



New York City Comptroller  
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# **The Slippery Cost Slope of Ice and Snow Removal in New York City**



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When major winter storms hit New York City, the task of removing ice and snow from city streets can be gargantuan – and expensive. The oft-cited adage is that the City spends \$1 million per inch of snow removal. However, a closer look at recent New York City Department of Sanitation (DSNY) budget data reveals a much more nuanced portrait of ice and snow removal costs, with declining cost curves that resemble the slippery slopes of a toboggan jump.

Clearing ice and snow from primary, secondary and tertiary streets is a complex task involving specialized supplies, machinery and personnel. Over 3,000 pieces of ice and snow removal equipment are pre-positioned along snow-plowing routes and activated once needed. Immense quantities of salt and calcium chloride are purchased and spread each year and the replenishment of winter weather hardware such as tire chains and plow blades is an ongoing necessity.

Winter weather events require the Sanitation workforce to mobilize with little notice, at times, and for durations, dictated by Mother Nature. From mid-November to early April, DSNY increases its nighttime staffing levels and when winter storms threaten or occur, DSNY assigns many within its workforce to special twelve hour shifts. In some circumstances, temporary assistance from non-DSNY personnel is also sought and paid for on an hourly or contract basis.

This report will briefly examine and explain the City's ice and snow removal budget, including fluctuations in the amounts spent during a twelve year study period from FY 2003 – FY 2014.

## Total Costs for Ice and Snow Removal

Each fiscal year, the amount budgeted for the removal of ice and snow follows a formula outlined in Chapter 6, § 103 of the New York City Charter.

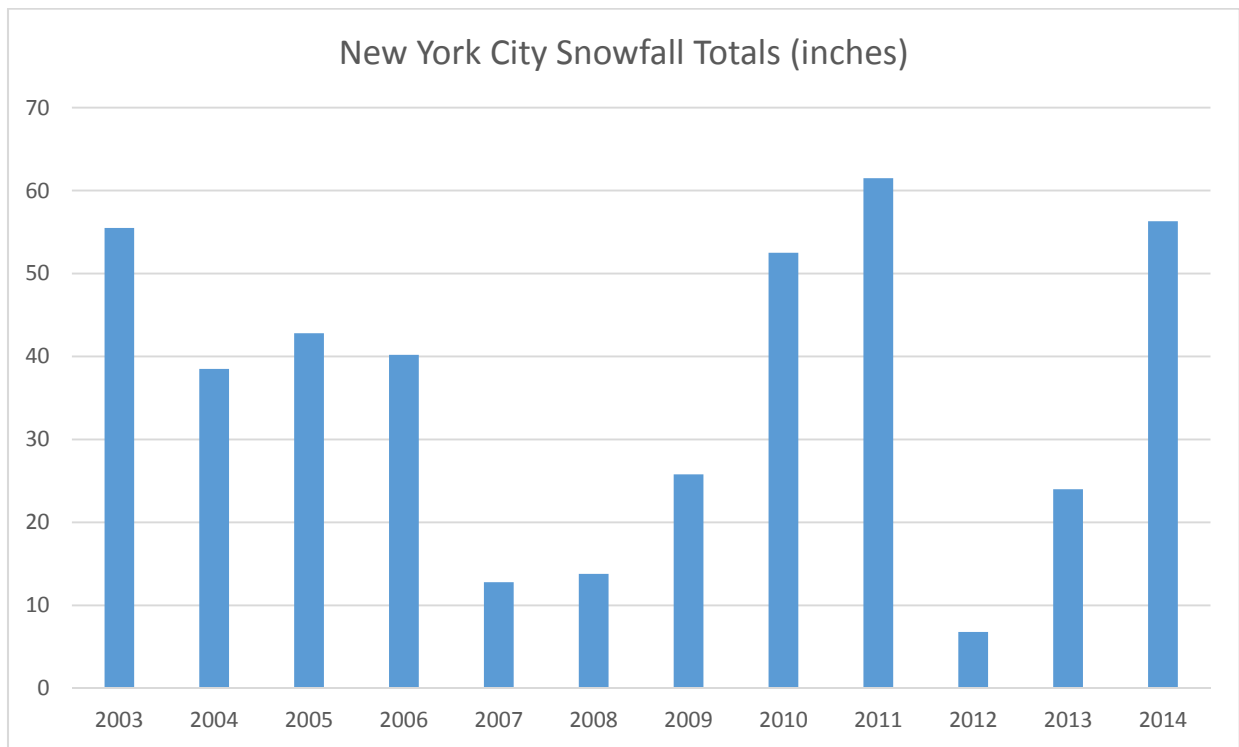
The budgeted amount is equal to the average spent for ice and snow removal for the five fiscal years preceding the year being budgeted. The amount includes personal services costs for overtime and for work on Sundays and holidays but excludes regular salaries and wages of employees.

