
Idaho Department of Environmental Quality Street Sweepings Management

Review of Regional Street Sweeping Practices

DEQ EDMS Document No. 2024BAF3
Tetra Tech Project #117-8296107
July 16, 2024



Street Sweepings Management

DEQ EDMS Document No. 2024BAF3

Tetra Tech Project# 117-8296107

July 16, 2024

PRESENTED TO

State of Idaho Department of Environmental Quality

1410 North Hilton
Boise, ID 83706

PRESENTED BY

Tetra Tech

3380 Americana Terrace,
Suite 201, Boise, ID 83706

Prepared by:



Shane Matolyak
Environmental Scientist

7/16/2024

Prepared by:



Maureen McGraw
Senior Engineer, PhD., PE

7/16/2024

Reviewed by:



Jerold A. Armstrong
Senior Hydrogeologist

7/16/2024

TABLE OF CONTENTS

1.0 INTRODUCTION1

2.0 STREET SWEEPING LITERATURE REVIEW.....2

 2.1 Composition2

 2.2 Pollutants of Concern.....2

 2.2.1 Particle Size.....2

 2.2.2 Metals3

 2.2.3 Organics3

 2.2.4 PFAS3

 2.2.5 Nutrients3

 2.3 Storage.....3

 2.4 Disposal4

 2.4.1 Landfill4

 2.4.2 Beneficial Reuse.....4

 2.4.3 Composting.....5

3.0 CURRENT STATE OF IDAHO STREET SWEEPINGS DISPOSAL PRACTICES5

**4.0 DISPOSAL METHODS AND REGULATORY REQUIREMENTS BY STATE OR MUNICIPALITY
PROXIMATE TO IDAHO.....5**

 4.1 North Dakota7

 4.1.1 Disposal7

 4.1.2 Beneficial Reuse.....7

 4.2 Montana7

 4.2.1 Beneficial Reuse.....8

 4.3 Nevada8

 4.4 Oregon8

 4.4.1 Disposal9

 4.4.2 Beneficial Reuse.....9

 4.5 South Dakota9

 4.5.1 Disposal9

 4.5.2 Beneficial Reuse..... 10

 4.6 Washington 10

 4.6.1 Disposal 10

 4.6.2 Beneficial Reuse..... 10

 4.7 Summary..... 10

5.0 CONCLUSIONS AND RECOMMENDATIONS 12

6.0 REFERENCES 12

LIST OF TABLES

TABLE 1. Summary of Disposal and Beneficial Reuse Options Identified at States or Municipalities Proximal to Idaho.6

TABLE 2. Summary of State Disposal and Beneficial Reuse Options Identified Proximal to Idaho. 11

TABLE 3. Summary of Municipal Disposal and Beneficial Reuse Options Identified Proximal to Idaho. 12

APPENDICES

APPENDIX A. STATE / MUNICIPALITY QUESTIONNAIRE.

ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
BMP	Best Management Practice
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
DANR	Department of Agriculture and Natural Resources
DEP	Department of Environmental Protection
DEQ	Department of Environmental Quality
MS4	Municipal Separate Storm Sewer System
MSW	Municipal Solid Waste
NPDES	National Pollutant Discharge Elimination System
PAH	Polycyclic Aromatic Hydrocarbon
PCA	Pollution Control Agency
PWA	Public Works Administration
PWD	Public Works Department
PWMD	Public Works and Mobility Department
RCRA	Resource Conservation and Recovery Act
TCLP	Toxicity Characteristic Leaching Procedure
TMDL	Total Maximum Daily Load
TEH	Total Extractable Hydrocarbons
<i>um</i>	Micrometer
USEPA	United States Department of Environmental Quality

1.0 INTRODUCTION

Removal of debris, such as sediment, vegetation, vehicle debris, litter, atmospheric particulates, and other refuse that accumulate on paved surfaces (e.g. streets and parking lots) using street sweepers is a common practice. Historically, street sweeping was conducted to maintain aesthetic appeal, but now it is also considered a Best Management Practice (BMP) for water quality management for municipal separate storm sewer system (MS4). This can help municipalities keep trash out of water ways and the ocean, as well as meet total maximum daily load (TMDL) limits for pollutant(s) of concern (POC) by preventing this material from migrating into stormwater drains. This helps meet the surface water requirements under the National Pollutant Discharge Elimination System (NPDES) regulations. Following collection, street sweepings, sometimes referred to as Road-Deposited Sediment, can be disposed of in a variety of ways that vary by state and which may require physical and/or chemical characterization to determine the proper disposal method. In general, they are typically disposed of in municipal solid waste (MSW) landfills.

In general, highly industrialized or urbanized eastern states such as Ohio and Massachusetts tend to have more complex programs directing the handling and disposal of street sweepings compared to more rural areas of the intermountain west (MA DEP, 2018; Miller *et al.*, 2016; MT DEQ, 2023). This may be due to the greater volume of sweepings collected from urbanized areas due to the larger number of paved streets and/or the perceived potential for these sweepings to be contaminated by industrial activities or increased vehicular traffic.

