EXECUTIVE SUMMARY

A forest health assessment was performed in stands dominated by bur oak and trembling aspen to study the potential effects of airborne emissions from the Manitoba Hydro Selkirk Generating Station. Forty-two stands were sampled within a 16-km radius of the station for both leaf symptoms and trace element toxicology, and a subset of these were sampled using tree-ring methods. The concentrations of trace elements in the leaf litter were not spatially congruent with suspended particulate matter deposition models, nor were they at phytotoxic levels, but were related to soil parameters including organic matter and texture. No patterns were found in forest health along directional or distance gradients from the generating station. Trembling aspen stands demonstrated little decline in general, but three of the 19 bur oak plots, all located on thin sandy soils developed on calcareous till, demonstrated branch dieback. In addition to poor soil conditions, two of these sites (just north of Birds Hill Park) also had high water tables resulting from the construction of an adjacent road, and exhibited tree mortality. One of these declining bur oak sites (Birds Hill Park) was examined with tree-ring techniques, and displayed marked radial growth decline following 1977, the year the road was built. None of the other bur oak or trembling aspen stands showed distinct radial decline, and displayed similar radial growth patterns regardless of distance from or direction relative to the generating station. The radial growth of both species was significantly affected by climatic factors, including mean monthly temperature and total monthly precipitation. The bur oak decline was not found to be related to airborne emissions from the station, but is likely a result of poor soil status, with urban development (building of a road perpendicular to the direction of drainage) as an additional causal factor.