However, the adopted budget amount is rarely an accurate predictor of the amount spent for actual snow and ice removal. Generally, the budget is modified after the fact to match the actual expenses.

As one would expect, the City’s spending for ice and snow removal varies according to snowfall amounts during the winter season. However, snow removal costs may be incurred even when there is little or no snowfall. For example, a snow forecast may prompt pre-salting and the mobilization of DSNY ice and snow removal crews and equipment, but the anticipated snowfall may not actually materialize.

From FY 2003 – FY 2014, annual snowfall totals averaged 35.9 inches per year, with a high of 61.5 inches in FY 2011 and a low of 6.8 inches in FY 2012.

**Figure 1 – Annual Snowfall Totals (inches)**



Source: Mayor’s Management Report

Annual costs for ice and snow removal range widely, from a low of \$25.4 million in FY 2008 to a high of \$130.7 million for last fiscal year’s winter season. The average annual cost from FY 2003 – FY 2014 was \$55.3 million.

The two years with the most snow – FY 2011 and FY 2014 – are 125% and 136% above the average cost, respectively.

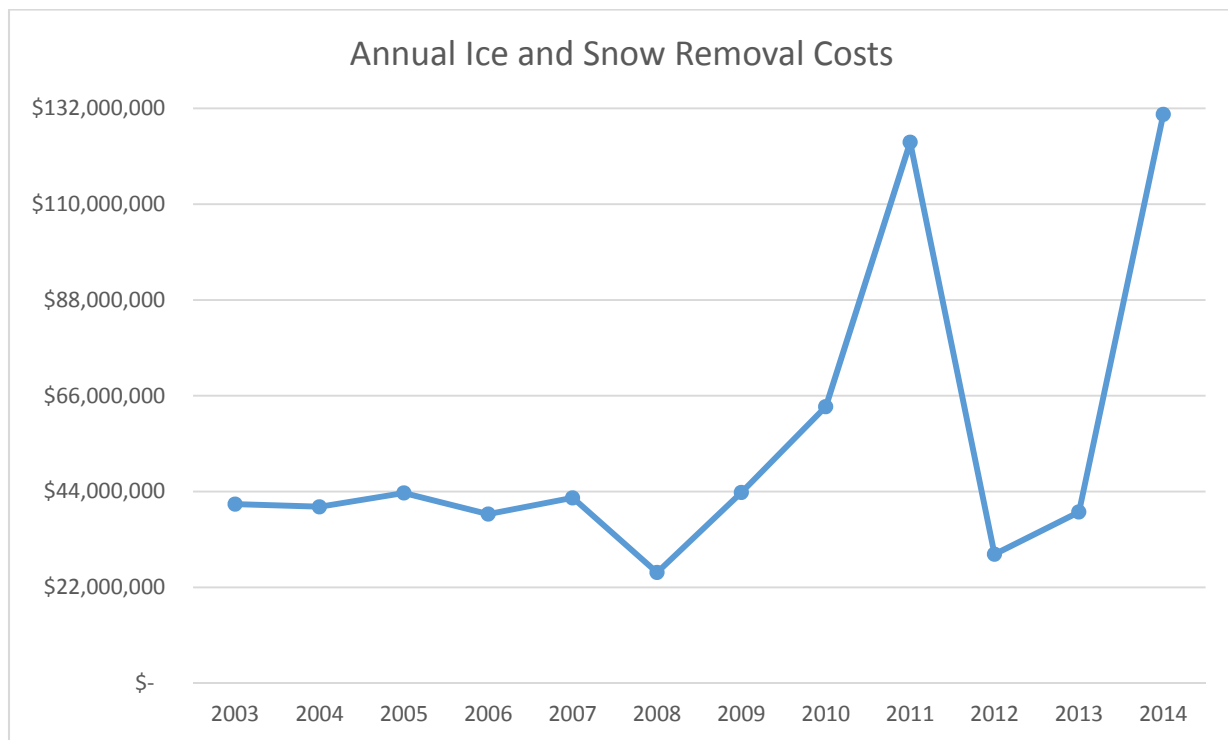
FY 2011 is best remembered for the post-Christmas blizzard that dumped over 20 inches of snow on the City. A successive blizzard just weeks later also left 19 inches of snow on City streets, resulting in the highest yearly accumulation of the last twelve years.