The cost of street sweeping includes the capital cost of the equipment, paying staff, and disposal costs. To date, disposal at a MSW landfill has generally been considered the least expensive option for managing street sweepings. However, as the volume of waste generated during street sweeping and the cost of disposal at MSW landfills increases, other management options, such as using the material for backfill, composting, and reuse will become more prominent. For example, in Dana Point, California in 2017 they were generating between 45 to 80 tons/month of sweepings and the City of San Francisco spent \$34,988,059 in 2016-2017 for street sweeping management (EPA, 2021). The cost per curb mile swept is often used to compare cost between cities. In 2016-2017, the cost ranged from \$6.24/mile in Sacramento, CA to \$201.16/mile in Portland, OR (EPA, 2021).

The purpose of this report is to review the management and associated regulatory requirements of street sweepings generated during routine road maintenance activities in neighboring states. The information will be used to support the Solid Waste Program within Idaho Department of Environmental Quality (DEQ) to evaluate the best approach for street sweepings management in Idaho. The report is organized as follows:

Section 1.0 provides background information and the purpose of this investigation.

Section 2.0 presents a literature review of the composition of street sweepings, potential pollutants, storage, and options for disposal.

Section 3.0 summarizes current management practices and regulations in effect in the State of Idaho.

Section 4.0 presents current management practices and regulations in affect in other states with an emphasis on states directly adjacent or near to Idaho (*i.e.*, North Dakota, Montana, Nevada, Oregon, South Dakota, Washington, and Wyoming).

Section 5.0 presents conclusions and recommendations.

Section 6.0 presents references for sources of information.

2.0 STREET SWEEPING LITERATURE REVIEW

2.1 COMPOSITION

Street sweepings consist primarily of soil intermixed with pavement, organic materials (*i.e.*, leaves and other plant detritus), and litter such as cigarette butts (USEPA, 2013). Most, if not all, states do not allow road-deposited sediment impacted by fuel spills or other hazardous waste releases to be collected and managed as street sweepings (MN PCA, 2010; MA DEP, 2018). Instead, those contaminated materials require testing to determine whether they are hazardous prior to appropriate disposal. Similarly, materials typically collected using vacuum trucks from catch basins, roadside ditches, storm drains, and similar infrastructure where oils, greases, and other contaminants may become concentrated are handled separately from street sweepings in some states (MA DEP, 2018; MT DEQ, 2023).

Even after excluding materials impacted by release of hazardous materials, street sweepings may contain contaminants including oils and greases, pesticides, herbicides, metals/metalloids, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) (Lloyd *et al.*, 2019; Miller *et al.*, 2016) and per and polyfluoroalkyl substances (PFAS). For stormwater management, the concerns are often different and focus instead on total suspended solids, nitrogen, and phosphate that can affect the quality of surface water or groundwater if the material is used for backfilling trenches or other applications in areas with shallow groundwater. Of particular concern are heavy metals, oils and greases, and PAHs due to their persistence in the environment and their tendency to be associated with vehicle emissions and leaks, asphalt binder, brake wear, and vehicle corrosion. Constituent concentrations in street sweepings may be influenced by factors including surrounding land use, average daily traffic count, roadway characteristics, frequency and timing of sweeping, and the type of street sweeping equipment used (Miller *et al.*, 2016).

2.2 POLLUTANTS OF CONCERN

Because street sweepings can be disposed of as solid waste or applied to a beneficial reuse depending on their chemical characteristics, numerous studies evaluated correlations between the source of street sweepings and contaminant concentrations.

2.2.1 Particle Size

Regardless of land use or traffic count, strong correlations between small particle size and elevated contaminant concentrations are consistently documented (Lloyd *et al.*, 2019 and Miller *et al.*, 2016). For instance, Lloyd *et al.* (2019) reported between 23% and 83% of the concentration of each heavy metal studied and 78% of the PAH load were associated with particles smaller than 300 micrometers (μm). The trend of increasing metals and PAH concentrations occurring with decreasing particle size was consistent with five other studies cited by Lloyd *et al.* (2019) and five others reported by Miller *et al.* (2016).

A study in Florida compared the effectiveness of street sweeping to catch basins and other BMPs and found that the finer fraction is often missed by mechanical street sweepers and passes through catchment basins and BMPs (Raje and Sansalone, 2022). This is consistent with other studies that indicate that smaller particles are more readily washed from the street surface. A review of the range of particles collected from street sweeping operations was summarized by Hixon *et al.* (2018) that shows that fine and medium particles comprise 80% of the street sweeping

and the fraction less than 250 μm in size was 30-50%. Therefore, the separation of the finer material that typically contains the POC for disposal and larger particle size for reuse will be dependent on the type of sweeper, sweeping frequency, geographical location, adjacent land use, and other regional factors.

