QuickNotes
Science summaries from fRI Research

Candidate Sites Identified for a CABIN Reference Model—Including 13 in Hinton Wood Products' FMA

Erin Humeny

While water quality monitoring is not an operational requirement for Hinton Wood Products, the FMA holder is responsible for protecting the aquatic environment. Biomonitoring could help West Fraser assess whether current practices are effectively supporting water quality objectives. The Canadian Aquatic Biomonitoring Network's (CABIN) biomonitoring protocols and tools, which are currently focused on benthic macroinvertebrates, are gaining popularity among government and community-based watershed stewardship groups in Alberta.

The CABIN program offers standardized sampling procedures, training, data management, and analytical tools that are being used to help watershed managers assess watershed condition and cumulative effects, and to inform decision-making. CABIN's flagship analytical and data interpretation tools are based on the reference condition approach whereby users assess impacts at their test (or monitoring) site(s) by comparing the benthic macroinvertebrate community to those of several sites that:

1. are located in minimally disturbed (ideally) or in the least-disturbed watersheds in the region, and
2. have similar watershed and reach characteristics (e.g., land cover, climate, topography, streamflow, channel slope) to the test site(s).

To support reference model development in the Eastern Slopes and foothills region of Alberta, we completed an important initial step by identifying candidate reference sites.

Methods

We identified candidate reference watersheds using a combination of spatial analyses and statistical techniques. First, we delineated watersheds in the study region using GIS tools and reduced the dataset to 9,247 complete watersheds (identified by a change in stream order) at least 5 km^2 in size. We then quantified the natural features (e.g., bedrock types, land cover, mean elevation) for each watershed and applied principal component analysis and cluster analysis to group watersheds with similar characteristics. Finally, we quantified human activity (e.g., oil and gas, transportation, forest harvest, agriculture, etc.) across the watersheds and identified watersheds with no disturbance (based on the available data), and the least disturbed watersheds.

We dropped from further analysis watersheds that were affected by recent or intense wildfires, watersheds in which we identified potential point sources (e.g., coal mines, mills, high-density livestock operations, urban areas) within 10–20 km of the pour point, and watersheds with major dams. To facilitate field reconnaissance and site selection, we created a subset of candidate reference watersheds—stratified by stream order and distributed as much as possible across the five major basins in the study area—based on the proximity of the pour points (proposed sample locations) to roads for ease of access.

Results

We identified a total of 2,709 candidate reference watersheds, ranging in size from 5 to 1,346 km^2, across two natural groupings. Five hundred and nine (509) of these intersected Forest Management Agreement Areas (FMAs), and 103 intersected Hinton Wood Products' FMA. Of the 127 watersheds selected for field reconnaissance and confirmation as reference sites (Figure 1), 40 of the pour points were located in an FMA, and 13 were located within Hinton Wood Products' FMA (inset).

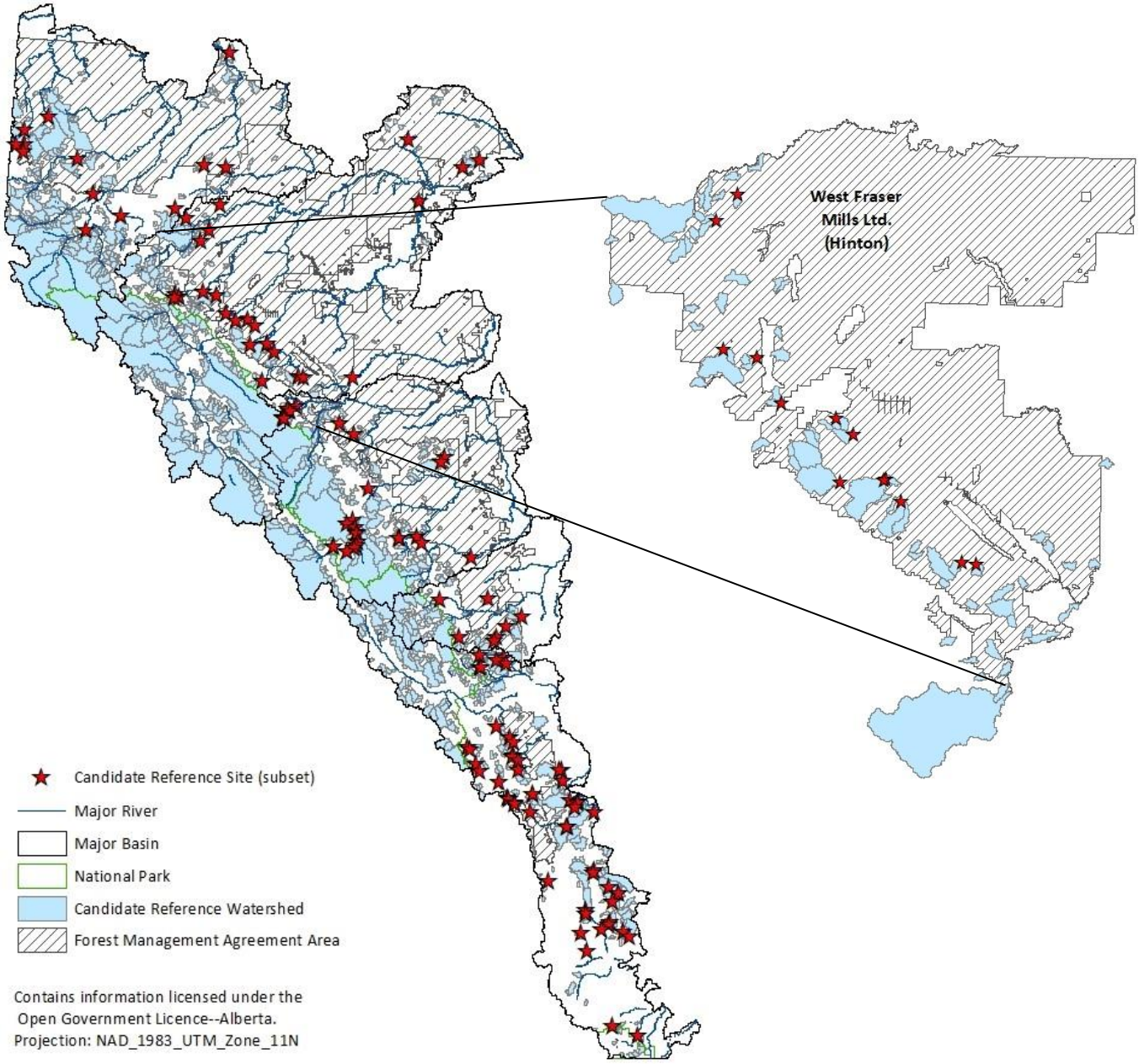

Figure 1. Subset of candidate reference watersheds and pour points (sampling locations).

For more information on CABIN, the reference condition approach, and how these tools can be used to answer questions and inform watershed management, visit resources from the Water and Fish Program's Introduction to the Canadian Aquatic Biomonitoring Network workshop (https://friresearch.ca/resource/introduction-canadian-aquatic-biomonitoring-network).

For more information on this or other Water and Fish Program publications, please contact: Erin Humeny.

Tel.: (403) 305 – 7025, Email: ehumeny@friresearch.ca or visit friresearch.ca/program/water-program