

Snow & Ice Plan For Winter Maintenance Agencies

Presented by

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Pacific Northwest Snowfighters

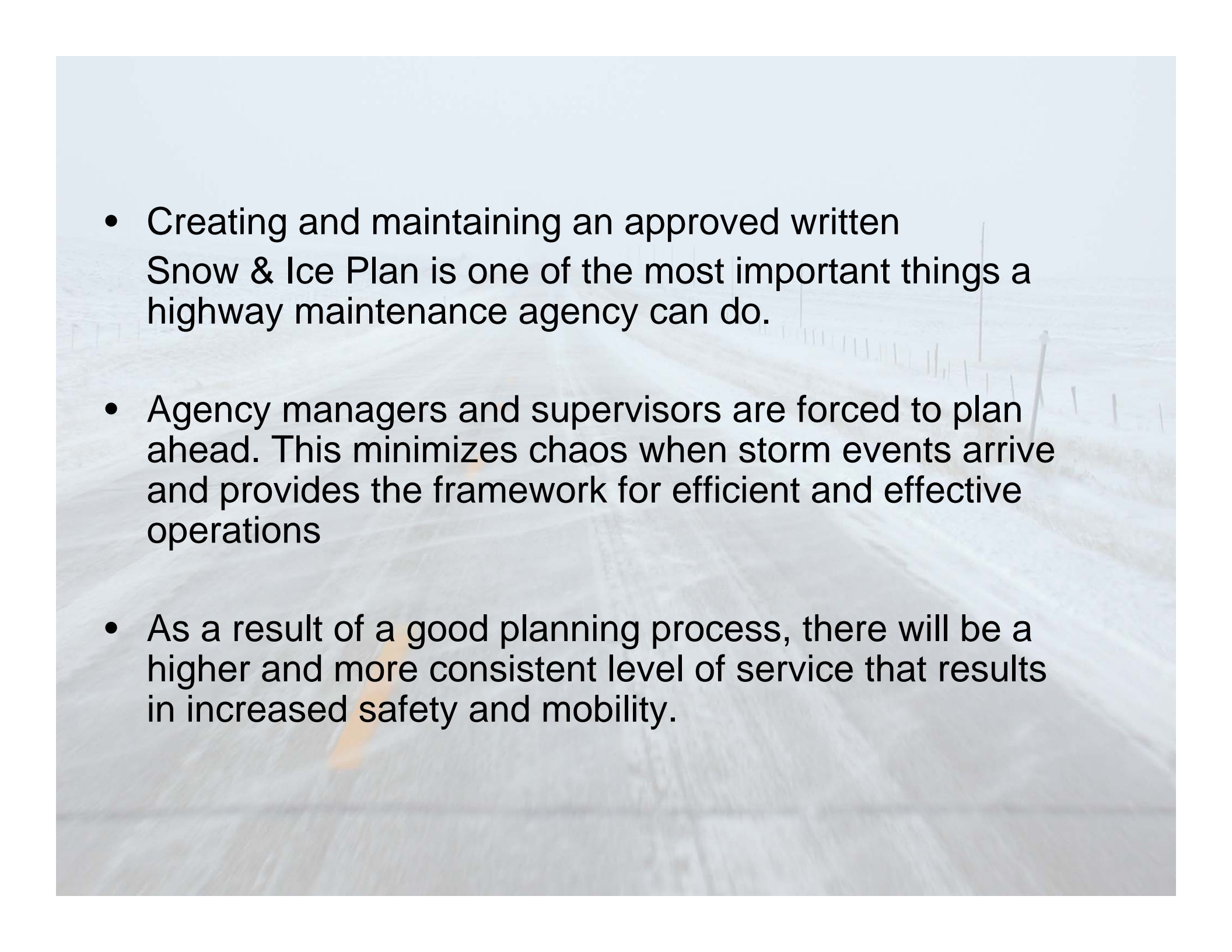
Pacific Northwest Chemical Deicer Buyer and User Group

