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## Assessing the Impact of ~65 years of Land Use and Land Cover Change on the Utah Lake Watershed with Remote Sensing and Spatial Modeling

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Utah Lake is one of the largest natural freshwater lakes in the western United States. Its watershed is 9,800 km<sup>2</sup>. Utah Lake is located in Utah County which is expected to have the highest population growth in the state through 2060. Land use and water regulation has shifted the Utah Lake shoreline since the 1900s. Monitoring the land use and land cover change (LULCC) in the watershed is critical to understanding surrounding hydrology and future sustainability. In this study, we compared the Utah Lake shoreline change from 1953-2014 and classified the land cover in the Utah Lake watershed from 1985-2018. Our results show that there was a 41.45 km<sup>2</sup> decrease in lake surface from 1953 to 2014. The shoreline around the Provo Bay and Goshen Bay has receded lake-ward considerably in 2014 compared to the 1953 shoreline, and the lost water and wetland area was equivalent to 3,851 football fields in size. Land cover change calculations indicate that from 1985 to 2018 urbanization increased by 6%, forest by 2%, and barren by 3%, whereas water and agriculture decreased by 1% and 6%, respectively. The findings from this project could be used by Utah's legislature to implement meaningful watershed planning and management, especially in light of the state considering House Bill 272 that promotes "comprehensive restoration of Utah Lake by building an island on it." The bill proposes an island in Utah Lake which could dramatically alter LULCC around the lake. In addition, any significant LULCC on and around the lake will modify the lake water budget, its ecosystem, and have profound consequences on Utah Lake watershed and the surrounding regions.