FY 2014 was also notable for a trio of snowstorms in late January and early February characterized by wet, heavy snows, frigid temperatures and total accumulations of 8 – 11 inches per storm.

Both of those fiscal years correspond to a winter that experienced a large storm, early in the season and public criticism of that storm’s cleanup. A key indicator of avoiding above average costs seems to be an effective cleanup of the first storm.

Figure 2 below illustrates fluctuations in total ice and snow removal costs for FY 2003 – FY 2014.

**Figure 2 – Annual Ice and Snow Removal Costs**



Source: New York City Comptroller’s Office, Comprehensive Annual Financial Reports

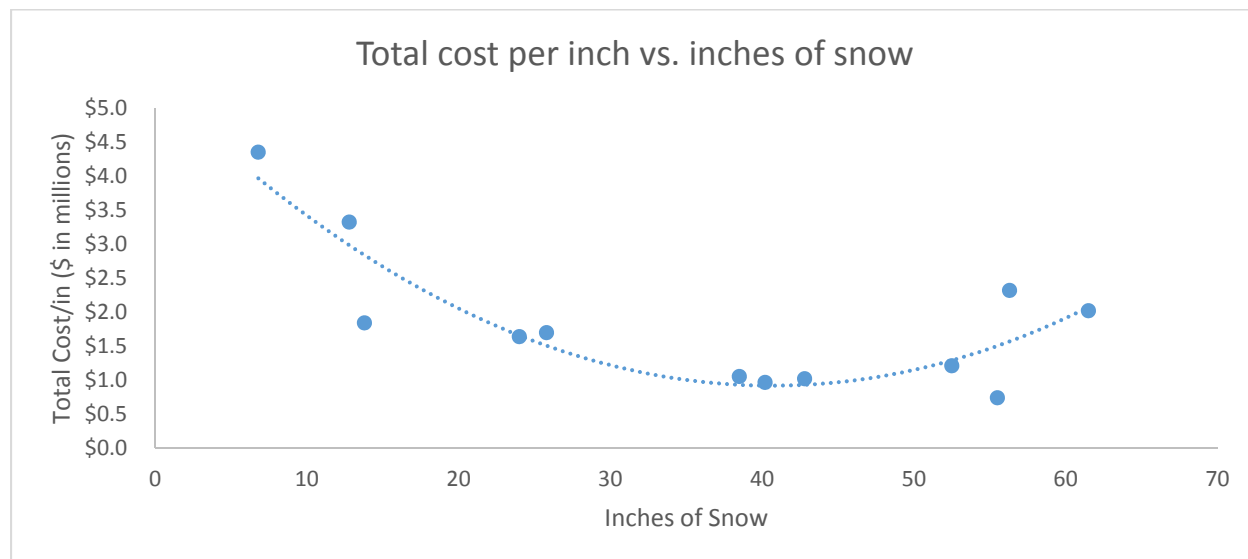
A review of per inch removal costs illustrates the powerful impact that uncontrollable weather conditions have on DSNY’s spending amounts for ice and snow removal each fiscal year. At first blush, per inch removal costs may appear counterintuitive in that the costs per inch of snow removal are significantly higher in light snow years than in heavier ones.

Generally, the cost-per-inch for ice and snow removal follows a declining cost curve where expenses peak in light snowfall years and then decrease in years with greater snowfall accumulations. From FY 2003 – FY 2014, the average cost-per-inch was \$1.8 million. The lowest cost-per-inch, \$740,000, was observed in FY 2003 when the City experienced a winter snowfall amount of 55.5 inches. The highest observed cost, \$4.4 million per inch, was recorded in FY 2012, a year when snowfall topped out at only 6.8 inches.

Large snowfall amounts as a predictor of low per inch ice and snow removal costs only holds true when annual snowfall totals between 24 and 56 inches. When annual snowfall totals increased beyond approximately 43 inches, costs began to rise. Per inch ice and snow removal costs increased in FY 2011 (61.5 inches) and FY 2014 (56.3 inches) to \$2.0 million and \$2.3 million respectively.

