
Appendix A: Survey Methodology and Results

We surveyed 520 counties, cities, and townships in Minnesota. We received 427 responses, or approximately 80 percent of our survey sample. The purpose of the surveys was to gather information on snow and ice control in local governments. Because no comprehensive data on snow and ice control costs, operations, or practices had ever been collected, we needed to build our own data base of information. We subsequently used that information to help identify examples of effective practices and to report current findings and trends in snow and ice control across the state.

SURVEY DESIGN

We developed 24 principal questions for our survey. Because most questions had more than one specified part, the total number of sub-questions was 136.¹ The questions were open-ended (30 sub-questions), closed-ended (88 sub-questions), and a mix of both (18 sub-questions). The questions generated both quantitative and qualitative data. We developed questions on general information (*e.g.*, size, roads, and lane miles), snow and ice control information (*e.g.*, costs, snowfall, operations, and practices), and summary information (*e.g.*, challenges, innovations, and needs). We used an 11-page survey to gather systematic, comprehensive information on all major facets of snow and ice control. Our technical advisory panel pretested the survey before we sent it to our sample.

DATA COLLECTION

We surveyed all 87 Minnesota counties, all 186 cities with a population of 2,500 or more, a sample of cities with a population less than 2,500, and a sample of townships. We randomly sampled ten per-

cent (72 cities) of all cities with populations less than 2,500 and ten percent (175 townships) of all townships, with both samples stratified across 13 districts to achieve geographic representation. We additionally surveyed all eight Mn/DOT district headquarters, as well as five Mn/DOT subdistricts where appropriate. We allowed departments two weeks from the mailing date to return the survey in a self-addressed, stamped envelope provided by this office. We then sent another survey and follow-up letter to departments which had not responded by the deadline, again asking departments to complete and return the survey. We mailed the surveys to county engineers, city public works directors or street superintendents, and township clerks.

DATA ANALYSIS

We completed data entry internally and inspected the data for response and entry errors. We used frequency distributions and descriptive statistics to summarize and report data. Departments which returned a survey but answered questions incompletely (non-responses) were included in frequencies of responses but omitted in median statistics. Survey results found in this report are sample responses, not estimates for all local governments in the state.

RESULTS

We report the survey results on the following pages for each type of jurisdiction. A total of 414 local government respondents, or 80 percent of those surveyed, returned the survey as indicated in Table A1. Figure A1 shows the distribution of the local governments that responded to our survey. All 13 Mn/DOT districts and subdistricts returned their surveys.

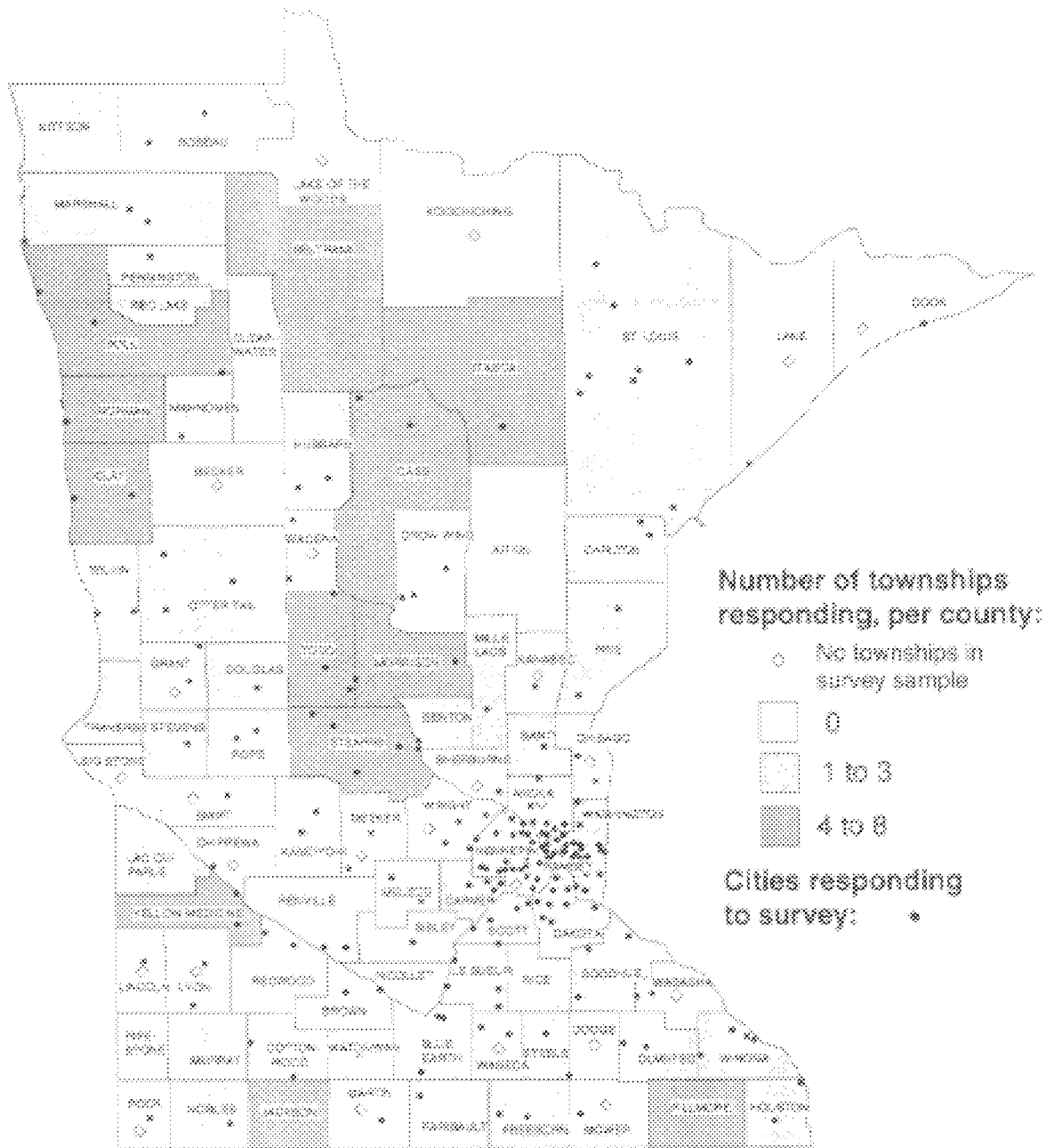
¹ A sub-question is any question or part of a question in the survey specified with a number (*e.g.*, 1, 2, 3) or letter (*e.g.*, a, b, c).

