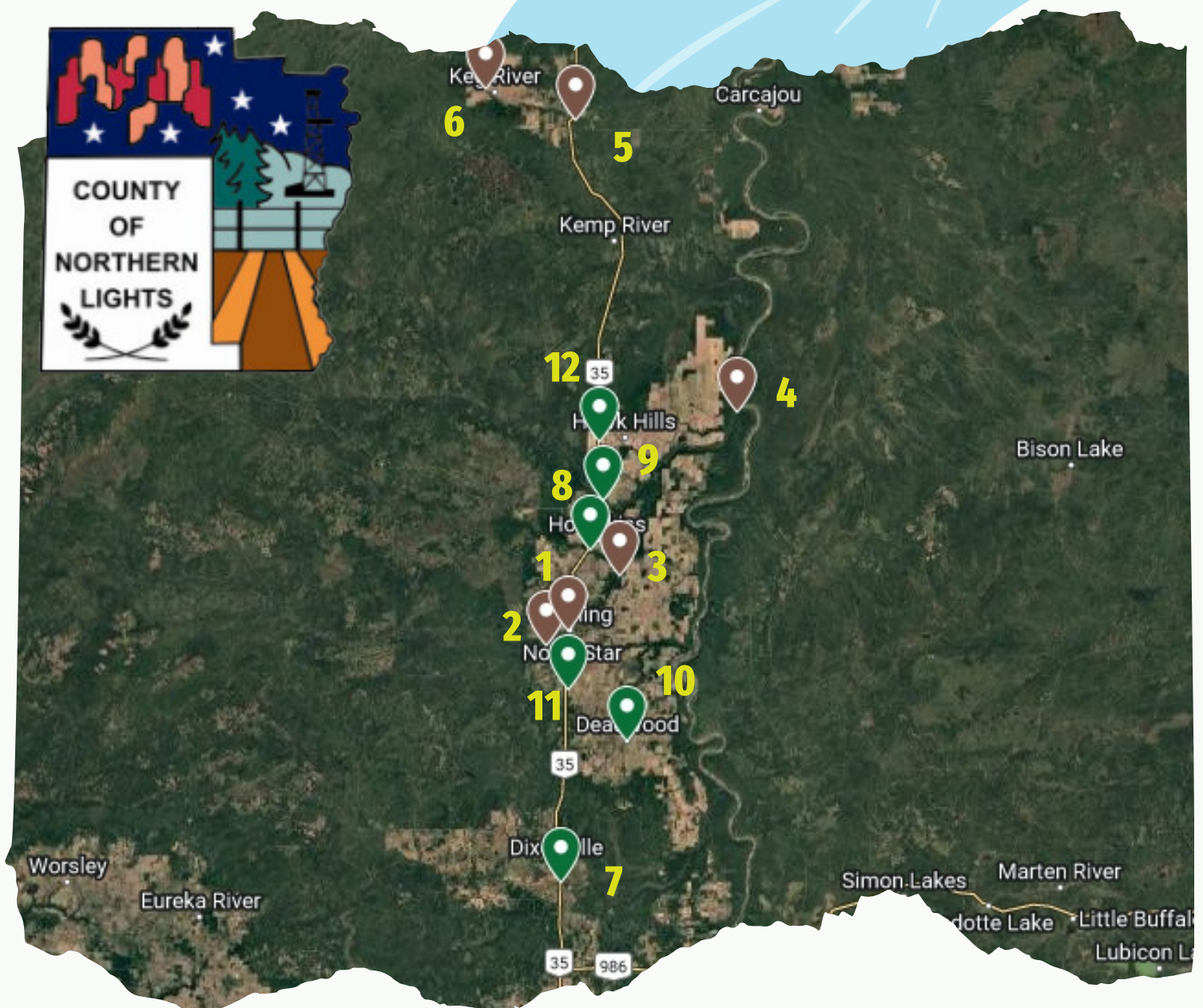


# WATER QUALITY MONITORING

The County of Northern Lights (the County) and the North Peace Applied Research Association (NPARA) have maintained an ongoing water quality monitoring program in the Notikewin and Keg rivers since 2011. The study was designed and implemented by Aquality Environmental Consulting Ltd. (Aquality). The purpose of the study was to gather baseline water quality information for a complete suite of parameters, for future planning of land use and environmental management activities on the two rivers, and to determine water quality for use as a drinking and agricultural water source.



# WATER QUALITY MONITORING

Surface waters were sampled at two sites on the Notikewin River and two sites on the Keg River, as well as 8 additional sites distributed across the County. The collected water samples were analyzed for the following parameters in the spring and fall sampling:

- Routine Water Chemistry
- Nutrients
- Total and Dissolved Metals
- Turbidity and TSS

All parameters were measured during the spring, summer and fall of 2024 at 6 sites. At the other 6 sites, only turbidity and total suspended solids (TSS) were analyzed, as previous results had indicated a strong correlation between these parameters and the majority of pollutants of concerns. TSS and turbidity were used as a proxy for these pollutants, increasing the spatial detail of sampling while maintaining reasonable costs for analysis.

The Notikewin and Keg rivers remain within the ideal pH range to support aquatic life, and there are no concerns for water hardness, alkalinity, or salinity at any of the monitored sites. Total Suspended Solids (TSS) and turbidity are generally higher during spring runoff than in the summer or fall. TSS was highest in the Keg River and Whitemud River. Excess phosphorous is the most concerning detriment to water quality in both rivers, though phosphorous concentrations in 2024 are below historical averages.

Erosion continues to contribute to metal contamination in both rivers. Riparian buffers or sediment control structures would be the most effective strategies to alleviate metal pollution in these areas. Overall water quality index scores have been improving in both rivers over the last few years.



# WATER QUALITY MONITORING

Water quality in the Notikewin and Keg rivers continue to display strong seasonal patterns, which appear to be driven largely by interactions of precipitation with the surrounding landscape. The general historical trend has been for the poorest water quality to occur in the spring, with improvement and stabilization by fall. Evidence to date from the study continues to support that this seasonal trend is strongly influenced by soil and sediment laden runoff, which is generally highest in the spring. Analysis of differences in land cover provides some evidence of the landscape factors driving water quality, including the proportion of developed lands versus forested areas, and the relative densities of wetlands across the watersheds.



At the current time, there do not appear to be any negative long-term trends in water quality at any one site, though there is clear and consistent variation between the long-term monitoring sites and especially between the two basins (Notikewin and Keg). As indicated in past reports, any measures taken to improve water quality within these two basins should focus on controlling sources of sediment into the rivers, especially in areas where human activities have increased the potential for erosion. Improving the spatial and temporal resolution of the study will assist in identifying problem areas within the watersheds, and by using a low-cost proxy measurement such as total suspended solids, could do so with minimal additional analytical costs. This increased resolution could be augmented by or guided by identification and inspection of crossings throughout the basins (culverts and adjacent riparian areas), to increase information on the pathways for pollutants entering the two rivers. This in turn would provide valuable information and indicate potential mitigations for potential impacts to the aquatic ecosystem.