The scatter plot in Figure 3 illustrates the total cost-per-inch for each of the fiscal years from 2003 – 2014.<sup>1</sup>

**Figure 3 – Total cost per inch vs. inches of snow**



Source: New York City Comptroller’s Office

The Comptroller’s Office analyzed the Department’s ice and snow removal budget by its two major components – personal services (PS) which include employee overtime, holiday pay and hourly wages for temporary workers and other than personal services (OTPS) which covers payments to snow-removal contractors, the cost of materials, equipment, fuel, maintenance, and training. As noted before, regular salaries and wages of employees are not included in the City’s snow budget. We explore both components in depth in the following sections.

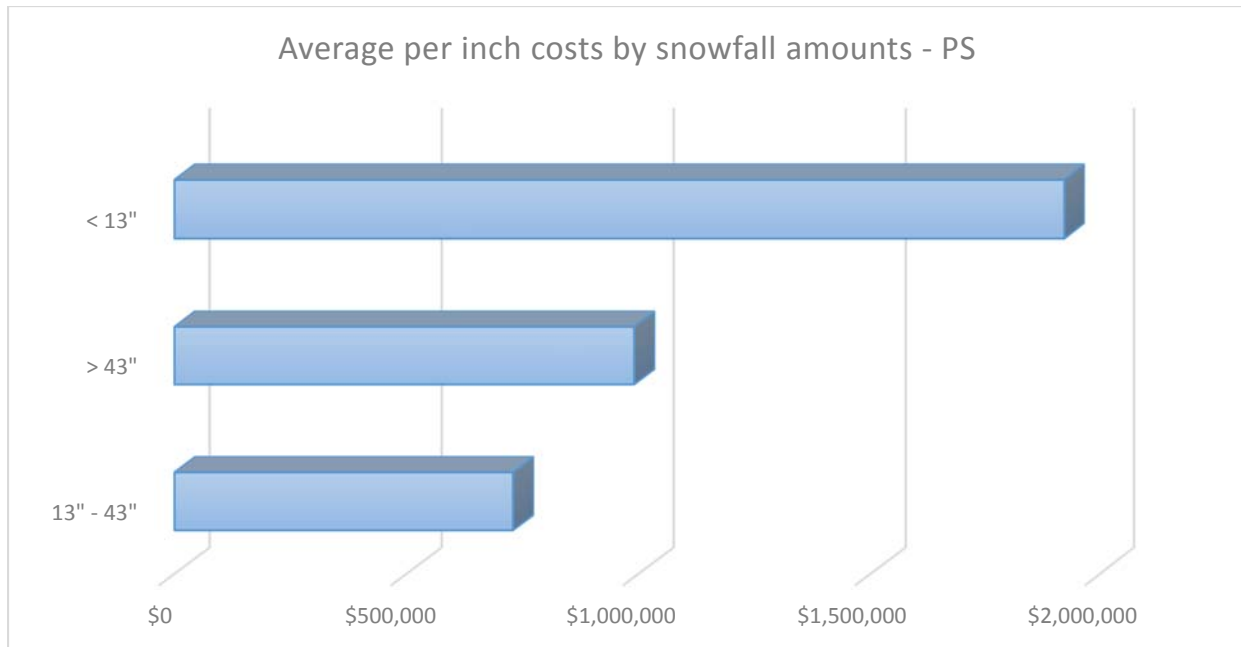
## Personal Services

Between FY 2003 and FY 2014, PS costs ranged from a low of \$11 million in FY 2008 when snowfall totaled 13.8 inches to a high of \$82 million in FY 2014 when snowfall totaled 56.3 inches. Average PS costs were \$32.6 million per year.

As Figure 4 illustrates, average per inch costs for personal services are also impacted by total winter snowfall amounts. The average PS cost-per-inch was highest in seasons when the total amount of snowfall was less than 13 inches and lowest when snowfall totals ranged from 13 to 43 inches. When the amount of winter snowfall rose above 43 inches, per inch removal costs increased.

<sup>1</sup> R<sup>2</sup> = 0.8021

Figure 4 – Average per inch costs by snowfall amounts



Source: New York City Comptroller’s Office

The unpredictable nature of winter storms can sometimes necessitate large PS expenditures. Overtime accounts for the largest share of DSNY’s ice and snow removal PS costs. Between FY 2003 and FY 2014, overtime pay averaged eighty-two percent of DSNY’s PS costs for ice and snow removal. Additionally, FY 2014 saw total overtime payments well above average relative to other years.

The PS ice and snow removal budget also includes the costs of hiring emergency snow laborers to clear areas such as bus stops and street corners. In FY 2014, emergency snow laborers were paid a starting rate of \$12 per hour which increased to \$18 per hour after forty hours of work in a given week.

