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| VIU acronym_and text | | **Advanced Diploma in GIS Applications**  **Practicum Opportunity Summary** | | |
| Project | Title: | MoF/WLRS Stream and Lake Basin Geospatial Technician | | |
| Organisation: | Ministry of Forests (MOF)/Ministry of Water, Land and Resource Stewardship (WLRS) | | |
| Location: | Nanaimo | | |
| Sponsor | Name: |  | Title: | Fish Research Biologist  Geospatial Services Coordinator |
| Email: |  | Phone: |  |
| Project Overview | The results of this project will become aspects of the following two separate but related Ministry of Forests/Water, Land and Resource Stewardship research projects:   1. Forestry/climate change impacts to headwater streams and downstream reaches.   Headwater streams are expected to experience shifts in water temperature and discharge, changes to productivity and disruptions to nutrient exchange between riparian and aquatic ecosystems as a result of climate change. Although studies have predicted how climate change might affect aquatic and riparian habitats, the consequences of climate change on harvested systems are rarely addressed. This project investigates how the effects of forest harvest affect headwater stream habitat and if different management strategies can be used to mitigate the cumulative effects of forestry and projected climate-induced changes. The technician will:   * use lidar to identify and map the depression/flood zones between logged and unlogged headwater streams and downstream reaches and adjacent riparian zones. * transform raw stream habitat data into an accessible form then upload those files to a web mapping application with an interactive orthophoto map.  1. An examination of small lakes and riparian forests in the South Coast of BC.   Lakes are intimately connected to their adjacent forests with the ecological integrity of each depending on the underlying processes and functions that the other provides. We randomly selected 25% of lakes 5-1000 ha in size in the Vancouver Island/Haida Gwaii area and ran a GIS tool constructed during a previous VIU practicum project to extract fish species present, number of streams, forest age and tree height, basin slope, area of forest harvest and road area within 10, 30, 50 and 100 m of the lake shore. The technician will:   * develop a digital elevation model to identify depression/flood zones to hydrologically define lake shore and inlet stream and wetland riparian zones within a randomly selected number of lake basins analyzed during the previous VIU practicum. * develop a map that compares the hydrologically defined riparian zones with legislated buffer zones (e.g. 0 on headwater streams, 10 m on lakes and wetlands). | | | |
| Task Summary  (Types of work involved) | Project 1 – Forestry/climate   1. Create a workflow and timeline. 2. Generate digital elevation models (DEM) of the study areas from Lidar data to be provided using Abood (referenced below) as a guide for methodology and required outputs. 3. Map depression/flood zones between headwater and downstream reaches and riparian areas. 4. Transform raw stream and riparian habitat data currently summarized in Excel into readable tables summarizing habitat assessments at each headwater and downstream site and link these to each point in a spatial layer 5. Create a web mapping application of the study areas containing orthophoto images and stream and riparian habitat data displaying the analytical results.   Project 2 – Lake and riparian forests   1. Create a workflow and timeline. 2. Generate digital elevation models (DEM) of the study areas from Lidar data to be provided using Abood (referenced below) as a guide for methodology and required outputs. 3. Delineate hydrological riparian buffer zones for lakes, lake/wetland edges, inlet streams and wetlands for a sample of lake watersheds in the Vancouver Island & Haida Gwaii area. 4. Create a map suitable for publication that contrasts hydrological riparian zones created in #3 vs. legislated riparian buffers for lakes and lake/wetland edges, inlet streams and wetlands in the watershed and inlet streams. 5. Create a web mapping application of the study areas containing orthophoto images and stream and riparian habitat data displaying the analytical results. | | | |
| Additional Information  (Appealing Aspects) | Reference Material:  Abood, S. A., A. L. Maclean, and L. A. Mason. 2012. Modeling Riparian Zones Utilizing DEMS and Flood Height Data. Photogrammetric Engineering & Remote Sensing 78(3):259–269. <https://1drv.ms/b/s!ArhHBQUNGZ_ZgT8YgbSebE0VA6A6?e=xd90z9>  Dindaroğlu, T., M. Reis, A. E. Akay, and F. Tonguç. 2015. Hydroecological approach for determining the width of riparian buffer zones for providing soil conservation and water quality. International Journal of Environmental Science and Technology 12(1):275–284 <https://1drv.ms/b/s!ArhHBQUNGZ_ZgT7NuOJtV9fU_-Jt?e=s5jwb4> | | | |
| Funding | None  Minor (< $3,000)  Major (>$3,000) | | | |
| Workplace | Off-site  Full-Time On-Site  Other/Mixture  Description (if Other): A site will be provided at the WLRS office, however, the student may also work at home or at VIU at times if they wish. | | | |
| Student Selection | Faculty Selection (Student with highest grades selected from among those interested)  Shared Selection (Faculty and Sponsor make selection based on discussion of interested students)  Sponsor Competition (Sponsor interviews, in-person or via telephone, and selects from interested students) | | | |

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