Table A1: Local Governments Responding to Snow and Ice Control Survey

<u>Jurisdiction</u>	<u>Number of Surveys Returned</u>	<u>Number of Surveys Sent</u>	<u>Percent of Surveys Returned</u>
Counties	81	87	93%
All Cities	204	258	79
Cities >2,500	154	186	83
Cities <2,500	50	72	69
Townships	<u>129</u>	<u>175</u>	<u>74</u>
ALL JURISDICTIONS	414	520	80%

Responses found on the following survey instrument are reported for counties, cities (all sizes combined), and townships, respectively.

Figure A1: Cities and Townships Responding to Snow and Ice Control Survey, by County



Note: All 87 counties were surveyed and 93 percent responded. Aitkin, Chisago, Crow Wing, Houston, Redwood and Rice counties did not respond in time for analysis. Of 258 cities surveyed, 204 cities (79 percent) responded in time for analysis. Of 175 randomly selected townships, 129 townships (74 percent) responded in time for analysis.

Source: Office of the Legislative Auditor snow and ice control survey.

Note: Responses are listed first for counties, second for cities, and third for townships.

Office of the Legislative Auditor
Best Practices Reviews

SNOWPLOWING PRACTICES SURVEY

INSTRUCTIONS Please complete this survey with information from your 1993-1994 winter snowplowing season. If you do not have information on a particular question, or the question does not apply to your jurisdiction, simply write "NA" in the corresponding question blank. You may attach a separate sheet for responses as needed.

Please return this survey in the enclosed envelope by January 18, 1995.

Person Completing Survey _____

Position _____ Phone Number _____

GENERAL INFORMATION

1. Jurisdiction _____
(name of county, city, or township)

2. Population _____
(number of residents in jurisdiction)

3. Centerline miles of roadway (total miles under your jurisdiction by type of road):

County Jurisdictions

City/Town Jurisdictions

- a) gravel roads 194 centerline miles
- b) two-lane 314 centerline miles
- c) multiple lane 3 centerline miles
(more than two-lane)

- d) gravel roads 3 30 centerline miles
- e) local streets 30 3 centerline miles
- f) major arterials 8 -- centerline miles

4. Number of:

- | | | | | |
|----------------------------|----------------|-----------|-----------|----------|
| a) cul-de-sacs/dead-ends | median: | 3 | 24 | 5 |
| b) bridges | | 90 | 3 | 4 |
| c) alleys | | 25 | 15 | 2 |
| d) other (Please specify): | | 65 | 10 | 5 |

