

Setting TMDLs into Action

Wenck Associates, Inc.

Shingle Creek Watershed Management
Commission

What is a Total Maximum Daily Load (TMDL)?

$$TMDL \equiv LC = \sum LA + \sum WLA + MOS$$

- The maximum amount of a pollutant that a water body can receive and still meet water quality standards
- Originated from Section 303d of CWA
 - TMDLs incorporate NPDES permit limitations
- Developed for waters not supporting designated uses after traditional controls

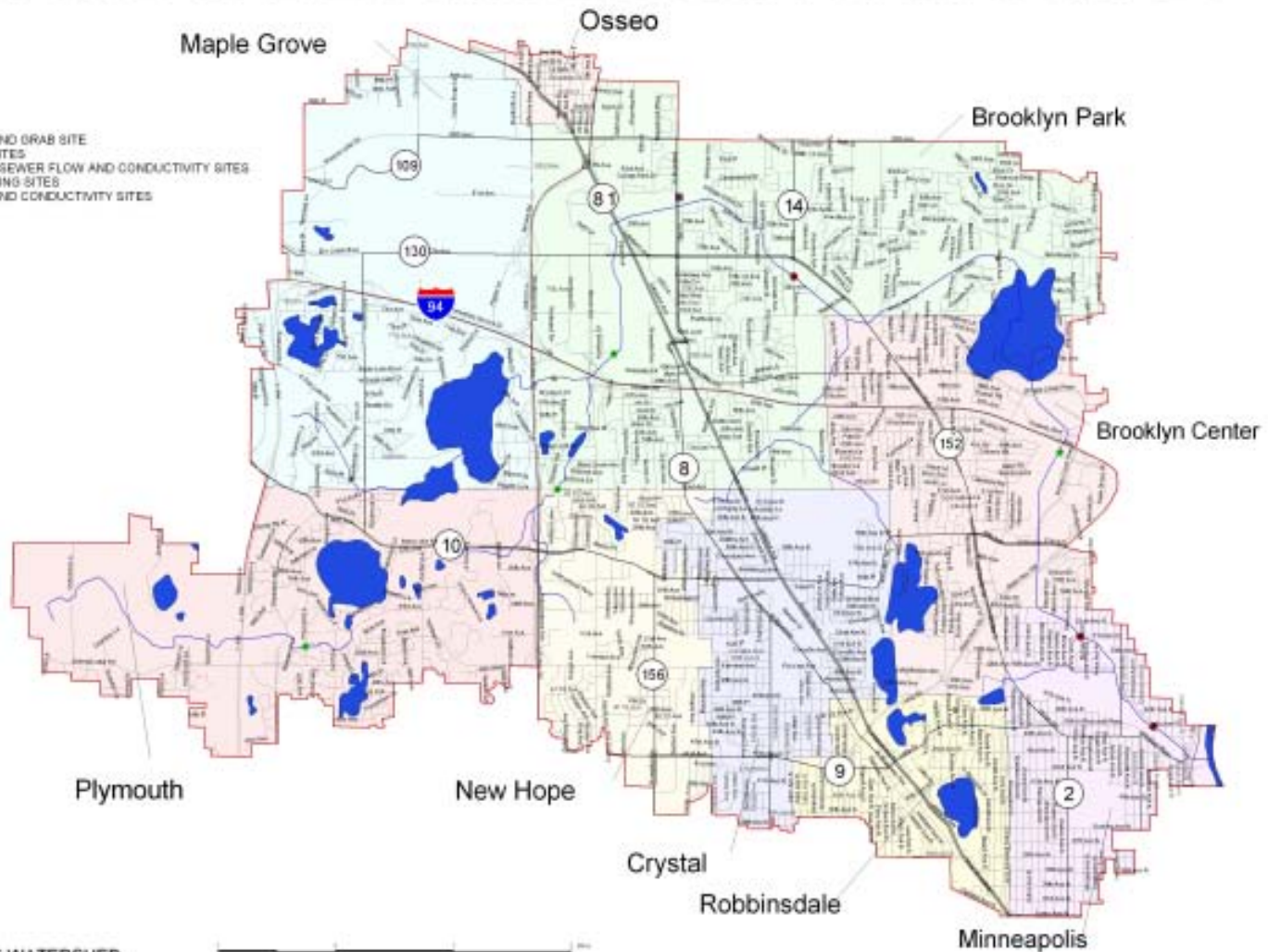
Why complete a TMDL?

