

Flooding, erosion, and declining water quality, exacerbated by climate change, pose significant risks to northeastern Illinois. To address these challenges, the Chicago Metropolitan Agency for Planning (CMAP) is creating the region's comprehensive stormwater infrastructure inventory. Supporting this initiative, teams from the Data Science Institute (DSI) have been developing a deep learning model to identify stormwater infrastructure from aerial images (Figure 2), making the inventory process more efficient.

This team refined the model by adding Digital Elevation Model (DEM) data (Figure 2), improving the Intersection over Union—a measure of overlap between predicted and actual areas—by 5% in classifying the stormwater infrastructure. Progress was also made in integrating river data and improving class balance, laying the groundwork for future performance improvements. Additionally, a workflow using the pretrained Segment Anything Model was developed to generate polygons from single-point prompts (Figure 1), streamlining training data creation.

The improved model effectively identifies ponds and wetlands but continues to face challenges with structures like dry-bottom detention basins. Future work will focus on finalizing river integration and broadening the model's capacity to detect a wider range of stormwater infrastructure. These efforts support CMAP's work in advancing stormwater management and preparing the region for growing climate challenges.

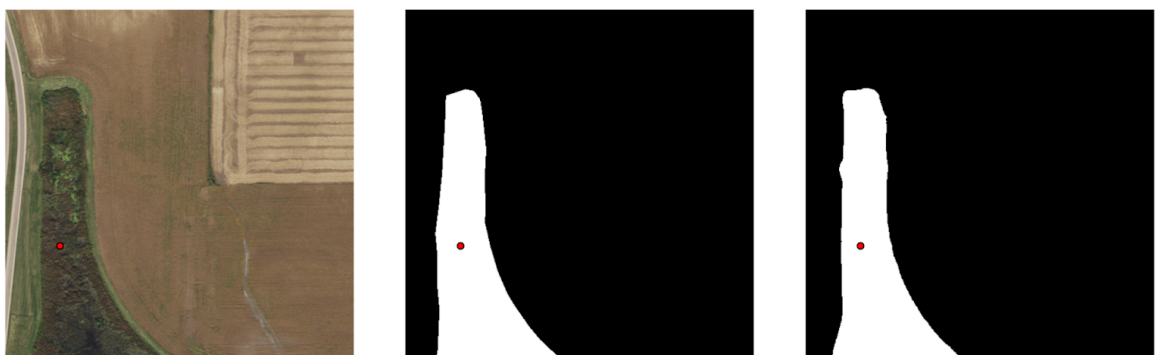


Figure 1: (1) Aerial view of the stormwater basin with a single-point prompt (red dot), (2) ground truth mask, (3) Segment Anything library prediction achieving 0.93 IoU, closely matching the basin's boundaries.



Figure 2: Example of model input and prediction. From left to right : (1) aerial input image, (2) DEM input image, (3) true basin types, and (4) predicted basin types, with labels for background, pond, and dry bottom mesic prairie.