5. What type of curbs does your jurisdiction have? *(Check all that apply)*

<u>Percent Who Checked Yes</u>					<u>Medians</u>				
25%	49%	2%	<input type="checkbox"/> a)	surmountable	_____	percent surmountable curbs	10	20	--
32	39	2	<input type="checkbox"/> b)	bituminous	_____	percent bituminous curbs	5	10	51
20	26	1	<input type="checkbox"/> c)	right angle	_____	percent right angle curbs	15	25	--
86	82	2	<input type="checkbox"/> d)	concrete	_____	percent concrete curbs	95	95	4
10	6	--	<input type="checkbox"/> e)	barrier	_____	percent barrier curbs	95	25	--
5	18	4	<input type="checkbox"/> f)	other <i>(Please specify type and percent):</i> _____			87	25	--
10	5	66	<input type="checkbox"/> g)	N/A					

SNOWPLOWING DATA

Medians

6. a) What is the estimated 1993-94 cost of your snow and ice operations (excluding capital) ?

\$231,528
35,775
4,295

b) What percent of your estimated 1993-94 winter operating costs went toward:

	<u>Medians</u>		
(1) Snowplowing personnel costs	33%	50%	50%
(2) Snowplowing materials and equipment (operating and maintenance) costs	67%	46%	59%

7. Total 1993-1994 Winter Snowfall	55	52	37	inches
8. Total 1993-1994 Winter Snow Events	26	17	13	events
9. Total 1993-1994 Winter Snowplowing Operations	34	15	10	operations
10. Total 1993-1994 Winter Sand/Salt Operations	25	24	8	operations

11. Routes

a) How many snow plowing routes are in your jurisdiction?

Medians: 13 4 1 routes *(total number of routes or average number of routes if jurisdiction has multiple snowplowing policies)*

b) What were the total man-hours spent on snow/ice control in the 1993-94 season?

Medians: 5,799 1,080 130 hours

d) Do you establish priority routes that are plowed first following a snow fall?

<input type="checkbox"/> no	<input type="checkbox"/> yes
9% 12% 43%	90% 84% 29%

e) How often do you re-evaluate or change your routes?

<input type="checkbox"/> every year	<input type="checkbox"/> every 2-5 years	<input type="checkbox"/> every 5 + years	<input type="checkbox"/> never
62% 55% 26%	30% 11% 3%	4% 5% 0%	2% 20% 45%

Note: Responses adding to less than 100% indicate that some local governments did not respond.

Note: Responses are listed first for counties, second for cities, and third for townships.

12. PERSONNEL

SNOWPLOWING EMPLOYEE DATA (responses are medians unless otherwise designated)		SNOWPLOWING PERSONNEL										
		SUPERVISORS		SNOWPLOW OPERATORS								
				Regular Staff			Back-Up Staff <i>(additional non-contract persons used in full call-out)</i>			Contract Staff		
				<i>full-time</i>	<i>part-time</i>		<i>full-time</i>	<i>part-time</i>		<i>routinely used</i>	<i>used only in full all-out</i>	
Number of Snowplowing Employees		1 1 1	15 5 1	3 2 1	3 4 1	2 2 2	2 2 2	2 4 --				
1993-1994 Employee Man-Hours <i>(1993-94 winter hours worked)</i>	<i>regular hours</i>	450 131 313	4,442 975 334	390 62 148	80 120 148	80 50 27	852 47 210	-- 277 --				
	<i>overtime hours</i>	99 42 59	801 200 48	60 25 --	39 100 --	-- -- --	-- -- --	-- -- --				
Average Hourly Employee Wage <i>(1993-94 hourly dollar rate)</i>	<i>regular rate</i>	15 17 10	12 14 10	8 8 10	13 15 10	8 9 8	42 39 23	60 50 55				
	<i>overtime rate</i>	22 22 16	18 20 18	13 14 12	19 22 12	11 10 --	-- -- --	-- -- --				
Unionized <i>(circle one)</i>	<i>yes</i>	14%12% 0%	74%44% 0%	5% 3% 0%	15%13% 0%	17% 1% 0%	1% 1% 1%	1% 1% 0%				
	<i>no</i>	64%50% 5%	11%23% 6%	17%15%11%	1% 6% 1%	6% 8% 3%	9% 8% 4%	2% 9% 1%				

