

# Pollutant Hot Spots - Priority Ranked Parcel Summary Report

**Municipality: Pembroke, NH**

**Date of Report: November, 2021**

---

## **Purpose**

The NH 2017 Small MS4 General Permit requires for permittees to create an inventory and priority ranking of permittee-owned properties that could be retrofitted with Best Management Practices (BMPs) to reduce stormwater discharges and address pollutant loading from catchments identified as having high loading for nitrogen and/or phosphorus. To aid in these efforts, the information presented in this report may be used to identify and prioritize measures to reduce pollutant loading to impaired waters from the permittee's MS4 area.

This information will assist in fulfilling the following permit requirements for Year 4:

1. MCM #5 Post Construction Stormwater Management
  - a. Inventory and priority ranking of permittee-owned property and existing infrastructure that could be retrofitted with BMPs designed to reduce frequency, volume and pollutant loads of stormwater discharges (page 48, section 2.3.6.e).
2. Appendix H - Requirements Related to Water Quality Limited Waters
  - a. Nitrogen Source Identification Report (Appendix H, page 3, section I.1.b).
  - b. Phosphorus Source Identification Report (Appendix H, page 6, section II.1.b).
3. Appendix F - Lake and Pond Phosphorus TMDLs
  - a. Information in this report may be used in the development of Lake Phosphorus Control Plans (LPCP), such as developing a priority ranking of areas and infrastructure for potential implementation of phosphorus control practices.

## **Methods**

Geographic Information System (GIS) analysis of the municipality of Pembroke, NH was performed in 2019 using publicly available GIS layers; the analysis yielded total suspended solids (TSS), total nitrogen (TN), and total phosphorus (TP) pollutant load "hot spot" data per parcel by utilizing layers for parcel boundaries, conservation areas, land use, and impervious cover (IC) coupled with the pollutant load export rates found in Table 2-1 of Appendix F of the NH MS4 permit\*.

The results were sorted to identify non-conservation parcels owned by the municipality in descending order by acreage of impervious cover, which indicated the priority rank for BMP implementation on municipally owned properties. Parcels were ranked using impervious cover because it is a key metric representing the largest manageable load for pollutants commonly associated with stormwater. Because impervious cover is not evenly distributed on municipal parcels, the graph of cumulative percent of impervious cover for the resulting ranked parcels is non-linear with a typical "knee" which indicates

\*<https://www.epa.gov/npdes-permits/new-hampshire-small-ms4-general-permit>

the point of decreasing IC area per additional parcel to be managed. The knee represents the optimal number of parcels to be treated by BMPs as they will treat the most impervious cover on the least number of parcels. This method also generally optimizes the resulting TSS, TN, and TP reductions, and costs for treatment as they are all linked to the IC area.

## Results

Figure 1 shows the graph of cumulative percent of IC for the resulting ranked, municipal, non-conservation parcels. The knee of the curve is called out as the goal for treatment.

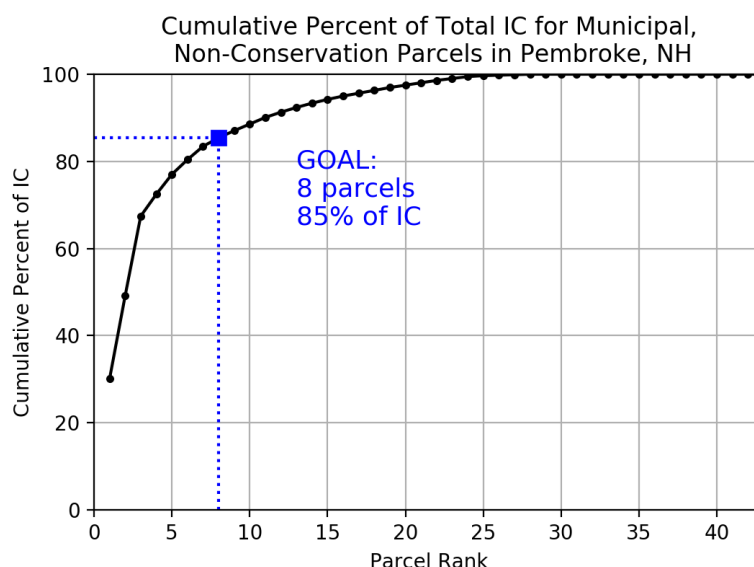


Figure 1: Cumulative percent of IC vs rank (priority) for municipal, non-conservation parcels.

Pembroke's target for treatment is 8 parcels . Treating all the IC from these top 8 parcels accounts for 85% of all the municipally owned, non-conservation properties.

Pollutant reductions were estimated using the EPA performance curves for an infiltration basin BMP class\*\* with a physical storage capacity of 0.4 inches and infiltration rate of 1.02 in./hr.. The curve yields 96% TSS reduction, 92% TN reduction, and 81% TP reduction. Table 1 is a summary table showing the IC, TSS reduction, TN reduction, TP reduction, and total estimated costs using the EPA costs outlined in UNH performance fact sheets\*\* for the top 8 parcels and the percentage of the top parcels to the total municipal, non-conservation properties.

Table 1: Summary of priority municipal, non-conservation parcels. The total IC, TSS, TN, and TP reductions using the stated assumed treatment, and estimated cost of treatment are summarized for the priority parcels and their percentage of total municipal, non-conservation parcels.

	IC	TSS Red.	TN Red.	TP Red.	Cost
Top 8 Parcels Total	8 ac	5,922 lb/yr	95 lb/yr	11 lb/yr	\$361,000
Percent of Municipal, Non-Cons.	85%	59%	45%	51%	85%

\*\*[https://www.unh.edu/unhsc/sites/default/files/media/ms4\\_permit\\_nomographs\\_sheet\\_final\\_2020.pdf](https://www.unh.edu/unhsc/sites/default/files/media/ms4_permit_nomographs_sheet_final_2020.pdf)

Table 2 shows the priority list of the 8 municipal, non-conservation parcels with their NH GIS ID and street address.

*Table 2: Priority municipal, non-conservation parcels ranked by descending IC with NH GIS ID and street address.\*\*\**

<b>Treatment Priority</b>	<b>IC (ac)</b>	<b>NH GIS ID</b>	<b>Street Address</b>
1	2.76	07170-VW-0189-000-000	8 Exchange St
2	1.75	07170-565-0256-000-000	311 Pembroke St
3	1.68	07170-266-0040-000-000	247 Pembroke St
4	0.46	07170-VE-0165-000-000	Central St
5	0.42	07170-565-0051-000-000	346 Pembroke St
6	0.31	07170-VW-0228-000-000	2 Exchange St
7	0.28	07170-VW-0117-000-000	4 Union St
8	0.18	07170-VW-0186-000-000	Exchange St

\*\*\*For the complete prioritized spreadsheet including loads, reductions, and estimated costs, see:  
[https://www4.des.state.nh.us/nh-ms4/?page\\_id=1798](https://www4.des.state.nh.us/nh-ms4/?page_id=1798)