet-areas derived 4ha hydro flow network. Discuss differences between the two data layers, and which one you would trust "on the ground" and why. Provide examples with detailed, in-depth explanation.