13. MATERIALS

MATERIALS USED	1993-1994 WINTER SNOW SEASON						
	TOTAL USE <i>(tons or gallons)</i>			UNIT COST <i>(dollars per ton/gallon)</i>			PROPORTION AND CONDITIONS FOR USE <i>(percent material used and winter weather conditions necessary for application)</i>
Sand Only	5,500	564	6	\$2.52	\$3.98	\$6.00	
Salt Only (no sand mixed)	883	141	5,020	\$29.62	\$28.50	--	
Salt/Sand Mix	2,500	750	20	\$12.09	\$12.43	\$12.50	average % salt mixed: 10 15 10 average % sand mixed: 90 80 90
Salt Brine	1,000	70	--	--	--	--	(a) average % salt mixed: -- 18 -- average % water mixed: -- -- -- (b) average % brine mixed: -- -- -- average % sand, salt or mix mixed: -- 59 --
Dry Calcium Chloride	2.5	5.5	--	\$275	\$210	--	
Liquid Calcium Chloride	3,250	1,680	--	\$675	--	--	
Alternative Deicers (please specify)	--	--	--				
Other	2	2	--				

14. EQUIPMENT

a) Motor Vehicles

MOTORIZED EQUIPMENT USED FOR PLOWING	NUMBER			OWNERSHIP					
	medians			<i>(number owned, leased or shared with another jurisdiction)</i>					
				percentages					
				Own	Lease	Share			
Total Dump Trucks	10	4	1	95%	77%	9%	--	1%	1%
Tandem dump trucks with plow	5.5	2	--	32	14	1	--	--	2
Tandem dump trucks with plow & wing	7	2	--	86	19	1	--	1	1
Tandem dump trucks with underbody plow	2.5	1	--	32	7	--	--	--	--
Single axle dump trucks with plow	2	3	1	35	52	3	--	1	--
Single axle dump trucks with plow & wing	2	2	1	53	46	6	--	--	1
Single axle dump trucks with underbody plow	2.5	2	--	17	24	1	--	1	--
Total Front-End Loaders	2	2	--	85	73	4	--	2	--
Loaders with bucket	2	1	--	79	62	3	--	1	--
Loaders with plow	1	1	--	7	25	--	--	--	--
Loaders with plow and wing	2	1	--	4	1	--	--	1	--
Total Pick-Up Trucks	8	2	--	53	65	2	--	1	--
Total Tractors	4	1	1	46	37	3	--	2	--
Graders	5	1	1	88	63	17	1	1	4
Snowthrowers/Snowblowers	2	1	4	57	54	--	--	1	1
Sidewalk Plow	1	1	--	9	43	--	--	--	--
Other (please specify): (percent who specified other)	12%	10%	2%						

b) Vehicle Attachments

ATTACHMENTS	NUMBER medians		
Plows	5	20	2
Standard One-Way	11	2	1
Two-Way Reversible	1	4	1
V-Plow	9	1	1
Underbody	4	2	1
Rotary	2	1	--
Other (please specify):	1	1	--
Wings	14	3	1
Sanders/Spreaders	9.5	3	1
Tailgate	9	3	1
V-Box, Permanent Mount	2	2	--
V-Box, Slip In	1	1	--
Towed	--	--	--
Other (please specify):	1	1	--
Sander Controls	10	3	--
Manual	10	3	1
Automatic	7	2	3
Ground-Oriented	5.5	1	--
Other (please specify):	--	1	--
Buckets	2	2	1
Snow Scoops	1	1	--
Other (please specify):	1	1	2

Note: Responses are listed first for counties, second for cities, and third for townships.

15. Do you have a capital equipment replacement plan?

no **10% 21% 55%** yes **90% 74% 10%**

Note: Responses are listed first for counties, second for cities, and third for townships.

If yes, how is it funded?

75% 46% 8% annual budget
-- 5 -- bond issue
1 9 2 equipment depreciation
-- 5 4 other (Please specify): _____

SNOWPLOWING PRACTICES

16. Snow Plans and Policies (Please attach to this completed survey copies of your jurisdiction's snow-related policies. As with other information in this survey, the policies are solely for the purpose of gathering information and comparing data and will not be the subject of audits or evaluations.)

a) Does your jurisdiction have a written snow plan or policy?

no (If no, proceed to "b") **46% 41% 56%** yes **52% 50% 17%**

(1) If yes, has it been approved by your governing body?

no **11% 8% 2%** yes **42% 43% 19%**

(2) Are there different policies in effect for different snow storms and conditions?

no **25% 25% 16%** yes **27% 25% 4%**

(3) Within your policies do you set snowplowing procedures according to:

class of street **17%** level of service **21%** time of day **20%** amount of traffic **31%**
 desired **18% 2% 8% 23% 2%**
 weather conditions **40%** other (Please specify): _____ **3% 6% 4%**