2.2.2 Metals

Metals in street sweeping generally come from vehicles, which includes tire wear, studded tires, corrosion of bushings, wear of brake linings, (Viklander, 1998). This can include zinc, lead, chromium, copper, nickel, iron, cobalt, molybdenum, tungsten, and titanium. The metals are generally found in the finer fraction ($<75 \mu\text{m}$) and the concentrations are generally higher when the traffic load is higher (Viklander, 1998). In some cases, these studies produced conflicting results. For instance, Irvine *et al.* (2009) found that elevated concentrations of certain metals were correlated with a heavy industrial area while others were correlated with high-volume traffic areas within the city of Hamilton, Ontario. Conversely, Lloyd *et al.* (2018) determined that contaminant loads in street sweepings collected from 79 locations across the state of Virginia were not significantly correlated with average daily traffic count or with the type of land cover adjacent to the streets.

2.2.3 Organics

2.2.4 PFAS

PFAS are a family of chemicals for which there are potential risks to human health and the environment due to their highly persistent and toxic nature. As beneficial reuse of street sweeping has become more prominent, concerns have arisen on the potential for PFAS in street sweeping since they are present across many different industries including automotive, construction, consumer products, electronics, and the aviation industry. In a study in Florida, one hundred and seventeen street sweeping samples were collected from six different urban areas. PFAS was detected across all six urban areas in every sample, but the species and concentrations varied (Ahmadireskety *et al.*, 2022).

2.2.5 Nutrients

In the literature review by Hixon *et al.* (2019) they reference studies that have demonstrated reductions of total suspended solids (TSS) from street gutters on swept streets compared to unswept streets and reductions in total phosphorus and nitrogen. Based on the difficulty of sampling receiving bodies of water, the Hixon study looked at the fraction of street sweeping susceptible to runoff and determined that for phosphate (particles $<250 \mu\text{m}$) a 12% to 30% reduction in mass reduction was possible with street sweeping and that for nitrogen ($<841 \mu\text{m}$) that a 29% to 66% reduction was possible based on the limited data set (Hixon *et al.* 2019). Although nutrient loading is not a consideration for the disposal of street sweeping residue to a landfill, if alternative uses are being considered the presence of an additional nutrient load may need to be considered.

2.3 STORAGE

Street sweepers often use water to control dust generation during sweeping, and as a result may contain free liquid. In addition, the street sweeping debris will be moist or wet depending on the weather and method of collection. Since free liquids are prohibited from disposal in a MSW landfill (40 CFR 258.28) it is often standard practice to remove free liquid and dry the street sweeping debris prior to disposal at a MSW landfill. Some municipalities use

decanting facilities that drain the free liquid from the street sweeping vehicles to a water treatment or recycling facility or evaporation ponds.

Depending on the state, the street sweeping debris must be managed in a manner to keep leachate and debris away from surface water resources through berming, containers, placement on impervious surfaces, and/or designated areas/facilities while it is being stored prior to disposal. Depending on the degree of moisture, the sweeping debris may need to be dried. Drying may include rotating/turning the material to ensure the material is uniformly dried. Depending on the location, it may be necessary to provide overhead cover to prevent stormwater contact or cover with tarps to prevent dust generation, especially if the method collects the finer fraction. As discussed, in **Section 3.0** testing requirements and frequency are discussed by state and at times, the MSW facility. Therefore, management and handling of street sweeping debris should be part of a municipalities plan.

Ideally, accumulated street sweepings would be disposed of as soon as practical after the material is dried and or segregated appropriately. The temporary storage of street sweepings varied between states and generally ranged from three to six months.

2.4 DISPOSAL

Once collected, street sweepings can either be either discarded as solid waste (hazardous or non-hazardous) or applied to a beneficial reuse.

2.4.1 Landfill

Typically, street sweeping can be disposed of at a Class I (MSW) or Class II (industrial waste) landfill. In the review of the literature there were no cases found that permitted disposal of street sweeping waste at a construction and demolition landfill. The acceptance policy is based on the municipality and landfill operating plan to determine if testing is required in the absence of a state program.

2.4.2 Beneficial Reuse

Typical beneficial reuses of street sweepings include landfill daily cover, traction abrasive, subgrade beneath parking lots, general construction fill, and concrete aggregate. In general, states allowing beneficial reuse of street sweepings require that the material is screened to remove litter prior to use. A minority of states require some level of chemical analysis prior to reuse. For instance, Montana requires municipalities to test stockpiled street sweepings annually for Total Extractable Hydrocarbons (TEH) and chromium concentrations via the Toxicity Characteristic Leaching Procedure (TCLP) (MT DEQ, 2023). Missouri requires one sample per 500 cubic yards to be tested for benzene, toluene, ethylbenzene and xylene (BTEX), Total Petroleum Hydrocarbons (TPH), metals and SVOCs before allowing its use as structural fill, road base or as a soil amendment (Miller *et al.*, 2016). Based on previous test results, the state of Minnesota considers street sweepings safe for reuse in many areas as long as they are screened prior to stockpiling and are not used on playgrounds, residential yards, near drinking water wells, and other specified areas (MN PCA, 2010). Based on testing, Florida determined that the material can be used as a soil amendment, construction or industrial fill material, and other nonresidential projects, but must be at least 200 feet away from a potable well (FL DEP, 2004).