- Develop an understanding of source loads
 - Which loads can we control?
 - Most effective use of remediation dollars
- Develop a reduction scenario to meet water quality standards
 - Framework to balance sources and benefits (public safety)
 - Implementation plan for each source and spatial loads
 - Focus on primary sources and source areas

SHINGLE CREEK TMDL MONITORING SITES

LEGEND

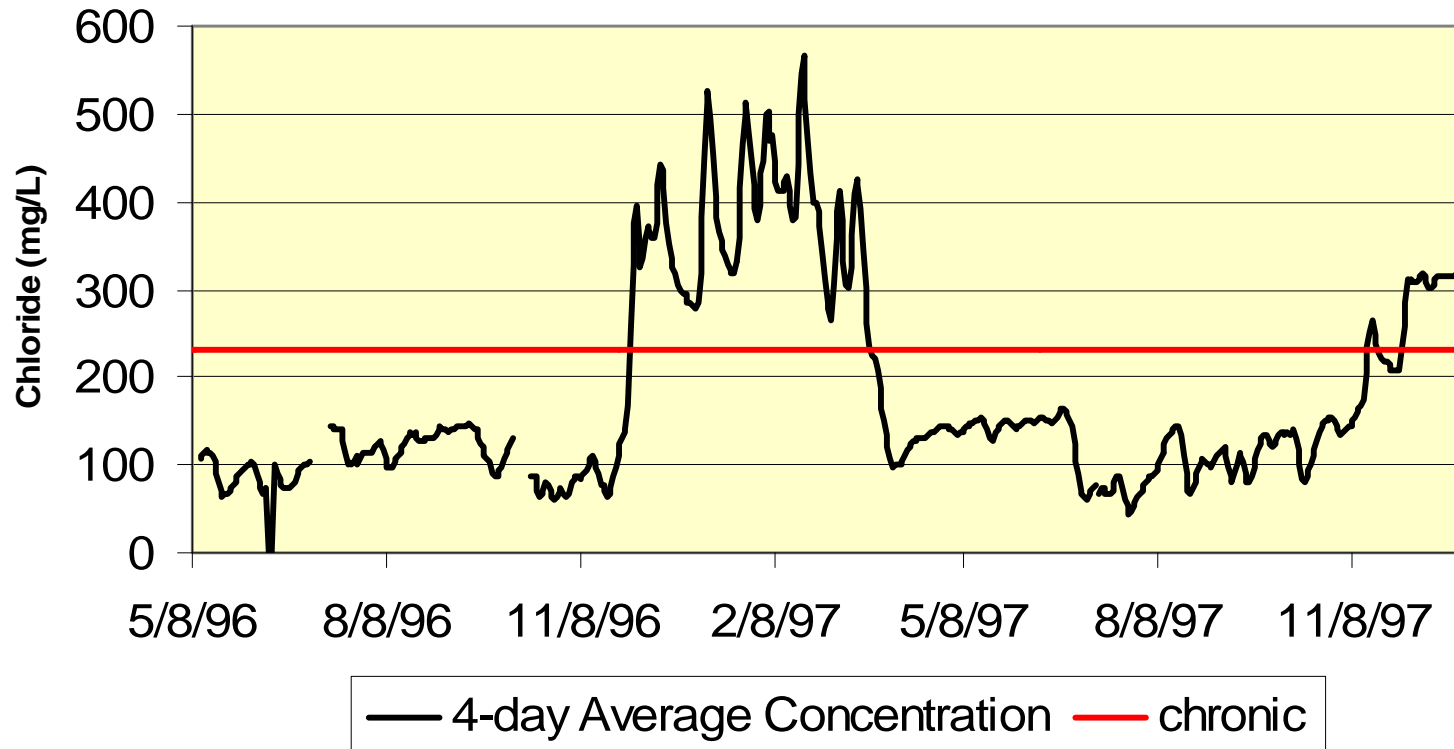
- POTENTIAL FLOW AND GRAB SITE
- POTENTIAL GRAB SITES
- POTENTIAL STORM SEWER FLOW AND CONDUCTIVITY SITES
- EXISTING MONITORING SITES
- POTENTIAL FLOW AND CONDUCTIVITY SITES
- SCW STREAMS
- SCW LAKES
- SCW ROADS