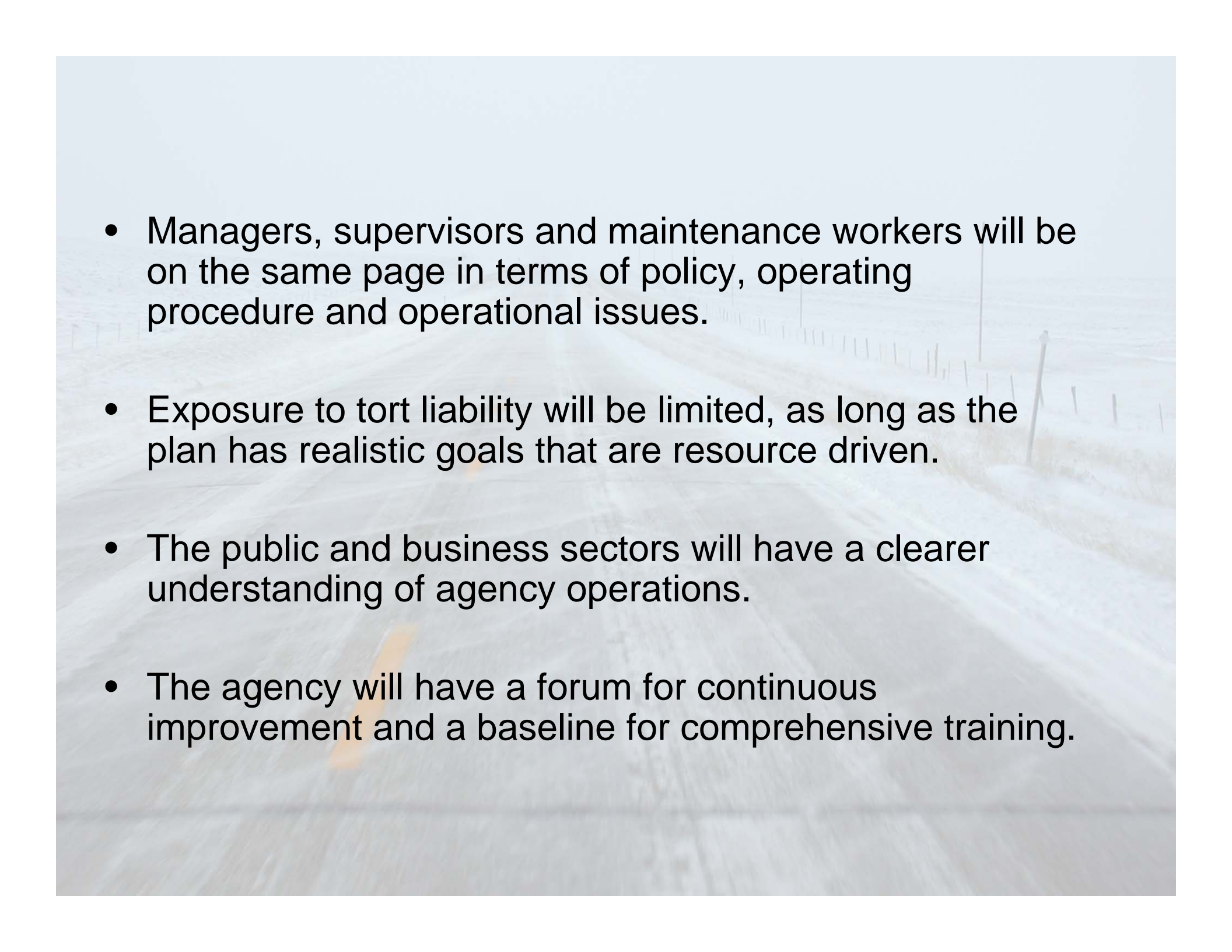
Divide the plan into three sections

- Section 1 Benefits of a written plan and policy
- Section 2 Drafting the contents of the plan
- Section 3 The focus and content of the plan in terms of operations and materials management

Creating A Written Snow & Ice Plan

- The process for creating a written plan and policy is important, broad-based participation is highly desirable.
- An effective way to ensure participation is to form a working committee. The committee should have top to bottom representation. Members should look for examples of plans and policy documents from other states and neighboring agencies.