(4) How frequently are you able to follow the policy(ies)?

all of the time **9%** most of the time **43%** some of the time **1%** rarely **--**
15% 10% 34% 11% 3% 2% -- -- --

b) Does your jurisdiction have a citizen parking plan or policy during snow plowing?

no (If no, proceed to "c") **90% 21% 67%** yes **6% 74% 2%**

(1) If yes, is this parking policy enforced?

all of the time **--** most of the time **27%** some of the time **3%** rarely **1%**
2% 3% 30% 2% 14% -- 4% 2%

(2) If yes, how effective do you consider the parking policy?

highly effective **3%** moderately effective **30%** somewhat effective **1%** little effect **1%**
1% 26% 2% 3% 12% 1% 6% 1%

Note: Responses adding to less than 100% indicate that some local governments did not respond.

c) What other policies, not included in your general snow control policies (mentioned above), does your jurisdiction have?

Note: Responses are listed first for counties, second for cities, and third for townships.

- 27% 37% 60% (1) no others
- 27 41 2 (2) policies for repairing items or ground damaged during plowing
- 53 34 4 (3) policies regarding construction and placement of mailboxes
- 8 1 (4) policies regarding placement of refuse or recycling containers
- 11 5 3 (5) other (*Please specify*): _____

e) How do you communicate these policies with the public? (*Check all that apply*)

- 41% 22% 43% (1) no active strategy for communicating polices
- 6 19 2 (2) distribute flyers to all residences and businesses
- 28 1 (3) cable t.v. announcements
- 10 22 -- (4) radio/t.v. public service announcements
- 48 57 7 (5) community newspaper articles
- 13 6 (6) post notices at community buildings
- 16 7 11 (7) other (*Please describe*): _____
- 6 -- (8) local newsletter

17. Snow Plowing

a) Do you plow roads belonging to other jurisdictions (*counties, cities, towns, or the state*)?

- | | |
|-----------------------------|------------------------------|
| <input type="checkbox"/> no | <input type="checkbox"/> yes |
| 38% 49% 65% | 62% 45% 9% |

b) Does your jurisdiction have a "bare pavement" (100% clearance of snow and ice until pavement is visible) policy for:

- | | | |
|-----------------------------------|-------------------------------------|------------------------------------|
| <input type="checkbox"/> no roads | <input type="checkbox"/> some roads | <input type="checkbox"/> all roads |
| 69% 64% 64% | 26% 21% 2% | 3% 7% 1% |

c) (1) Does your jurisdiction clear sidewalks?

- | | | | |
|-----------------------------|-------------------------------|------------------------------|------------------------------|
| <input type="checkbox"/> no | <input type="checkbox"/> some | <input type="checkbox"/> all | <input type="checkbox"/> N/A |
| 80% 22% 50% | 14% 60% -- | 1% 11% -- | 4% 3% 21% |

(2) If you do not clear sidewalks, or clear only some of them, who is responsible to clear them?

- | | | | |
|---|-------------------------------------|-------------------------------------|--------------------------------|
| <input type="checkbox"/> property owner | <input type="checkbox"/> contractor | <input type="checkbox"/> volunteers | <input type="checkbox"/> other |
| 65% 77% 23% | 1% -- -- | -- -- -- | 21% 5% 10% |

d) (1) Does your jurisdiction plow alleys?

- | | | | |
|-----------------------------|-------------------------------|------------------------------|------------------------------|
| <input type="checkbox"/> no | <input type="checkbox"/> some | <input type="checkbox"/> all | <input type="checkbox"/> N/A |
| 68% 12% 33% | 3% 14% 2% | -- 58% -- | 28% 12% 30% |

(2) If you do not plow alleys, or clear only some of them, who is responsible to clear them?

- | | | | |
|---|-------------------------------------|-------------------------------------|--------------------------------|
| <input type="checkbox"/> property owner | <input type="checkbox"/> contractor | <input type="checkbox"/> volunteers | <input type="checkbox"/> other |
| 11% 13% 17% | 1% 2% -- | -- -- 1% | 53% 8% 12% |

Note: Responses adding to less than 100% indicate that some local governments did not respond.

e) After what amount of fallen snow do crews in your jurisdiction begin plowing snow?