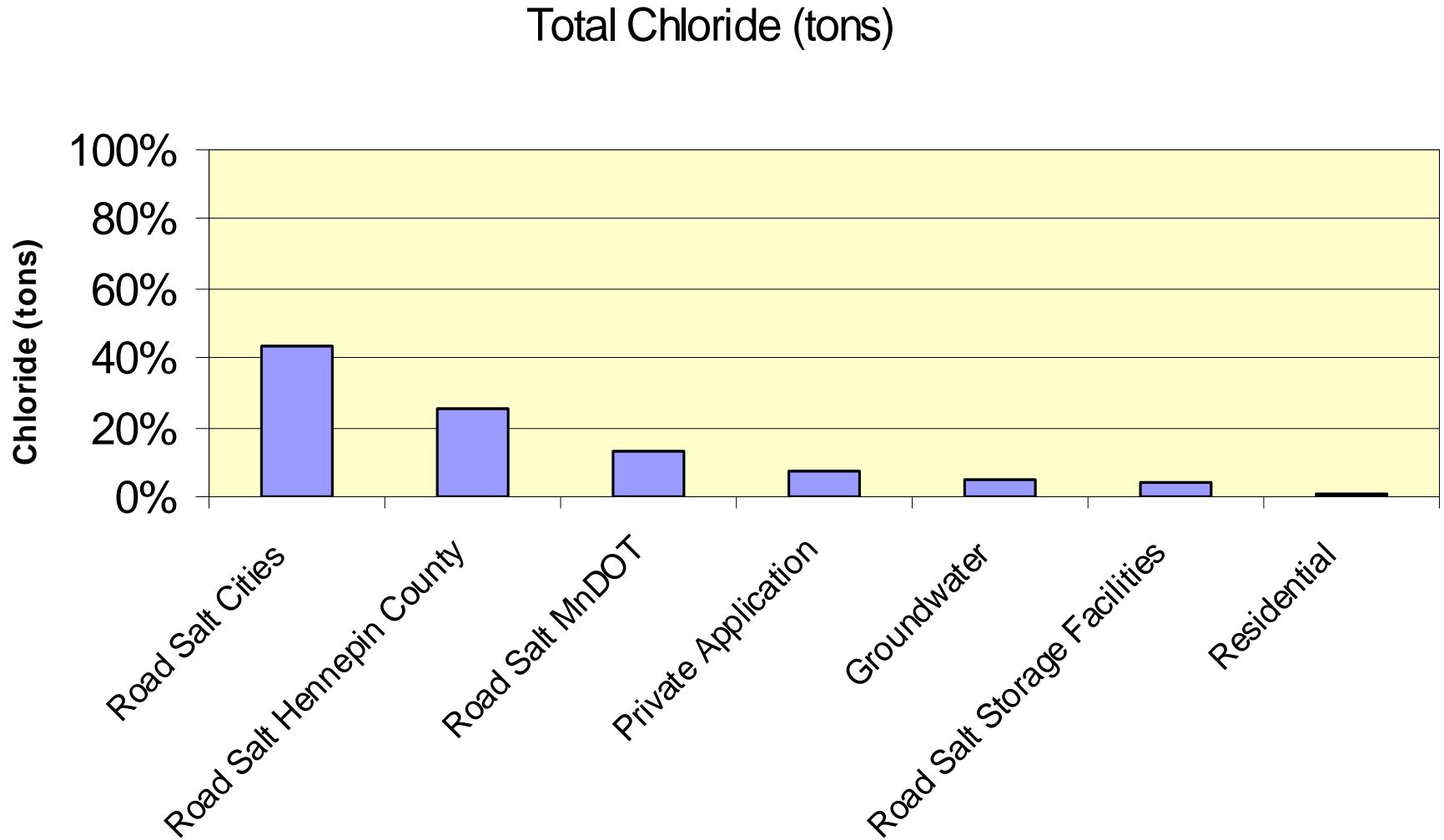
SHINGLE CREEK WATERSHED
MANAGEMENT COMMISSION