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- Creating and maintaining an approved written Snow & Ice Plan is one of the most important things a highway maintenance agency can do.
 - Agency managers and supervisors are forced to plan ahead. This minimizes chaos when storm events arrive and provides the framework for efficient and effective operations
 - As a result of a good planning process, there will be a higher and more consistent level of service that results in increased safety and mobility.

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- Managers, supervisors and maintenance workers will be on the same page in terms of policy, operating procedure and operational issues.
 - Exposure to tort liability will be limited, as long as the plan has realistic goals that are resource driven.
 - The public and business sectors will have a clearer understanding of agency operations.
 - The agency will have a forum for continuous improvement and a baseline for comprehensive training.

General Introduction Section

- Each plan should create a roadmap for users. The introduction section should contain information that will guide the user in terms of content, purpose and sources of information. It should also demonstrate the general philosophy of agency snow and ice operations.
- This section should also define the terms and language that will appear in the document.

Communication and Cooperation

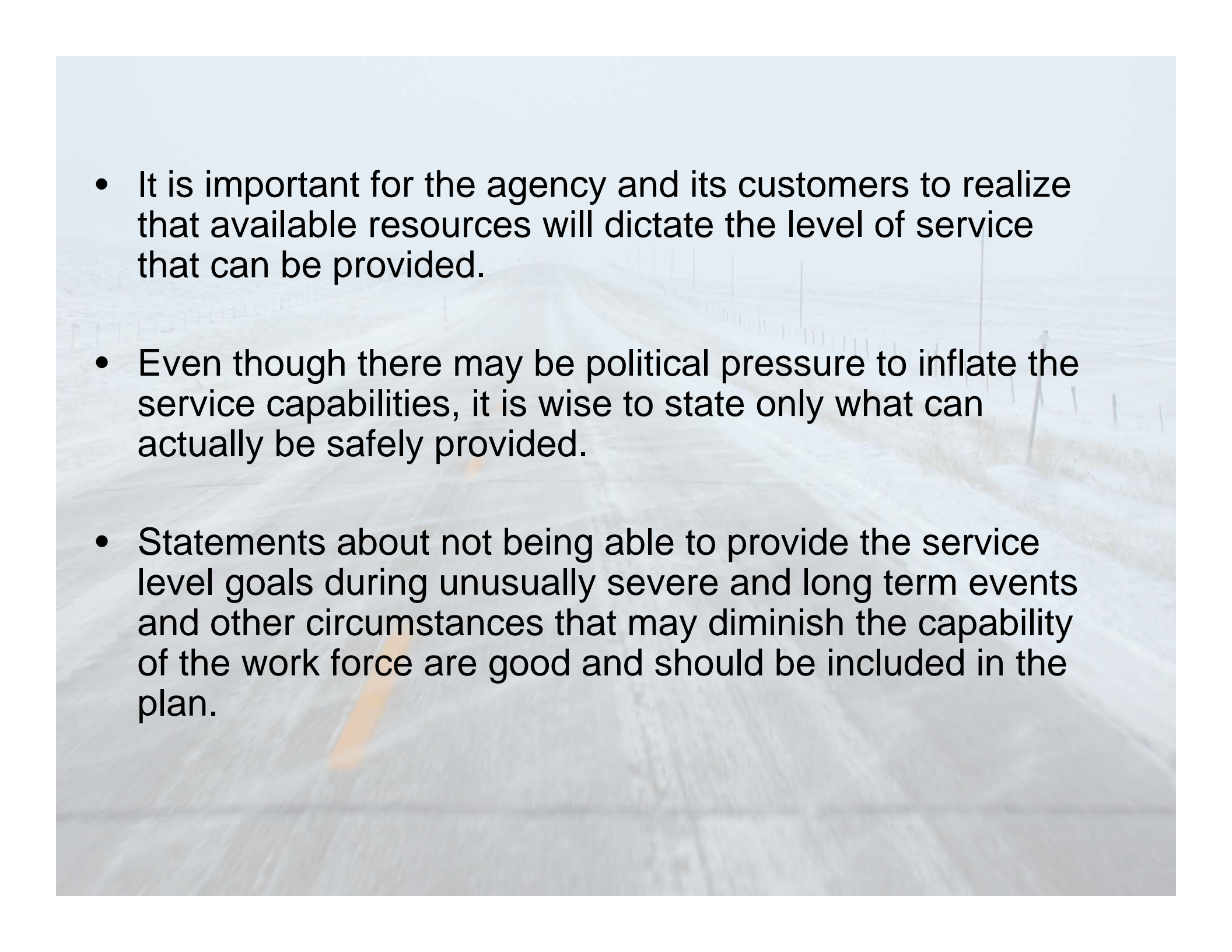
- This section should contain how “customers” can contact your agency. It might include your website URL, 511, or an other communication resources your agency utilizes.
- The section can also include items like snow emergency routes, snow removal operations, tire chain requirements etc..
- This is also a good location for multi-agency organizational and communications directories.