- | | | | |
|--|----------------------------------|----------------------------------|--|
| <input type="checkbox"/> trace - 1" | <input type="checkbox"/> 1" - 2" | <input type="checkbox"/> 2" - 4" | <input type="checkbox"/> no set policy |
| 17% 6% 2% | 36% 42% 9% | 12% 34% 20% | 24% 8% 33% |
| <input type="checkbox"/> other (Please specify): _____ | | | |
| 9% | 4% | 9% | |

f) What is part of your clean-up operations following the initial snow plowing? (Check all that apply)

- | | | | | |
|-----|-----|-----|------------------------------|-------------------------------|
| 94% | 62% | 43% | <input type="checkbox"/> (1) | widening lanes |
| 48 | 54 | 6 | <input type="checkbox"/> (2) | removing snow windrows |
| 44 | 67 | -- | <input type="checkbox"/> (3) | hauling and disposing snow |
| 93 | 64 | 13 | <input type="checkbox"/> (4) | cleaning intersections |
| 11 | 14 | -- | <input type="checkbox"/> (5) | cleaning medians |
| 21 | 20 | 16 | <input type="checkbox"/> (6) | other (Please specify): _____ |

Note: Responses are listed first for counties, second for cities, and third for townships.

g) How much additional time do these clean-up activities typically take in your jurisdiction? _____ hours
Median Hours: 9 12 8

18. Snow and Ice Control Practices

a) (1) Do you routinely **pre-wet** your salt or salt/sand mix?

- | | | | |
|---|-----|-----|-----|
| <input type="checkbox"/> no routine pre-wetting (Proceed to 18a)(3)) | 89% | 91% | 32% |
| <input type="checkbox"/> we use pre-wetting tanks on back of truck | 7% | 4% | -- |
| <input type="checkbox"/> we pre-wet bucket of salt or salt mix before loading truck | -- | 2% | 1% |
| <input type="checkbox"/> we pre-wet truck box before it leaves station | 1% | 1% | -- |
| <input type="checkbox"/> other (Please describe): _____ | 3% | 3% | 4% |

(2) What materials do you use to pre-wet?

- | | | | |
|---|----|----|----|
| <input type="checkbox"/> salt brine | 3% | 3% | -- |
| <input type="checkbox"/> chemical (Please specify): _____ | 7% | 3% | 1% |
| <input type="checkbox"/> water | -- | 1% | 1% |
| <input type="checkbox"/> other | -- | -- | 1% |

(3) Have you ever pre-wet your salt or mix in the past?

- | | |
|-----------------------------|------------------------------|
| <input type="checkbox"/> no | <input type="checkbox"/> yes |
| 79% 78% 41% | 15% 5% 1% |

b) What winter **facilities for salt and sand storage** do you use ?

Facility	Salt (circle one)			Sand (circle one)			Salt/Sand Mix (circle one)		
	own	lease	share	own	lease	share	own	lease	share
(1) permanent enclosed storage facility	42%	--	1%	4%	1%	--	24%	--	4%
	19	--	4	5	--	2	13	1	4
	--	--	--	--	--	--	--	--	--
(2) permanent semi-enclosed storage facility	27%	--	3%	6%	--	1%	19%	--	9%
	9	1	3	3	--	2	10	--	3
	--	--	--	--	--	--	--	--	--

Note: Responses adding to less than 100% indicate that some local governments did not respond.

b) What winter facilities for salt and sand storage do you use (continued)?

Facility	Salt (circle one)	Sand (circle one)	Salt/Sand Mix (circle one)
(3) outside covered piles on impermeable pad	own / lease / share 1% -- -- 4 -- -- -- -- 1	own / lease / share 3% -- -- 3 -- -- -- -- 1	own / lease / share 5% -- 1% 8 -- 1 -- -- 2
(4) outside covered piles on ground surface	own / lease / share -- -- -- 1 -- -- -- -- --	own / lease / share 1% -- -- 2 1 -- -- -- --	own / lease / share 4% -- 1% 5 -- -- -- -- --
(5) outside uncovered piles on impermeable pad	own / lease / share 3% -- -- 3 -- -- 1 -- --	own / lease / share 10% -- 1% 8 1 -- 1 -- 1	own / lease / share 28% -- 4% 19 1 3 1 1 --
(6) outside uncovered piles on ground surface	own / lease / share 3% -- -- 4 -- 1 -- 1 --	own / lease / share 19% -- 1% 12 -- 1 -- 1 1	own / lease / share 28% -- 1% 19 1 -- 1 1 --
(7) other _____	own / lease / share 3% -- -- -- -- -- -- -- --	own / lease / share 1% -- -- -- -- -- -- -- --	own / lease / share 3% -- -- 1 -- -- -- -- --
(8)	N/A -- -- -- 2% -- -- 4 1 --	N/A -- -- -- 2% -- -- 4 1 --	N/A -- -- -- 1% -- -- 5 1 --

c) Do you control runoff around storage facilities?

