

GWF core-funded research associate positions:

YK-based:

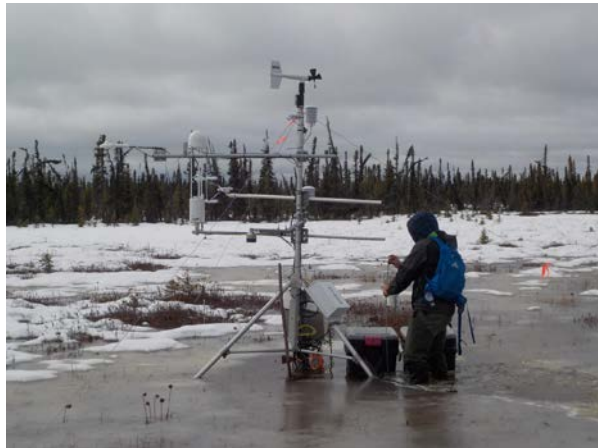
- Hydrometeorology - Ryan Connon, Ph.D. (Faculty Lead: Michael English)
- Water Quality - Jenny Hickman, M.Sc. (Faculty Lead: Jason Venkiteswaran)

Waterloo-based:

- Permafrost - Ashley Rudy, Ph.D. (Faculty Lead: Phil Marsh)
- Ecosystem resilience - Ana Sniderhan, Ph.D. (Faculty Lead: Jenn Baltzer)
- Biomonitoring - Heather Dixon, Ph.D. (Faculty Lead: Deb MacLatchy)



Hydrometeorology – Ryan Connon



Hydrometeorology: instrumentation set-up and infrastructure installation, data collection and logistics coordination



GWF Pillar 1-3 projects supported:

- Subarctic Metal Mobility Study (SAMMS) – GWF Pillar X
- NWT highway and runway ground freezing systems project (NWF)
- Arctic and Boreal Vulnerability Experiment (ABoVE) ground trothing and data analysis (NWF O1)
- Working with First Nation groups to examine implications of permafrost thaw
- Operating funds sourced from: WLU, NWT Geological Survey, GNWT ENR, LKFN

Data

- Site instrumentation (logger downloads, thaw depth and soil moisture measurements, UAV flights)
- Soil manipulation (*i.e.* wetting/drying/snow disturbance) studies on freezing and thawing of peatlands
- Creating NWT hydrological overview and update reports; hydrological and ground thermal data from field sites

Activities

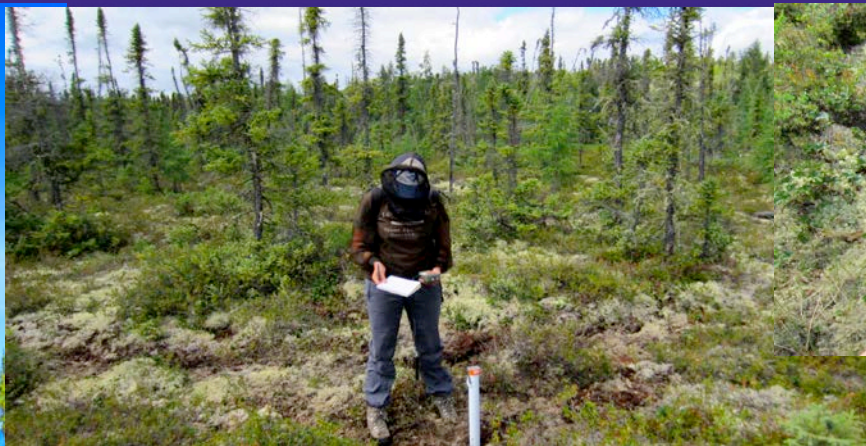
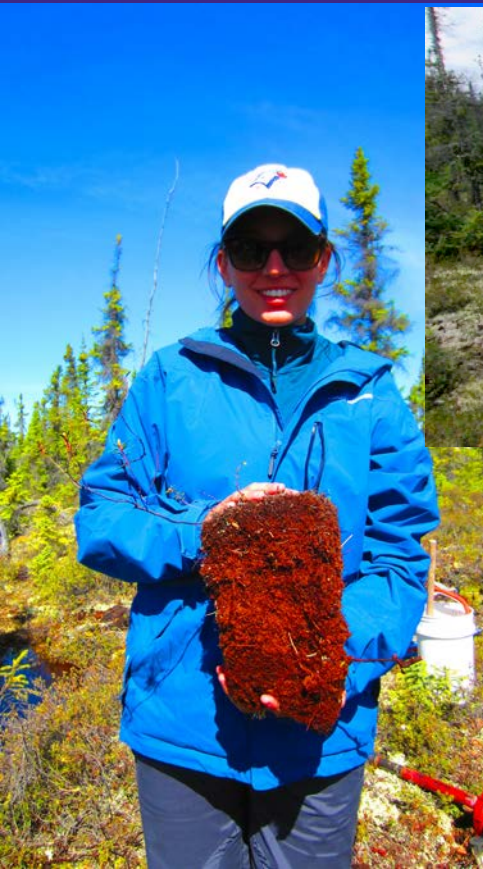
- Role: Project planning, instrumentation, data acquisition and analysis, writing manuscripts
- Data downloads, field measurements (frost table, soil moisture, wetland mapping, meteorological station, water level recorders, ground temperature and moisture sensors) and site reconnaissance
- Assisting graduate students with study design and implementation;
- Provide support for high school courses offered in NWT by WLU faculty