Level of Service

- This section is where the agency defines their expectations in terms of level of service. In addition to providing service levels, it will be the standard of accountability in the event of slippery roads and related litigation.
- Common descriptions include:
 - When treatments are supposed to begin after a storm starts.
 - Road conditions at various points in time during an after a winter weather event.

Level of Service continued...

- The level of service that will be provided for various conditions.
- The priority classification of the entire road system (A,B,C; 1,2,3; Red, Yellow, Blue, etc.).
- Treatment timing and priorities for various storm conditions by time of day and day of week.
- The time or times service will be diminished or not provided.
- When clean up operations will begin.

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- It is important for the agency and its customers to realize that available resources will dictate the level of service that can be provided.
 - Even though there may be political pressure to inflate the service capabilities, it is wise to state only what can actually be safely provided.
 - Statements about not being able to provide the service level goals during unusually severe and long term events and other circumstances that may diminish the capability of the work force are good and should be included in the plan.

<u>Treatment Level Goals</u>	<u>Washington State Description of Roadway Treatments</u>
Level 1	<ol style="list-style-type: none"> 1. Pre-treat as conditions allow with anti-icing chemicals before a forecast snow, black ice, frost or freezing rain / mist event. 2. Apply anti / deicing chemicals to roadway if snow is accumulating to try to keep snow from compacting and bonding to pavement. 3. If compact snow and ice or heavy black ice forms on the roadway, apply pre-wet solid chemicals to the surface to try to break up the snow/ice for removal.
Level 2	<ol style="list-style-type: none"> 1. Pre-treat as conditions allow with anti-icing chemicals before a forecast snow, black ice, frost or freezing rain / mist event. 2. Applications of anti / deicing chemicals to roadway if snow is accumulating to try to minimize snow compacting and bonding to pavement. 3. If compact snow and ice or heavy black ice forms on the roadway, apply combination of sand and / or deicing chemicals to try to provide traction and assist in the breakup and removal of snow/ice.
Level 3	<ol style="list-style-type: none"> 1. Pre-treat as conditions allow with anti-icing chemicals before a forecast snow, black ice, frost, or freezing rain / mist event. 2. If snow accumulates, plow with or without the moderate use of sand and / or solid deicing chemicals. 3. Treat existing amounts of compact snow and ice with the moderate use of sand and / or solid deicing chemicals.
Level 4	<ol style="list-style-type: none"> 1. Limited pre-treatment of anti-icing chemicals for snow, black ice, frost or freezing rain as conditions allow. 2. If snow accumulates, plow with or without the limited use of sand and / or solid deicing chemicals. 3. Treat existing amounts of compact snow and ice by plowing with the limited use of sand and / or solid deicing chemicals.
Level 5	<ol style="list-style-type: none"> 1. Treat like level 4 roads while open. 2. Road will remain passable as conditions allow. 3. Road closed when conditions dictate.