- 47% 34% 13% no control
- 15 19 1 runoff is to storm sewer system
- 17 10 2 runoff is collected and recycled
- 3 -- runoff is collected and treated prior to discharge
- 20 17 5 other (Please specify): _____

Note: Responses are listed first for counties, second for cities, and third for townships.

d) Do you routinely use anti-icing measures or pavement treatment prior to a snowfall?

- no yes
- 93% 83% 46% 6% 7% --

e) Do you recycle some or all road sand?

- no yes
- 93% 67% 47% 5% 25% 1%

f) Do you use snow fences?

- no yes
- 65% 74% 58% 33% 21% 7%

g) Do you use natural plantings or shelter belts to control snow blowing and drifting?

- no yes
- 72% 77% 57% 25% 15% 6%

Note: Responses adding to less than 100% indicate that some local governments did not respond.

Note: Responses are listed first for counties, second for cities, and third for townships.

- h) What **weather forecasting** information do you use? (*Check all those that apply and STAR (*) the one you find most useful/important.*)
- | | | | | | |
|-----|-----|-----|--------------------------|-----|---|
| 93% | 85% | 29% | <input type="checkbox"/> | (1) | television or radio weather reports |
| 35 | 37 | 2 | <input type="checkbox"/> | (2) | radio scanner for weather information |
| 17 | 11 | 2 | <input type="checkbox"/> | (3) | private weather forecasting service |
| 7 | 2 | 2 | <input type="checkbox"/> | (4) | forecast modeling software |
| 6 | 10 | 27 | <input type="checkbox"/> | (5) | no formal weather forecasting information |
| 12 | 7 | 5 | <input type="checkbox"/> | (6) | other (<i>Please specify</i>): _____ |

- i) Does your jurisdiction use **pavement-specific forecasting or sensors** ?
- | | | | |
|--------------------------|-----|--------------------------|----------|
| <input type="checkbox"/> | no | <input type="checkbox"/> | yes |
| 99% | 94% | 64% | 1% -- -- |

- j) Do you use **computerized routing** software?
- | | | | |
|--------------------------|-----|--------------------------|----------|
| <input type="checkbox"/> | no | <input type="checkbox"/> | yes |
| 99% | 95% | 63% | 1% -- -- |

- k) Other than advertising your snow policies, such as a parking policy, do you use **public relations** to publicize your snowplowing activities?
- | | | | |
|--------------------------|-----|--------------------------|------------|
| <input type="checkbox"/> | no | <input type="checkbox"/> | yes |
| 67% | 47% | 57% | 32% 49% 4% |

If yes, what types of activities?

- | | | | | | | | | | | | |
|-----|-----|----|--------------------------|-----|---------------------------------------|----|-----|----|--------------------------|-----|---|
| 24% | 30% | 3% | <input type="checkbox"/> | (1) | news articles/press releases | 1% | 28% | 1% | <input type="checkbox"/> | (4) | newsletters/brochures |
| 1 | 2 | -- | <input type="checkbox"/> | (2) | public school workshops | 14 | 22 | -- | <input type="checkbox"/> | (5) | radio/television announcements |
| 1 | 6 | 1 | <input type="checkbox"/> | (3) | telephone hot lines/information lines | 3 | 3 | 1 | <input type="checkbox"/> | (6) | other (<i>Please describe</i>): _____ |

- l) Do you have a routine **maintenance program to prepare** your snowplowing vehicles and equipment prior to each snow season?
- | | | | |
|--------------------------|----|--------------------------|-------------|
| <input type="checkbox"/> | no | <input type="checkbox"/> | yes |
| 3% | 4% | 29% | 96% 89% 20% |

- m) Do you keep ongoing **records for your snowplowing vehicles and equipment**, such as type, number of hours of use, and maintenance schedule?
- | | | | |
|--------------------------|-----|--------------------------|-------------|
| <input type="checkbox"/> | no | <input type="checkbox"/> | yes |
| 3% | 21% | 32% | 96% 70% 14% |