Major research sites and facilities:

- Scotty Creek Research Station, Suhm Creek (northeast British Columbia), Canol Trail (Mile 222), Inuvik-Tuk Highway (ITH), Highway 3 (Yellowknife to Fort Providence)



Water Quality – Jenny Hickman



Water Quality: hydrological surveys, mass balance calculations, snowpack assessment, logistical support and research planning



GWF Pillar 1-3 projects supported:

- NWF - Snare River watershed hydrological mass balance (NWF O1 and O3)
- Subarctic Metal Mobility Study (SAMMS) – GWF Pillar 1,
- Operating funds sourced from: GNWT ENR, Infrastructure, NWT Power Corporation

Data

- Water quality data, flow, snow surveys, modelling, compiling and integrating existing water quality datasets

Activities

- Assist with ongoing studies at research sites, snow surveys, model ground-truthing, NWT hydrological overview and update reports; snow surveys to contribute to GlobSnow ground-truthing dataset for ongoing caribou-snow project and for improving estimates of snowpack in the GWF supported Snare River watershed project
- Assist with community-based initiatives
- Provide support for high school and university courses offered in NWT by WLU faculty

Major research sites and facilities:

- Snare River watershed, Airport and Pontoon field sites, Yellowknife, Wekweeti



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Permafrost – Ashley Rudy



Transect of active layer temperature thermistors installed in thermokarst depression at Trail Valley Creek



ERT Field course in Texas



Field crew at Trail Valley Creek

Permafrost: understand permafrost landscape sensitivity by examining link between permafrost changes, climate, infrastructure and resource development



GWF Pillar 1-3 projects supported:

- GWF Pillar 3 project Northern Water Futures (NWF)
 - Objective 1, N1, expand capacity for research and monitoring in the NWT; Objective 3, N9, implement baseline monitoring; Objective 3, N11, improve regional mapping of thermokarst hot spots
- Operating funds sourced through: WLU, GNWT, Polar Continental Shelf Logistics

Data

- electrical resistivity tomography profiles (Role: acquisition, processing, management), active layer temperature profiles (Role: acquisition, processing, management), spatial analysis of DInSAR displacement maps (Role: analysis)

Activities

- Field measurements: hydrological and active layer monitoring, installation and analysis of temperature thermistors to examine the influence of deep snow accumulation in a shrub patch on active layer thaw and permafrost temperature
- Collect/assist/process with Electrical Resistivity Tomography (ERT) profiles
- Evaluate DInSAR displacement maps using geomorphological mapping and field data.

Major research sites and facilities:

- Trail Valley Creek Research Station, Scotty Creek Research Station, Inuvik-Tuktoyaktuk Highway

Ecosystem resilience - Ana Sniderhan



Ecosystem resilience - Investigate ecological change and ecosystem resilience, primarily using paleoecological data



GWF Pillar 1-3 projects supported:

- NWF: changes in ecosystems; SAMMS: metal records in tree-ring series; GWC: through work with Tłıchǫ Marian Watershed Stewardship Program (MWSP)
- Operating funds: NWF, GNWT, NSERC

Data

- Forestry Permanent Sample Plot data (management), tree-ring/paleoecological records (acquisition & management)

Activities

- Successful on-the-land event with Tłıchǫ MWSP (Sept 2017)
- Larch sawfly outbreak meta analysis: investigating outbreak patterns, spatially, temporally, and with respect to climate (ongoing)
- Completion of manuscripts associated assessing black spruce response to climate change
- Support of field work focused on ecological impacts of tundra shrubbing
- Continued support of ecology projects, through technical training, organization, and field assistance

Major research sites and facilities:

- Trail Valley Creek, Scotty Creek, Marian Watershed, Sahtu region



Biomonitoring - Heather Dixon



Biomonitoring – examining ecosystem health and fisheries sustainability in response to environmental changes and resource development



Purpose: GWF Pillars 1-3 projects supported:

- GWF Pillar 3 project Northern Water Futures (NWF)
 - Objective 2, Need 6: Understanding the sustainability of fisheries; Objective 3, Need 9: Baseline monitoring for environmentally sustainable non-renewable resource extraction; Objective 3, Need 10: Assess the viability of the biofuel industry in rapidly changing permafrost environments
- Operating funds: GWF, NCP, Wilfrid Laurier University, NWT CIMP, NSERC, University of Waterloo

Data

- Fish morphometrics data (role: management, analysis), acoustic telemetry data, fish contaminants data (role: acquisition and analysis)

Activities

- Acoustic telemetry to assess fish habitat use: receiver deployment and tag insertion surgery
- Sampling lakes for fish morphometric data, stable isotope samples for food web analysis, mercury samples from fish tissue/water/sediment
- Benthos and zooplankton sampling for community composition for baseline monitoring
- Curating and analyzing previously collected fish morphometrics

Major research sites and facilities:

- DehCho lakes (primarily Kakisa and Tathlina), Norman Wells, Inuvik



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Milestones

We are also looking to utilize the RAs to

1. Conduct cross-site studies to develop comparative data for permafrost and ecosystem resilience
2. Characterize regional hydrological resilience
3. Support the completion of the establishment and deployment of CANet infrastructure
4. Enhance user engagement in the NWT, including training courses
5. Synthesis of community-based aquatic ecosystem monitoring data