In contrast, in Virginia, road deposited sediment is not considered acceptable for beneficial reuse without some sort of treatment (Lloyd, 2019).

2.4.3 Composting

Especially in the fall when leaves are present, some municipalities dispose of the street sweeping by mixing the material with other compostable material once it has been screened to remove litter.

3.0 CURRENT STATE OF IDAHO STREET SWEEPINGS DISPOSAL PRACTICES

Street sweeping operations in Idaho appear to be managed at the county level. The Ada County Highway Department prepared a County Highway District Street Sweeping Plan that outlines sweeping locations and schedules, operator training requirements, waste management, and other facets of street sweeping operations (Brown and Caldwell, 2015). The Plan includes a standard operating procedure for the collection and analysis of material to determine its particle size distribution to determine the effectiveness of street sweeping operations however these data are specified for use in determining proper disposal or reuse of the material.

Ada County manages sweepings debris as nonhazardous waste to be disposed in the county landfill. To support disposal at this facility, an annual report is submitted to the Ada County Landfill detailing the results of annual testing for VOCs (EPA Method 8260), eight RCRA metals (EPA Method 1311), and a paint filter test (EPA Method 9095A). No reuse practices for typical street sweepings are in place however leaves collected during fall collections are composted, chips swept from recently chip-sealed roadways are recycled back into the chip-sealing supply line, and water decanted from vacuum trucks is filtered and used on sweepers, vacuum trucks, and water trucks. Other communities in the State do not have as formal a street sweeping program as the City of Boise.

4.0 DISPOSAL METHODS AND REGULATORY REQUIREMENTS BY STATE OR MUNICIPALITY PROXIMATE TO IDAHO

Programs managing the disposal or reuse of street sweepings vary greatly between states with some having no state-wide regulations (i.e., North Dakota and Nevada) and others requiring chemical sampling, albeit limited, prior to reuse (i.e., Missouri and Montana) (Miller *et al.*, 2016; MT DEQ, 2023; ND DEQ, 2023a). In a survey of 47 state or municipal departments of transportation across the United States, Miller *et al.* (2016) tabulated that 15% categorically classify street sweepings as hazardous waste requiring disposal under applicable state or federal regulations while 67% classify street sweepings as solid waste that may be disposed of in a landfill or considered for beneficial reuse.

Within individual states, street sweepings disposal and reuse are often managed at the municipal level. In general, street sweepings collected from areas free of acute releases of hazardous materials (i.e., spills, waste cleanup sites, or other contaminated areas) are considered non-hazardous, are generically covered under state solid waste regulations, and can be disposed of in approved solid waste disposal facilities without analytical testing. Beneficial reuse of street sweepings is allowed in many areas and can provide economic benefits however some use restrictions and/or testing and reporting requirements may be applicable. In some cases, beneficial reuse is uneconomical due to the expense of screening or washing the sweepings compared to disposal at a landfill.

The remainder of this section describes state-level regulations or guidance in states and municipalities directly neighboring or in the vicinity of Idaho. Where possible, information was obtained from discussions or email correspondence with state environmental regulatory agencies or municipal public works personnel. When such

personnel were unavailable, an online search of state regulations and guidance was conducted. **Table 1** summarizes the agencies contacted as part of this research and whether they provided a response.

When an agency contact was available to discuss their programs and policies regarding disposal or reuse of street sweepings a questionnaire was provided listing questions pertinent to this research (Appendix A). Questions included topics such as whether the agency had written regulation or guidance documents guiding disposal, the types of materials considered to be street sweepings, disposal methods, options for reuse, required analytical methods, etc.

TABLE 1. Summary of Disposal and Beneficial Reuse Options Identified at States or Municipalities Proximal to Idaho.

Agency	Representative	Response Provided	Date Contacted
Arizona DEQ	Administrative Assistant	No	April 25, 2023
Montana DEQ	Tim Stepp	Yes	April 13, 2023
Oregon DEQ	Julie Miller	No	April 13, 2023
Oregon DEQ	Todd Hess	Yes (referred to webpage)	May 1, 2023
Washington Department of Ecology	Peter Lyon	No	April 13, 2023
South Dakota DANR	Steve Kropp	Yes	April 14, 2023
North Dakota DEQ	Ted Popke	Yes	April 13, 2023
Wyoming DEQ	Kevin Frank	No	April 13, 2023
Nevada DEP	Anonymous	Yes	April 14, 2023
Utah DEQ	Brian Speer	No	April 25, 2023
New Mexico Environmental Department	Levi Lementino	No	April 25, 2023
Las Vegas PWD	Sherri McManning	Yes	April 27, 2023

Agency	Representative	Response Provided	Date Contacted
Missoula PWMD	Brian Hensel	Yes	April 25, 2023
Sioux Falls PWA	Dustin Hansen	Yes	April 26, 2023
Salt Lake City Streets Division	General Voicemail	No	April 25, 2023
Spokane Street Maintenance Division	James Biggar	No	April 25, 2023

4.1 NORTH DAKOTA

The state of North Dakota has no regulations, guidance, or programs specific to the management of street sweepings (ND DEQ, 2023a).