Examples of Treatment Level Maps



Planning

- This section is primarily a blueprint for an agency to conduct the year round activities that relate to snow & ice control. A good approach is to use the four seasons of the calendar year to describe agency activities that should be accomplished in a timely manner in those time frames.
- Spring activities may include:
 - Equipment breakdown and storage
 - Materials inventory
 - Review the effectiveness of operational procedures





Summer activities

- Contract negotiation, ordering and receiving material.
- Drainage improvements, obstacle remediation.
- Improvements to high snow & ice accident areas.
- Training for new operators and staff.
- Equipment system additions, or winter equipment overhaul.
- Pre-winter planning meetings to discuss winter strategies.

Spring activities continued...

- Highway inspection.
- Analysis of winter data.
- Review the effectiveness of personnel and staffing policies.
- The time or times service will be diminished or not provided.
- Review equipment performance and maintenance activities.
- Clean up of winter materials, storage and stockpile auditing.
- Winter damage repair to the highway and infrastructure.

Fall activities

- Make sure weather information and other informational systems are fully functional for the upcoming winter season.
- Start sequentially bringing winter equipment on line.
- Refresher training for seasoned operators and staff.
- Calibrate equipment and technology devices.
- Install snow fences when applicable.
- Mark drainage structures.



Ongoing winter activities...

- Getting physically and operationally prepared for the first storm and succeeding storms (whenever they arrive).
- Review performance after each storm and make adjustments.
- Maintain materials inventory control.
- Timely performance of safety restoration and clean up operations should include:
 - Achieving and maintaining satisfactory pavement conditions.
 - Clearing sight distance problems.

Ongoing winter activities continued...

- Maintaining “problematic areas”
- Drainage restoration/appurtenances as necessary.
- Clearing signs and signals if applicable.
- This is also a good location to include the continuous improvement activities that occur throughout the year.
- This could include: preseason meetings, post storm meetings, post season meetings, training forums and “living document” provisions for the plan and policy document.

Record Keeping

- A basic record keeping system for snow and ice control is a very valuable asset.
- It can be used in defense of frivolous tort claims.
- Development of budget requests and defining impacts of budget reductions.
- Measurement of the effectiveness of agency operations
- Measurement of the success or failure of process improvement.

Example of Web Based Record Keeping

Washington State Department of Transportation

Intranet Home Human Resources Search Site Index WSDOT Internet

Maintenance and Operations

Job 51574

Org Code: 455110 State Route: 090 Road Condition: Compact Snow Weather Condition: Temps Below Free; Air Temperature: -24.0000

Start Day: 1/20/2007 Start Time: 2:16 AM End Day: 1/20/2007 End Time: 2:41 AM Plow Route: Road Temperature: 24.0000

Record Locked

Save Record

Status:

Operator First Name	Operator Middle Init	Operator Last Name	Equipment ID
<input type="button" value="Edit"/>	<input type="button" value="Delete"/>		08E24001

Start MP	End MP	Direction	Pre-event	LocationName	
<input type="button" value="Edit"/>	<input type="button" value="Delete"/>	97.00	106.50	Increasing	N

Material	Unit	Rate	Quantity	Pre-Wet	ICP		
<input type="button" value="Edit"/>	<input type="button" value="Delete"/>	FreezGard	Gallons	12.00	13.80	Y	Ellensburg
<input type="button" value="Edit"/>	<input type="button" value="Delete"/>	Salt	Pounds	200.00	2600.00	Y	Ellensburg

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Risk Management

- This section should describe activities and programs that relate to snow and ice risk management.