Impaired Waters Listing

Chronic Chloride Concentrations
Queen Avenue



Watershed Chloride Sources



TMDL as Percent Reduction

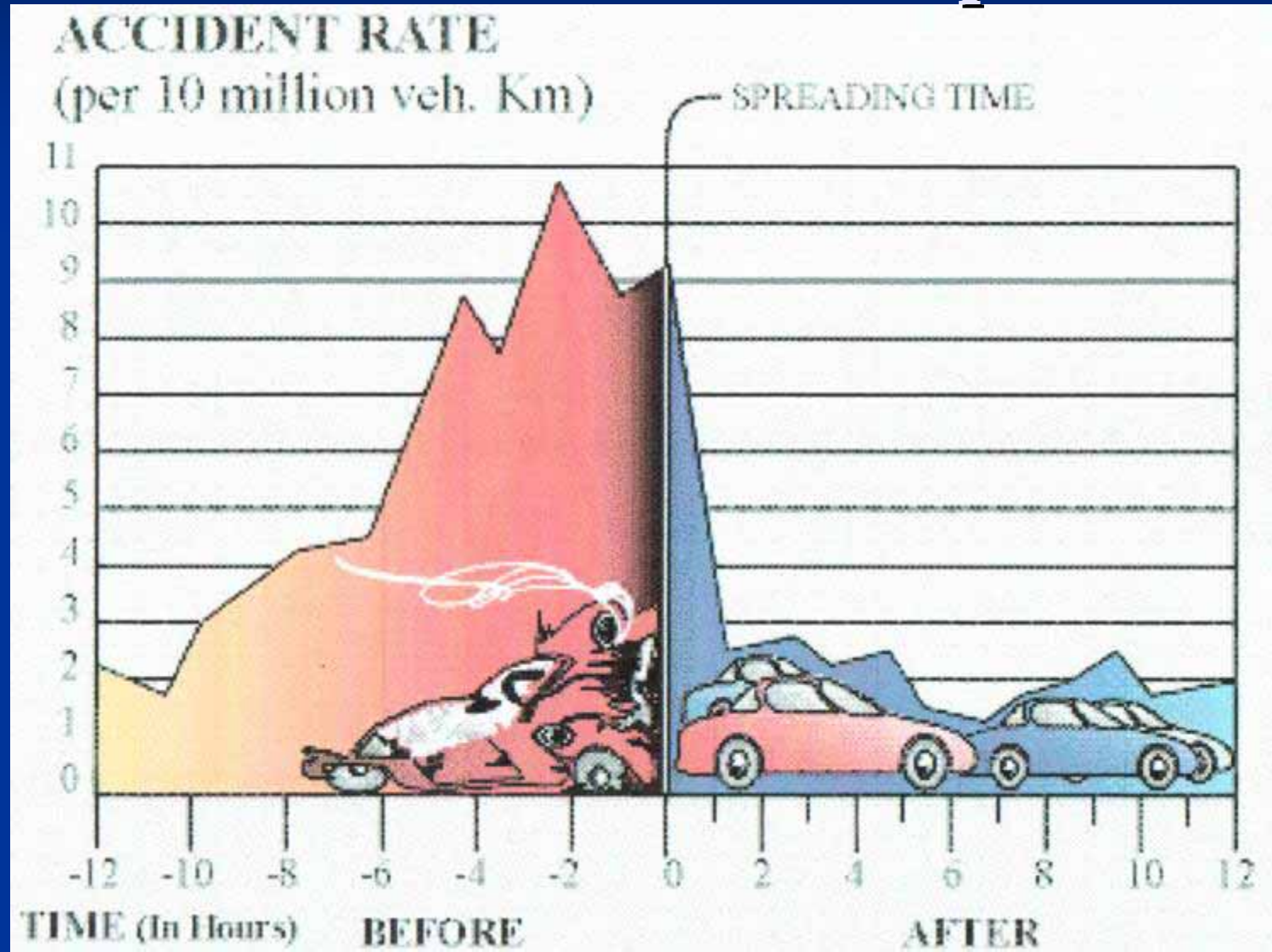
Critical Condition ¹	Wasteload Allocation (percent reduction)	Load Allocation (percent reduction)	Margin of Safety (percent reduction)	TMDL (percent reduction)
Winter Low Flow (60 to 100%)	48%	3% ¹	12%	63%
Winter Runoff (60% to 0%)	61%	4% ¹	6%	71%

¹Assumed groundwater reductions with reductions of surface application of chloride (37% and 52% respectively). Total load reduction was based on an assumed stream load share of 8%. For example, a 37% load reduction on 8% of the entire load results in a 3% reduction of the entire load.

