

Attribution of Anthropogenic Methane Sources in Downstate New York

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Methane (CH₄) is the second most important GHG behind carbon dioxide (CO₂), and landfills are the major point source for in NY. Currently, direct CH₄ flux measurements of landfills in NYC are limited. Accurate assessment of New York City metro area CH₄ fluxes is important to support the development of the state's emissions and climate policies, and better understand global CH₄ pathways. This study, project NYAQQ (New York Atmospheric/ Air Quality) will assist New York State, a leader in climate action — the 2015 Reforming the Energy Vision (REV) goals committed NYS to reducing greenhouse gas emissions and the 2017 Methane Reduction Plan (MRP) targeted in-state methane emissions (Commane, 2022)— to adopt effective CH₄ mitigation strategies. This project aims to quantify Downstate New York atmospheric CH₄ concentrations of anthropogenically disturbed and undisturbed wetland ecosystems. Urban areas contain the largest point sources of CH₄ (landfills, waste water treatment and natural gas consumption). A project objective is to identify the system processes whereby CH₄ is released into the atmosphere from landfill point sources. This research aims to quantify the lateral aquatic flow of CH₄ through the landfill system. Utilizing surface water sampling methods, we collected aquatic samples from key point source sites, Croton Point Park, Piermont Marsh, and Meadowlands Conservation and Wildlife Area, from different fluid types: groundwater, open river water, marsh channels, and leachate. Through this work, a reproducible sampling protocol was established. Gas chromatograph flame ionization was used for CH₄ detection. These established sampling protocols will allow next research to ultimately measure year-round and seasonal CH₄ fluxes from New York Downstate Area wetlands and landfills.