These may include:

- Insurance or self insurance status.
- Safety training programs.
- Programs to identify and remediate high accident locations.
- Weather and road condition information systems (internal and external to the agency).
- Accident investigation/documentation procedures.
- Environmental risk management.

Appendix Information

- This section should contain a listing and location of the appended information at the end of the document.

These may include:

- Route maps.
- Memo's or personnel policy documents.
- Snow storage/disposal information.
- Maps showing emergency snow routes.
- Service level charts/maps.
- Personnel and equipment rosters

Operations

- This section should review the strategies of the agency. Some examples may include:
 - Anti-icing, De-icing.
 - Pre-wetting, Pre-treating
 - Material Application Rates
 - Eutectic Temperature, Exothermic
 - Snow Plowing, Tandem Plowing, Echelon Plowing.
 - Snow Removal.
 - Other locally Defined Terms and Procedures.

Specific Treatment Guidelines

- This section provides the guidance for all snow and ice control operations based on distinctive weather events.
- Light Snow Storm
- Light Snow Storm with Period (s) Moderate or Heavy Snow
- Moderate or Heavy Snow Storm
- Frost or Black Ice
- Freezing Rain Storm
- Sleet Storm

Example of FHWA Application Guidelines

Table 1. Weather event: *LIGHT SNOW*
 Using a 32% concentration of *Calcium Chloride*

PAVEMENT TEMPERATURE RANGE, AND TREND	INITIAL OPERATION			SUBSEQUENT OPERATIONS		COMMENTS
	Pavement surface at time of Initial operation	Maintenance Action	Chemical spread rate (gal/l _n -mi)	Maintenance Action	Chemical spread rate (gal/l _n -mi)	
			Liquid CaCl ₂		Liquid CaCl ₂	
Above 32°F, Steady or rising	Dry, wet, slush, or light snow cover	None, see comments	N/R	None, see comments	N/R	N/R=Not Recommended *Monitor pavement temperature closely *Treat icy patches if needed with chemical at 15-35 GPLM... plow if needed
32°F, or below is imminent;	Dry	Apply liquid	15-35	Plow as needed; reapply liquid Chemical when needed	15-35	*Application rates will depend on dilution potential
ALSO 20 to 32°F, Remaining in range	Wet, slush, or light snow cover		20-40		20-40	
15 to 20°F, Remaining in range	Dry, wet, slush, or light snow cover		30-65		30-65	
Below 15°F, Steady or falling	Dry or light snow cover	Plow as needed	N/R	Plow as needed	N/R	* It is not recommended that chemicals be applied in this temperature range * Abrasives can be applied to enhance traction

Personnel Management

Some examples this section should contain:

- Training requirements
- Call in procedures
- Overtime shift scheduling
- Hours of continuous duty
- Fitness for duty
- Interaction with the public or media
- Family readiness

Equipment Management

This section should contain policies and procedures associated with equipment:

- Routine inspection procedures
- Safe operating procedures for each type of equipment
- Criteria for determining a piece of equipment is not safe
- Maintenance schedule for each type of equipment
- Calibration procedures for various types of equipment
- Fueling procedures
- Any other equipment related issues

Post Storm Cleanup and Restoration

- This section should contain specific location details, the items of work and when they should be performed:
- Shoulder plowing
- Clearing sight distance problems
- Maintaining problematic areas
- Drainage restoration
- Achieving and maintaining satisfactory pavement conditions
- Clearing safety appurtenances as necessary

Policy Statement

- This section should clearly state the agency's policy objectives and commitment to minimizing environmental impacts .
- The policy statement should emphasize that highway safety is the first priority in the agency's snow and ice control operations.



Questions?

Acknowledgments:

Duane Amsler AFM Engineering

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