

A heat map of catch densities in Horizon Lake was produced to show the frequent catch locations for various species from 2010 – 2016.

ESRI Young Scholars Award

Horizon Lake Heat Map

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I worked for Canadian Natural Resources Limited during the summer of 2016 at the Horizon Site approximately 70 km north of Fort McMurray. Using research data gathered from 2010 and 2016, I created a heat map representing fish catch densities for the various species in the lake. Taking the fisheries research data along with land imagery, bathymetric information, and constructed habitat and water quality data, I was able to create visualizations of the data using ArcGIS which previously was difficult to interpret.

The maps described catch densities, preferred aquatic habitats, and potential areas for future research and program development. Using the data for each species, research and fisheries programs could develop plans around the information presented by the heat map. Identification of higher catch density areas can increase catch rates for targeted species and free-up time for other project demands. The heat map may also be used when collecting samples to reach the quota for a Fisheries Research License in Alberta; if the quota has not been reached, a sample could be taken from a different area which could have more specimen present to record more information in attempt to reach that goal.

Habitat utilization is a very important detail which can be seen in the heat map. The construction of a compensation lake is a large investment and the ability to determine the extent of utilized habitat is critical in justifying its continued use or future developments. The ability to assess the use of the constructed habitat by different species provides insight into its success and identifies areas for future improvement.

The data conveyed by these heat maps has possible applications outside of Horizon Lake. Areas that would benefit include development of other compensation lakes, conservation and enhancement initiatives in regional waterbodies, visualized habitat partitioning by species distribution, and improve research program efficiency. Heat maps could help future development of compensation lakes and conservation projects by using data gathered for a variety of regional locations.

Using this data, species specific research can be used to enhance habitats in regional waterbodies to provide ideal habitat conditions. This could also be useful for managing and monitoring species at risk, or reintroducing extirpated species to their native waterbodies.

Identification of preferred habitats could be taken a step further by constructing habitats that could minimize crossover between competing species and reduce competition for resources. This type of project could be used to create a “hatchery” lake in a natural environment and allow the target species to be transferred into other areas once the population reaches a healthy level.

In the absence of ArcGIS, it would have been very difficult to interpret the large amounts of data and create clear visualizations.