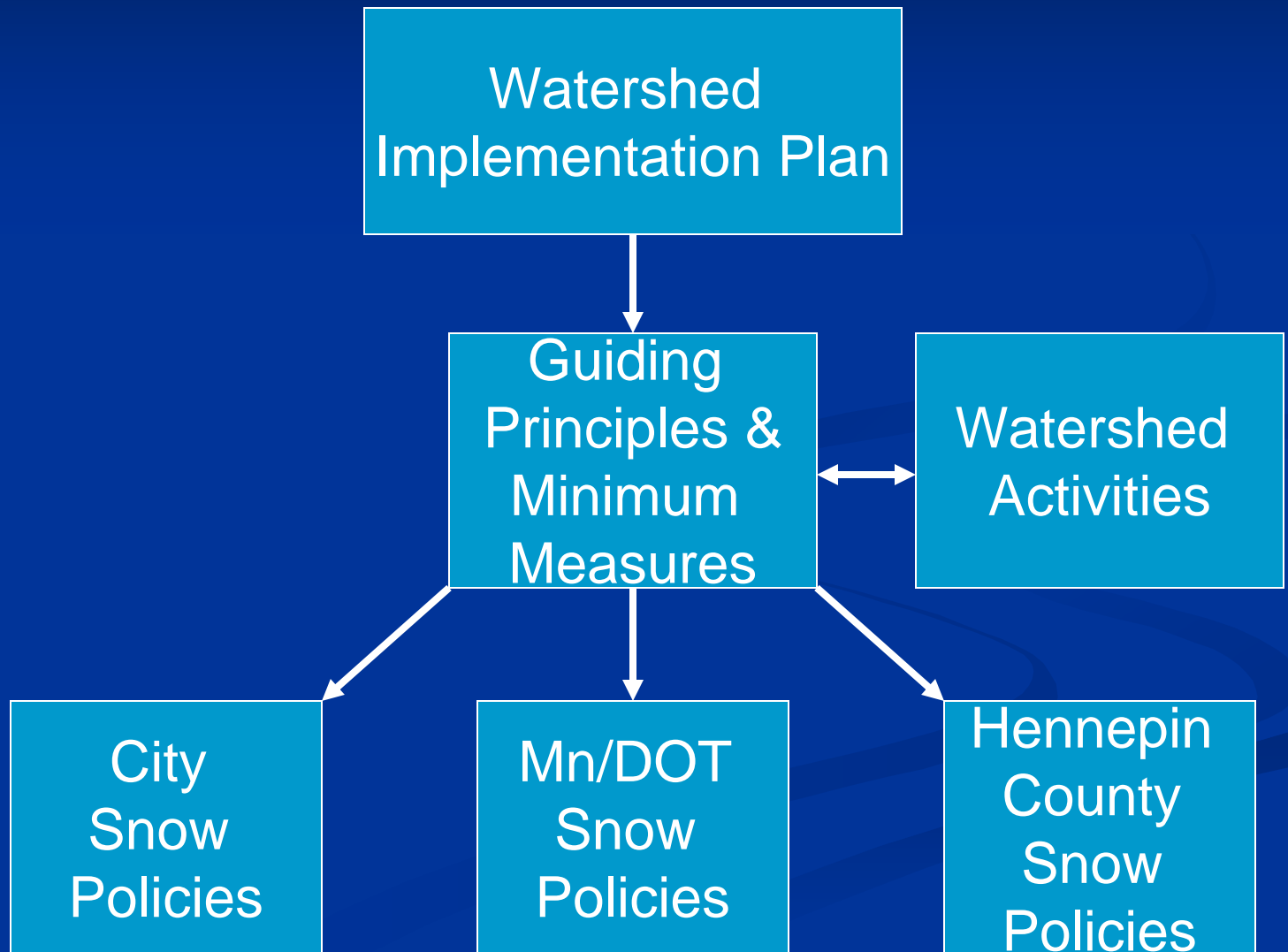
Stakeholder Process

- Agencies responsible for road maintenance
 - Cities, MnDOT, Hennepin County
 - Discuss load allocations
 - Develop activities to address required reductions
- BMPs
 - Discussion of effective and feasible BMPs
 - Tracking implementation and effectiveness
 - Establishment of Shingle Creek Policy Group

Balancing Public Safety with Environmental Impacts



Implementation Framework



TMDL Reduction Principles

- Apply appropriate snow plow techniques
- Select, store, and apply materials appropriately to balance public safety and environmental risks
- Encourage communication between applicators
- Foster stewardship through improved applicator awareness
- Communicate with the public