4.1.1 Disposal

The state considers street sweepings to be inert material with no permitting required for collection points receiving street sweepings (North Dakota Administrative Code 33-20-02.1-01) or for solid waste management facilities accepting street sweepings or other inert waste serving municipalities with a combined population less than 1,000 (North Dakota Administrative Code 33-20-02.1-02). Larger municipalities include street sweepings as inert waste in their regular permitting activities for solid waste disposal.

4.1.2 Beneficial Reuse

As an inert waste, street sweepings are allowed for beneficial reuses as described under Guideline 38 (ND DEQ, 2023b). Allowable reuses are not specified, however as it pertains to street sweepings, the material must be screened to remove litter prior to reuse and must be managed in a way that is consistent with other state and federal regulations applicable to placement of clean fill (i.e., coordination with US Army Corps of Engineers for use in Waters of the US, etc.) (ND DEQ, 2023b).

4.2 MONTANA

The state of Montana has no official regulations or guidance applicable to management of disposal of street sweepings (MT DEQ, 2023). The state considers street sweepings to be inert material with the potential to be contaminated. Material collected from storm drains, roadside ditches, curb inlets, etc. using vacuum-trucks are not considered street sweepings, are not considered for beneficial reuse, and must be landfilled as solid waste.

Whether to dispose or reuse street sweepings in Montana is a decision made at the municipal level and appears to be driven by regulations defining whether the sweepings are considered hazardous or non-hazardous and other requirements specific to the landfill excepting the material.

Based on the results of TCLP testing, street sweepings may be disposed in a landfill as either hazardous or non-hazardous solid waste. Street sweepings that contain a considerable amount of litter are required to be disposed of as solid waste.

4.2.1 Beneficial Reuse

The state of Montana allows for street sweepings to be applied to beneficial reuses as proposed by the municipality that collected the sweepings after screening to remove litter. Beneficial reuses can be proposed by municipalities and are largely evaluated by DEQ based on TEH concentration and TCLP results for chromium (the state considers chromium concentrations to be representative of other metals that may also be present in the sweepings) (MT DEQ, 2023). Known reuses include landfill daily cover and winter traction. Additionally, the city of Kalispell uses street sweepings to level ground used to land farm wastewater treatment facility sludge (MT DEQ, 2023).

At least one municipality, the City of Missoula, has determined that beneficial reuse of street sweepings is uneconomical (City of Missoula PWMD, 2023). The city Public Works and Mobility Department stockpiles street sweepings throughout the year, tests one annual composite for Resource Conservation and Recovery Act (RCRA) metals, BTEX, and hydrocarbons, and disposes of the sweepings at the city landfill where it is either used as daily cover or disposed as waste depending on the current needs of the landfill operator. The sweepings are accepted into the landfill free of charge in exchange for the city conducting street sweeping on the landfill's access roads. Due to consistently elevated constituent concentrations and assumed poor geotechnical stability the City of Missoula does not envision reuse of sweepings unless they would be required to pay for disposal. Reuse of the sweepings as winter traction is uneconomical due to EPA's requirement that the City of Missoula only use washed sand as winter a traction material. The labor and expense to separate the fine from coarse sweepings, washing, and subsequent disposal of the wash liquid make this option uneconomical under the reciprocal disposal agreement.

4.3 NEVADA

The state of Nevada has no regulations or guidelines pertaining to street sweepings, primarily due to the minimal volume of sweepings generated within each municipality. Street sweepings are placed along with other materials into evaporation basins permitted under the state's water pollution control program. Once the combined materials are sufficiently dry, they are disposed into landfills as solid waste (Anonymous 2023).

The City of Las Vegas currently disposes of all street sweepings as solid waste in their municipal landfill and it is not used as daily cover. The city does not have the capacity or desire to test or segregate sweepings for reuse (City of Las Vegas PWD, 2023).

4.4 OREGON

In the state of Oregon, street sweeping is managed by each county or municipality and managed under the general Solid Waste Provisions (OAR 340-93). The Oregon Department of Transportation (ODOT) requires road waste to be managed by conventional methods, which specified that the solid waste goes to landfills and liquid waste to

sewage treatment plants. An extensive three phase research project was conducted that looked at the issues and options, field trials, and the final report (Collins and Moore, 2000). The report indicated that road waste was not a hazardous waste and that the level of pollutants and trash varies widely. The report covers reuse options, dewatering solids and disposal in extensive detail.

4.4.1 Disposal

Unless approved as a beneficial use, the material is regulated under the solid waste rules and should be disposed at a landfill.