19. Measures of Effectiveness

- a) How do you **evaluate** your snowplowing effectiveness? (*Check all that apply*)
- | | | | | | |
|-----|-----|-----|--------------------------|-----|---|
| 12% | 17% | 24% | <input type="checkbox"/> | (1) | no routine evaluation of effectiveness |
| 75 | 77 | 50 | <input type="checkbox"/> | (2) | by responding to customer requests/complaints |
| 63 | 53 | 14 | <input type="checkbox"/> | (3) | by comparing our work with other similar jurisdictions |
| 47 | 44 | 9 | <input type="checkbox"/> | (4) | by comparing previous snow events |
| 25 | 22 | 3 | <input type="checkbox"/> | (5) | by measuring how well we adhere to guidelines set out in our policy |
| 17 | 5 | -- | <input type="checkbox"/> | (6) | by using formal statistical measures such as: lane miles cleared per operator, lane miles cleared per hour, lane miles cleared per plow |
| 9 | 8 | 5 | <input type="checkbox"/> | (7) | other (<i>Please specify</i>): _____ |

Note: Responses adding to less than 100% indicate that some local governments did not respond.

b) Do you **measure public satisfaction** of your snowplowing?

(Check all that apply)

- 4% 15% 2% (1) yes, with periodic citizen surveys
- 77 60 30 (2) yes, by monitoring customer request/complaints
- 67 64 37 (3) yes, by informal word of mouth
- 16 17 23 (4) no active measurement of public satisfaction
- 3 3 3 (5) other (Please specify): _____

Note: Responses are listed first for counties, second for cities, and third for townships.

20. Snowplow Operators

a) Does your jurisdiction provide or require **training** for snowplow operators? (Check all that apply)

- 16% 30% 33% (1) no formal training required
- 7 6 2 (2) require formal classroom training
- 15 13 -- (3) require operator certification
- 36 31 2 (4) require dry-run/trial runs prior to snowfall
- 75 57 3 (5) require in-house training on procedures and safety
- 3 8 2 (6) training is offered but not required
- 1 4 6 (7) other (Please specify): _____
- 1 12 (8) contract service

b) Approximately what share of your routes are plowed by the following operators: (Please fill in the appropriate percentage)

TYPE OF OPERATOR	PERCENT OF ROUTES								
	75 - 100%			50 - 74%			< 50%		
(1) Own jurisdiction's operators	96%	84%	22%	2%	2%	0%	2%	14%	78%
(2) Contract operators	0	3	40	1	2	0	99	95	60
(3) Other local government jurisdictions	0	2	9	0	1	0	100	97	91
(4) State	0	0	0	0	0	0	100	100	100
(5) Volunteers/non-profits	0	0	1	0	0	0	100	100	99
(6) Other	0	0	2	0	0	0	100	100	98
TOTAL	= 100%								

c) What is the normal/standard **shift time** for an operator to plow after a snowfall?

_____ average hours
Median Hours: 6 9 9

d) How long do operators usually **operate equipment without a rest** during a full call-out?

_____ average hours
Median Hours: 8 5 8

e) Does your jurisdiction use rotating shifts to provide **24-hour coverage** after a snowfall?

- no yes sometimes
- 90% 75% 35% 4% 6% 3% 5% 11% 2%

Note: Responses adding to less than 100% indicate that some local governments did not respond.

f) Do operators typically use the **same truck** or equipment each snow event?

no yes
 -- 4% 6% 100% 86% 36%

Note: Responses are listed first for counties, second for cities, and third for townships.

g) Do you assign operators to the **same routes** for each snow event?

no yes
 1% 10% 12% 99% 81% 26%

h) Have you established a **procedure to notify** the appropriate personnel for snow events?

no yes
 3% 13% 16% 97% 77% 24%

21. Does your jurisdiction **share** or cooperate in the use of equipment, personnel or duties?

no (If no, proceed to question 22) yes
 44% 48% 50% 56% 41% 7%

a) If yes, which of the following do you share or cooperate in the use of?

- 46% 22% 3% materials
- 32 24 3 equipment
- 15 23 3 operators
- 26 14 5 plowing service
- 1 1 1 other (Please specify): _____

b) If yes, with whom do you cooperate or share?

- 51% 28% 7% other government jurisdictions
- 19 25 1 other departments (Please specify): _____
- 1 3 -- other groups/interests (Please specify): _____
- 4 1 -- other (Please specify): _____

CLOSING INFORMATION

22. In your opinion, what is the biggest challenge in keeping your roads plowed?

23. In your opinion, what are the more innovative and effective methods of snow and ice control used in your jurisdiction or other communities you know of? (For instance, your methods for plowing cul de sacs or bridges, de-icing, routing, use of staff, or innovative equipment such as carbide or rubber-tipped blades, hazard markers, heated operator windows, two-way radios, computerized information systems, etc.)

24. What information do you want or need in your jurisdiction regarding snowplowing practices?

Note: Responses adding to less than 100% indicate that some local governments did not respond.