## Other than Personal Services

As expected, OTPS costs from FY 2003 to FY 2014 varied with annual snowfall amounts. During this time period, the highest OTPS cost was logged in FY 2011 when the City spent \$48.9 million to clear 61.5 inches of ice and snow. The lowest total OTPS cost was \$14.3 million in FY 2008, which saw snowfall totals of 13.8 inches.

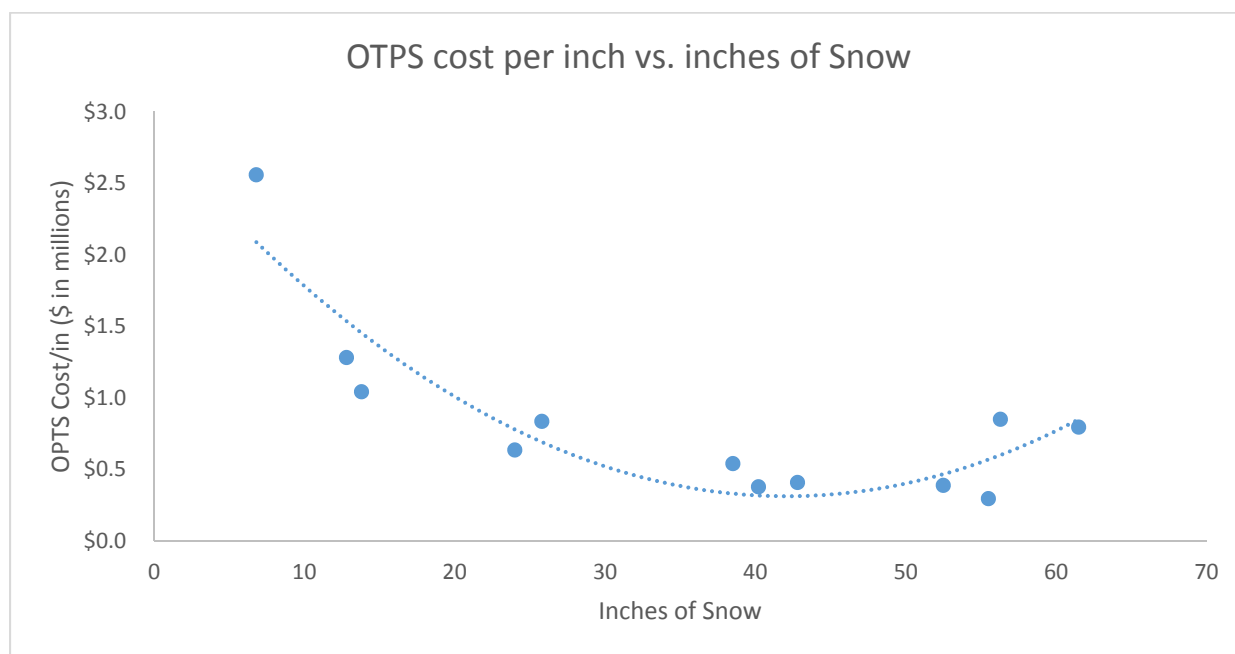
FY 2011 and FY 2014 both stand out as years with relatively large surges in OTPS spending on general supplies, materials and outside contracting for snow removal services. Perhaps not coincidentally, these are also the two years with the highest total snowfall amounts during the twelve years examined in this report.



FY 2003 had a winter snowfall total of 55.5 inches and saw the lowest per inch OTPS costs of \$295,894 per inch. The lowest amount of winter snowfall, 6.8 inches in FY 2012, resulted in the highest OTPS cost per inch which was \$2.6 million. The average OTPS cost per inch from FY 2003 to FY 2014 was \$834,087.

On a per inch basis, OTPS costs generally decrease as annual snowfall totals approach approximately 50 inches. Figure 5 illustrates fluctuations in OTPS cost per inch based on annual snowfall totals.<sup>2</sup>

**Figure 5 – OTPS cost per inch vs. inches of snow**



Source: New York City Comptroller’s Office

Additionally, the OTPS ice and snow removal budget includes payments to private snow-removal contractors. In FY 2011, which saw 61.5 inches of snowfall, the City paid private contractors \$11 million for snow removal services, mostly following the holiday blizzard in December 2010. The City currently pays an annual retainer to four private contractors to assist with snow removal from tertiary roadways outside of Manhattan. These contractors can be activated by DSNY when there is a forecast of six inches or more of snow accumulation.

