MWS Capstone Project Plan

Project Duration:	May-August 2019
Student:	Haley Brauner
External Partner and Organization:	Bruce Davison, Environment and Climate Change Canada (ECCC)
Faculty Advisor:	Andrew Ireson, School of Environment and Sustainability (SENS)
Work Placement Coordinator:	Palash Sanyal, SENS
Project Title:	Representation of spatial heterogeneity in the land-surface hydrologic model, MESH

General Project Plan

Purpose: Representation of spatial heterogeneity in hydrological land surface schemes.

General Task Flow:

- Literature review (theory and modelling skills/methodology)
- Run MESH and quickly plot the results
    - Pre- and post-processing using MESHr
- Reproduce Herbert's work in the Whitegull Creek watershed (for training)
- Use the same methodology as Herbert's work in the Baker Creek watershed and compare the conclusions of model performance
- Take the work further
    - Use a different Land Surface Scheme (SVS or 2.6.2 instead of CLASS
    - Use a different calibration algorithm (other than DSS)
    - Increase the number of runs
    - Set up the basin at a variety of spatial resolutions

Other:

- Data gathering, preparation, and QA/QC is likely to be a very large task
- Potentially involve Saman at some point
    - Ask him about DDS suspect results from Herbert's work
    - Ask for guidance
- Keep a folder with all model inputs, code, and results

Deliverables

Deliverable	Details	Draft due date (Haley)	Reviewer(s)	Reviewer due date	Final due date
Project Report	- Must use word template provided	August 9 (Fri)		August 16 (Fri)	August 23
Presentation	- 10 minutes				Capstone event, Aug. 23

Timeline

Week	Dates	General Task
1	May 6-10	Literature Review / MESH learning
2	May 13-17	Literature Review
3	May 21-24	Initial Model Setup, Run 1 scenario of Herbert's
4	May 27-31	Initial Model Setup
5	Jun 3-7	Repeat Whitegull Modeling on Baker Creek
6	Jun 10-14	Repeat Whitegull Modeling on Baker Creek
7	Jun 17-21	Repeat Whitegull Modeling on Baker Creek
8	Jun 24-28	Repeat Whitegull Modeling on Baker Creek
9	Jul 2-5	Take the work further
10	Jul 8-12	Take the work further
11	Jul 15-19	Take the work further
12	Jul 22-26	Take the work further
13	Jul 29-Aug 2	Prepare Deliverables
14	Aug 5-9	Prepare Deliverables
15	Aug 12-16	Prepare Deliverables
Capstone Week	Aug 19-23	Aug 20 or later for the presentation

Deviations from the Plan

- Data preparation took considerably longer than expected due to the number and nature of data sources, QA/QC work, and use of R for processing
- Errors running Scenario 2 delayed modelling by about a week
- PLATO being down for maintenance delayed starting Scenario 1-P and 2P by about 4 days
- Learning R and using it for all driving data processing, model post-processing, and graph creation took considerably longer than using Excel. However, the skills will be useful in the future and the end product is more transferrable and transparent.
- Model results were discussed with project partner and feedback incorporated, but the draft report was not reviewed.