Impacts of Oil Exploration and Production to Waterfowl Production Areas Managed by the USDI Fish and Wildlife Services Northeast Montana Wetland Management District (WMD)

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The Northeast Montana Wetland Management District (WMD), manages 44 Waterfowl Production Areas (WPA). Mineral estates were reserved when these parcels were purchased resulting in numerous oil wells on WPAs (several WPAs have wells located ≤ one half mi of a WPA wetland). These WPAs are located in the continuation of the prairie pothole region of the Dakotas, as well as the Williston Oil Basin, which is Montana's top oil producing area. The dominant waste product from the oil production process is produced water, and this basin contains some of the most saline water in the United States, often > 300,000 µs/cm specific conductance. Disposal of drilling wastes and produced waters occurred in unlined reserve pits until the late 1970s when liners were required. Based on average pit size and conservative chloride concentrations, an estimated 260 tons of sodium chloride salts are present in each pit. This research was conducted to address concerns over migration of salts from reserve pits into wetlands on WPAs. Produced water impacts were documented in half of 80 wetlands sampled on 23 WPAs. Saltwater plumes migrating out of reserve pits were delineated using an EM-31 soil conductivity meter and a Trimble GeoXT and mapped using ArcGis. Monitoring wells installed within the mapped plumes to determine water quality revealed that sodium chloride brines and to a lesser extent, trace elements and hydrocarbons had migrated out of the reserve pits. Further, some of these constituents migrated to nearby wetlands.