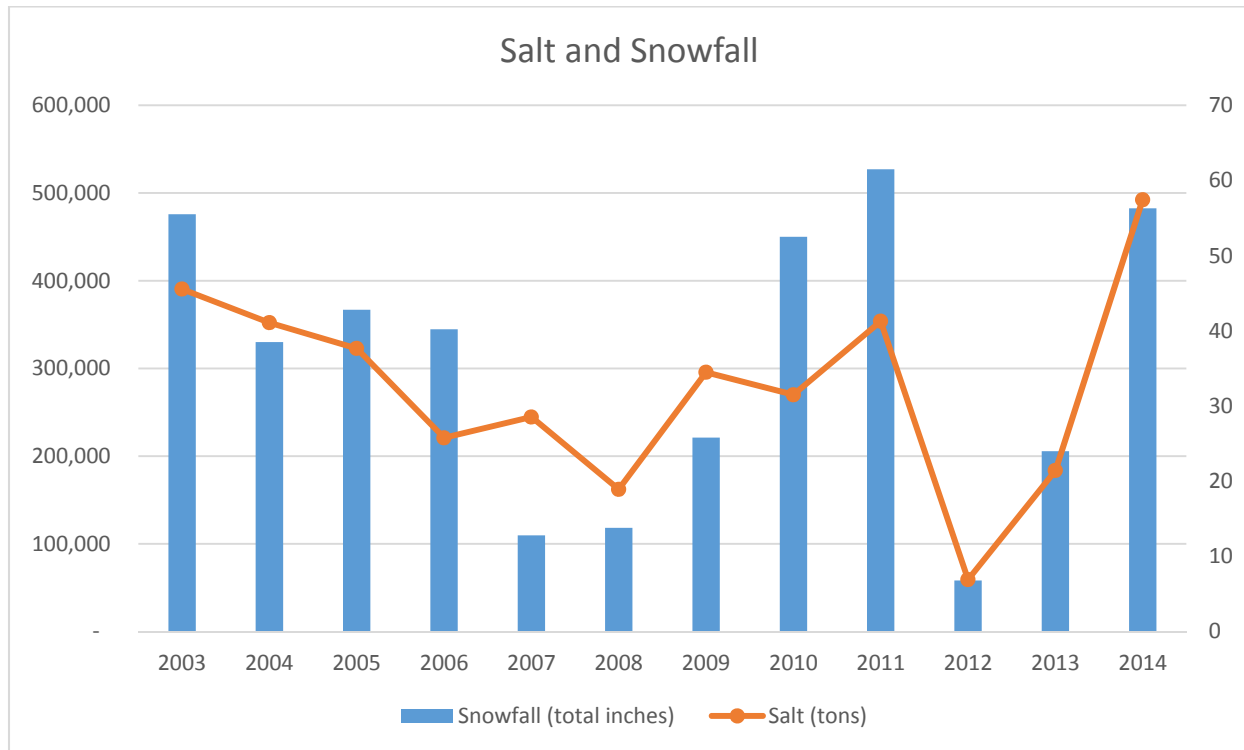
In FY 2014 DSNY dedicated over \$28.7 million of its OTPS budget to general supplies and materials, the highest amount spent in this category during the twelve year period that was examined for this report.

One important component of DSNY’s ice and snow removal OTPS budget for general supplies and materials is road salt. The Mayor’s Management Report details the City’s road salt usage each

<sup>2</sup> R<sup>2</sup> = 0.8344

fiscal year. As Figure 6 illustrates, the amount of road salt that DSNY spreads each year is not necessarily linked to snowfall amounts.

**Figure 6 – Salt and Snowfall**



Source: Mayor’s Management Report and New York City Comptroller’s Office

The City also maintains a large inventory of ice and snow management equipment that requires routine maintenance and repair. This includes over 3,500 plow blades and v-plows, 424 large salt spreaders, 36 large and small snowmelters, and 50 skid-steer loaders.

## Conclusion

In short, the cost of snow removal for New York City is far from a straight line when plotted over time. The old adage of \$1 million per year is also rarely true. While costs can dip that low and even lower in certain optimal years, from FY 2003 – FY 2014, the average cost-per-inch was \$1.8 million.

Despite constraints in predicting total ice and snow removal costs, this week, the City had the resources in place to ensure that DSNY crews and contractors were well equipped to clear our roads safely and quickly on the heels of a snow storm that dropped approximately 12 inches of snow on the City in recent days.







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