4.4.2 Beneficial Reuse

The State of Oregon DEQ reviews applications for beneficial use of solid waste such as street sweepings (Oregon Administrative Rules 340-0093-0260 through -0290, and 0030) (Oregon DEQ, 2023). If approved, Oregon DEQ no longer regulates the sweepings as a solid waste as long as the material is used in accordance with the beneficial use determination.

Current approved beneficial uses of street sweepings include the use of fines as a spill response absorbent and sand as winter traction (OAR 340-093-0270 (5)). After use as a spill response absorbent, street sweepings fines must undergo a hazardous waste determination and be disposed at an appropriate disposal site. To be used for winter traction, sweepings must be swept from the road surface within six months of application or after being re-exposed after snowmelt and the sand fraction separated from the bulk sweepings. Other approved beneficial uses for street sweeping debris includes composting organic material, using sand, silts and clay for aggregate, clean fill, and reusing winter road sand.

4.5 SOUTH DAKOTA

The state of South Dakota has no regulations or guidelines specific to street sweepings and manages it in the same manner as car wash sump wastes which are considered inert (SD DANR, 2023a and 2023b). The state does consider materials removed from non-industrial sources such as storm drains, roadside ditches, curb inlets, etc. using vacuum-trucks to be the same as street sweepings and these materials are all acceptable to be disposed as non-hazardous waste or applied to beneficial reuse as landfill daily cover. No analytical testing or reporting requirements are in place.

The state requires that street sweepings be stored away from surface water resources in a manner to control run-on and run-off prior to disposal or reuse (SD DANR, 2023a).

4.5.1 Disposal

Street sweepings may be disposed in permitted landfills and wastewater treatment facilities after receiving approval from the operator (SD DANR, 2023b).

The City of Sioux Falls, South Dakota disposes of street sweepings collected in the spring in a landfill as solid waste (City of Sioux Falls PWA, 2023). Previous testing showed that these street sweepings had metal concentrations below RCRA standards suggesting that beneficial reuse was possible however the expense to screen litter from the limited volume of sand present in the sweepings and the potential for contamination makes this uneconomical.

4.5.2 Beneficial Reuse

The only beneficial reuse of street sweepings that the South Dakota Department of Agriculture and Natural Resources is aware of is landfill daily cover however, under the state's Sump Waste Disposal Guidelines, this material could also be land applied on agricultural, crop, or pasture lands with no required permitting (SD DANR, 2023b).

As discussed above, the City of Sioux Falls does not apply their springtime street sweepings to beneficial use. However, fall sweepings which consist of about 90% leaves are composted (City of Sioux Falls PWA, 2023).

4.6 WASHINGTON

In the state of Washington, street sweepers are defined in WAC 296-127-01393 and is managed by each county or municipality. Solid disposal includes landfill disposal, asphalt and concrete manufacture, hazardous waste treatment, reuse, and fill. All street wastes must be regularly tested for contaminants based on volume generate, so it will be based on either time or volume, but a minimum once per quarter.

4.6.1 Disposal

Unless approved as a beneficial use, the material is regulated under the solid waste rules and should be disposed at a landfill.

4.6.2 Beneficial Reuse

Acceptable reuse options include compost, screened coarse sand street sanding, feedstock for topsoil, fill under sod or pavement, top dressing on roadway slopes, road/parking lot subgrade; and cement/asphalt manufacturing.

4.7 SUMMARY

States within the vicinity of Idaho interviewed for this report do not directly regulate disposal or reuse of street sweepings at the state level. Instead, street sweepings are considered as solid waste and must be handled in a manner consistent with regulations applicable to other solid waste. In some cases, municipalities are required to apply to the state for permission to apply street sweepings to beneficial reuse however some states require no notification or permitting for beneficial reuse. Individual municipalities generally stockpile street sweepings until disposing of them after the year's street sweeping activities are concluded. The municipalities follow their own protocols for whether to dispose or reuse the sweepings with requirements for disposal largely guided by the requirements of landfill operators (*i.e.*, whether or not analytical testing is required as part of landfill permitting activities). In the municipalities interviewed for this report, reuse of street sweepings is not practiced due to the limited volume of sweepings, low cost to landfill the sweepings (as waste or daily cover), the potential for sweepings to be contaminated, and the cost to screen or wash sweepings prior to reuse.

TABLE 2. Summary of State Disposal and Beneficial Reuse Options Identified Proximal to Idaho.

State	Disposal / Reuse Option	Required Testing	Permitting or Other Agency Notification
North Dakota	Landfill as waste or daily cover. Other reuses are allowed but not practiced.	None	None
Montana	Landfill as waste or daily cover, winter traction, mix with wastewater sludge.	As required by landfill accepting waste. TEH and TCLP for chromium if requesting Beneficial Use Determination from DEQ.	Apply to DEQ for previously unapproved beneficial reuse.
Nevada	Landfill as waste or daily cover.	None	None
Oregon*	Landfill as waste or daily cover. Compost, fill, spill response absorbent, winter traction.	None as of 2016	Apply to DEQ for previously unapproved beneficial reuse.
South Dakota	Landfill as waste or daily cover.	None	None
Washington*	Landfill as waste or daily cover, berms, fill.	None as of 2016	

Data from interviews cited in Section 4 unless indicated with "*" in which case data are from Miller *et al.* (2016).

TABLE 3. Summary of Municipal Disposal and Beneficial Reuse Options Identified Proximal to Idaho.

Municipality	Disposal / Reuse Option	Required Testing	Permitting or Other Agency Notification
Las Vegas, Nevada	Landfill as waste or daily cover.	None	None
Missoula, Montana	Landfill as waste or daily cover.	Annual testing of composite for RCRA metals, BTEX, and dissolved hydrocarbons.	None, reuse not under consideration at this time.
Sioux Falls, South Dakota	Landfill as waste or daily cover.	None	None
King County, Washington*	Landfill as waste gravel pit reclamation.	None. Use internal standards and test for TPH and PAHs.	

Data from interviews cited in Section 4 unless indicated with “*” in which case data are from Miller *et al.* (2016).

5.0 CONCLUSIONS AND RECOMMENDATIONS

States and municipalities in the vicinity of Idaho interviewed or researched for this report regulate street sweepings as solid waste. As such, street sweepings in these locations are usually disposed in a landfill as waste or daily cover according to the needs and requirements of the specific landfill. While street sweepings are generally allowed to be applied to other beneficial uses this is typically not the preferred disposal option due to the limited volume of sweepings collected in each municipality and the expense / effort to render the sweepings suitable for reuse and in some cases to obtain approval for such uses.

6.0 REFERENCES

Ahmadireskety, Atiye, Bianca F. Da Silva, Nicole M. Robey, Thomas E. Douglas, Joe Aufmuth, Helena M. Solo-Gabriele, Richard A. Yost, Timothy G. Townsend, and John A. Bowden (2022). Per- and Polyfluoroalkyl Substances (PFAS) in Street Sweepings. *Environ. Sci. Technol.* 2022, 56, 10, 6069–6077. DOI: 10.1021/acs.est.1c03766

Brown and Caldwell. (2015). Street Sweeping Plan. Prepared for Ada County Highway District Boise, Idaho. September 16, 2015.

- City of Las Vegas Public Works Department (PWMD). (2023). Telecommunication with Sherri McManning Re: Las Vegas's Rules or Guidance for Disposal of Street Sweepings. April 27, 2023.
- City of Missoula Public Works and Mobility Department (PWMD). (2023). Telecommunication with Brian Hensel Re: Missoula's Rules or Guidance for Disposal of Street Sweepings. April 25, 2023.
- City of Sioux Falls Public Works Administration (PWA). (2023). Voicemail from Dustin Hansen Re: Sioux Fall's Rules or Guidance for Disposal of Street Sweepings. April 26, 2023.
- Collins, Jay T. and Jeffrey T. Moore (2000). Roadwaste Management: A Tool for Developing District Plans, Oregon Department of Transportation, p187.
- Elium, Marie (2010). Street Sweeping: The Grit that Keeps on Giving. North American Sweeper Magazine http://www.nasweeper.com/2010/06/main_articles/street-sweeping-the-grit-that-keeps-on-giving/
- Environmental Protection Agency (2021). Stormwater Best Management Practice, Parking Lot and Street Sweeping. EPA-832-F-21-030J, December 2021. <https://www.epa.gov/system/files/documents/2021-11/bmp-parking-lot-and-street-sweeping.pdf>
- Florida Department of Environmental Protection (2004). Guidance for the Management of Street Sweepings, Catch Basin Sediments and Stormwater System Sediments. <https://floridadep.gov/waste/permitting-compliance-assistance/documents/guidance-management-street-sweepings-catch-basin>
- Hixon, Lee and Randall Dymond (2019). Characterization of Street Sweeping Material for Addressing Total Maximum Daily Waste Load Allocations. J. Sustainable Water Built Environ., 5(3): 04019003.
- Hixon, Lee and Randall Dymond (2018). State of the Practice: Assessing Water Quality Benefits from Street Sweeping. J. Sustainable Water Built Environ., 4(3): 04018007.
- Irvine, K., Perrelli, M., Ngoen-klan, R., and Droppo, I. (2009). Metal Levels in Street Sediment from an Industrial City: Spatial Trends, Chemical Fractionation, and Management Implications. Journal of Soils and Sediments 9:328-341.341
https://www.researchgate.net/publication/225470324_Metal_levels_in_street_sediment_from_an_industrial_city_Spatial_trends_chemical_fractionation_and_management_implications
- Lloyd, L.N., Fitch G.M., Singh T.S., and Smith J.A. (2019). Characterization of Environmental Pollutants in Sediment Collected During Street Sweeping Operations to Evaluate its Potential for Reuse. J. Environ. Eng, 145(2): 04018141.
- Massachusetts Department of Environmental Protection (DEP). (2018). Reuse and Disposal of Street Sweepings. DEP Policy # BAW-18-001. <https://www.mass.gov/doc/street-sweepings-reuse-disposal-policy-baw-18-001/download>
- Miller, C.M., Schneider W.H., and Kennedy M.J. (2016). Procedures for Waste Management from Street Sweeping and Stormwater Systems. University of Akron. Akron, Ohio.
https://rosap.nsl.bts.gov/view/dot/31076/dot_31076_DS1.pdf?
- Minnesota Pollution Control Agency (PCA). (2010). Managing Street Sweepings. w-sw4-54. June.
<https://www.pca.state.mn.us/sites/default/files/w-sw4-54.pdf>
- Montana Department of Environmental Quality (DEQ). (2023). Telecommunication with Tim Stepp Re: Montana's Rules or Guidance for Disposal of Street Sweepings. April 13, 2023.

North Dakota Department of Environmental Quality (DEQ). (2023a). Telecommunication with Ted Popke Re: North Dakota's Rules or Guidance for Disposal of Street Sweepings. April 13, 2023.

North Dakota Department of Environmental Quality (DEQ). (2023b). Guideline 38 - Beneficial Use of Inert Waste. March 2023. <https://www.deq.nd.gov/Publications/WM/Guideline38BeneficialUseOfInertWaste.pdf>

Oregon Department of Environmental Quality (DEQ). (2023). Materials Management Website. <https://www.oregon.gov/deq/mm/Pages/Beneficial-Use-of-Solid-Waste.aspx> Accessed April 26, 2023.

Raje, Saurabh and John Sansalone, (2022). Physical Characteristics of Particulate Matter Recovered from Urban Drainage Systems. J. Environ. Eng. 148(11):04022071.

San Diego, City of (2020). Performance Audit of the Transportation and Stormwater Department's Street Sweeping Section; To Improve Efficiency of Operations, September 2020. https://www.sandiego.gov/sites/default/files/21-003_streetsweeping.pdf

South Dakota Department of Agriculture and Natural Resources (DANR). (2023a). Email with Steven Kropp Re: Street Sweepings Questions. April 14, 2023.

South Dakota Department of Agriculture and Natural Resources (DANR). (2023b). Waste Management in South Dakota - Sump Waste Disposal Guidelines. Website Accessed April 20, 2023. <https://danr.sd.gov/Environment/WasteManagement/SolidWaste/SumpWaste.aspx>

United States Environmental Protection Agency (USEPA). (2013). Beneficial Use of Waste Materials: State of the Practice 2012. EPA/600/R-13/260. https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=536263

Viklander, Maria (1998). Particle Size Distribution and Metal Content in Street Sediments. J. Environ. Eng, 124(8): 761-766.

Washington State Department of Transportation (1993). Management of Hazardous Waste from Highway Maintenance Operations, WA-RD 286.1, p115

APPENDIX A: STATE / MUNICIPALITY QUESTIONNAIRE

1. Does the state have regulations or guidance documents for the disposal of street sweepings?
Yes No

If so, where can these documents be found?

2. What type of material does the state consider "street sweeping residuals"?

Inert material	Yes	No
Organics	Yes	No
Fall leaf collection	Yes	No
Dead animals	Yes	No
Metals or other roadside litter	Yes	No
Vac-truck contents	Yes	No

Other (please list):

3. Do street sweeping residuals include material collected using a vac-truck or other means from roadside ditches, storm drains, roadside curb inlets, stormwater channels, and/or pipe for stormwater discharge?
Yes No

If not, how is this material managed differently than street sweepings?

4. Which disposal methods are permitted in the state for street sweeping residuals?

Beneficial reuse	Yes	No
Landfill as non-hazardous waste	Yes	No
Landfill as hazardous waste	Yes	No
Composting	Yes	No

Other (please list):

5. If beneficial reuse is permitted, can it be used for:

Clean cover	Yes	No
Winter traction	Yes	No
Subgrade below parking lots	Yes	No
Filling strip medians	Yes	No
Other (please list):		

6. What type of analysis/testing is required for the reuse or disposal of street sweeping residuals?

None	Yes	No
Physical characterization (i.e., particle size)	Yes	No

Chemical characterization
(i.e., heavy metals, petroleum

hydrocarbons, PAHs, phthalates,
pesticides, herbicides, etc.)

Yes No

Other (please list):

How frequently do the residuals have to be tested?

Monthly

Yes No

Quarterly

Yes No

Annually

Yes No

Other (please state):

Does the frequency change after a certain number of samples (please state)?

7. What are the reporting requirements to the state regulatory agency (e.g., analytical, volume, frequency)? Please explain.

8. What are the requirements for how residuals are stored, screened, dried, and processed prior to reuse or disposal? Can residuals be screened and part reused and part disposed?

9. What is the state regulatory agency's general preferred method for disposal of street sweeping and/or vac truck residue?

10. Are there any educational programs in the state related to street sweeping?

11. Do you have an estimate of the volume of residuals disposed annually at municipal solid waste facilities? Are municipalities required to track the volumes? Please explain.