Apply appropriate snow plow techniques



- Annually evaluate current practices
 - Plowing, material application
- Improve where feasible and appropriate
- Written Snow Policies
 - Proposing that the Commission will develop templates
 - Commission may provide support in formatting the plans

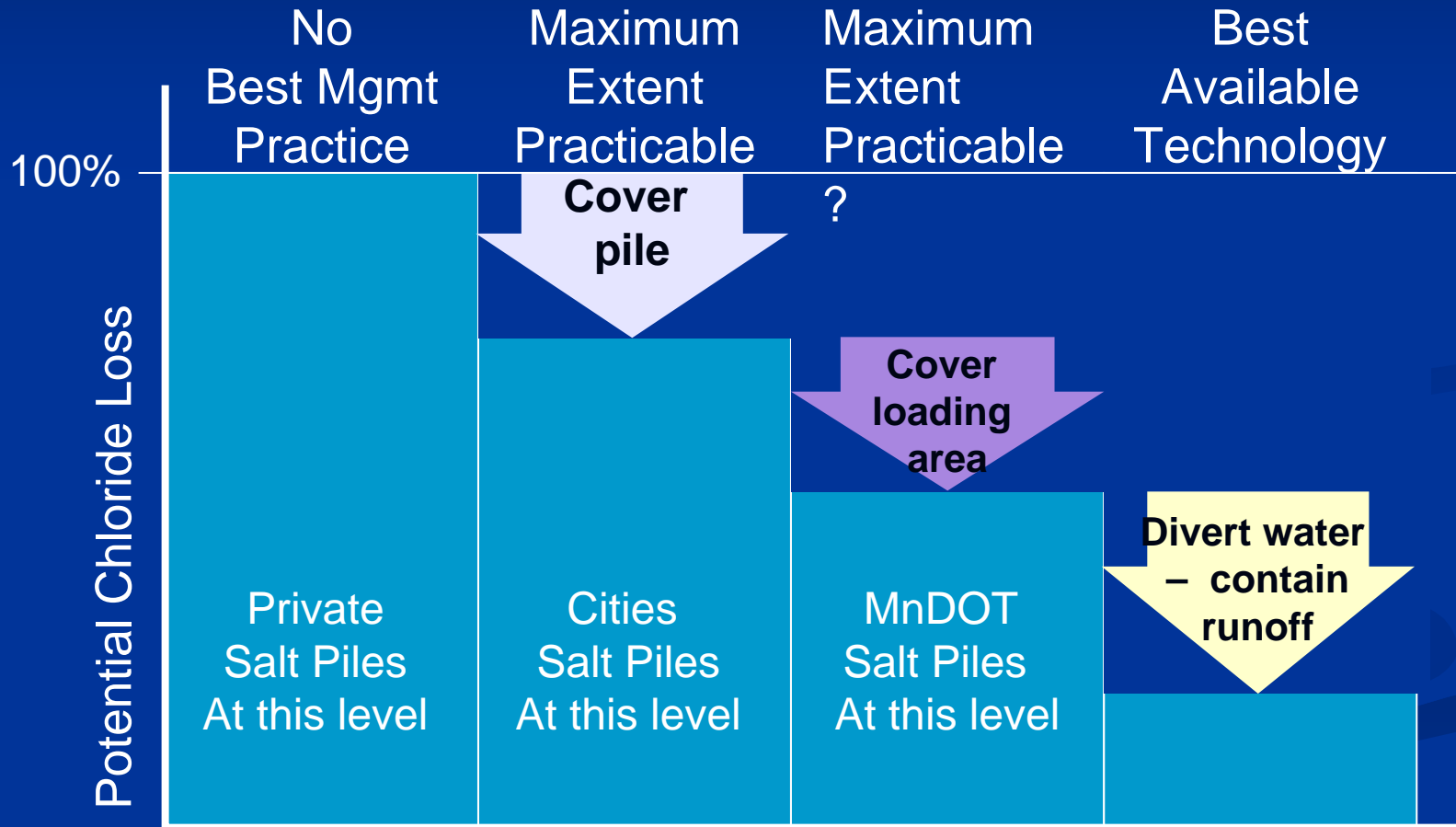


Select, store, and apply materials appropriately to balance public safety and environmental risks



- Implement salt reduction practices where feasible
- Ongoing research
 - Individual Agency research
 - Sharing research
 - Trying new products or techniques
- Reduce in sensitive areas

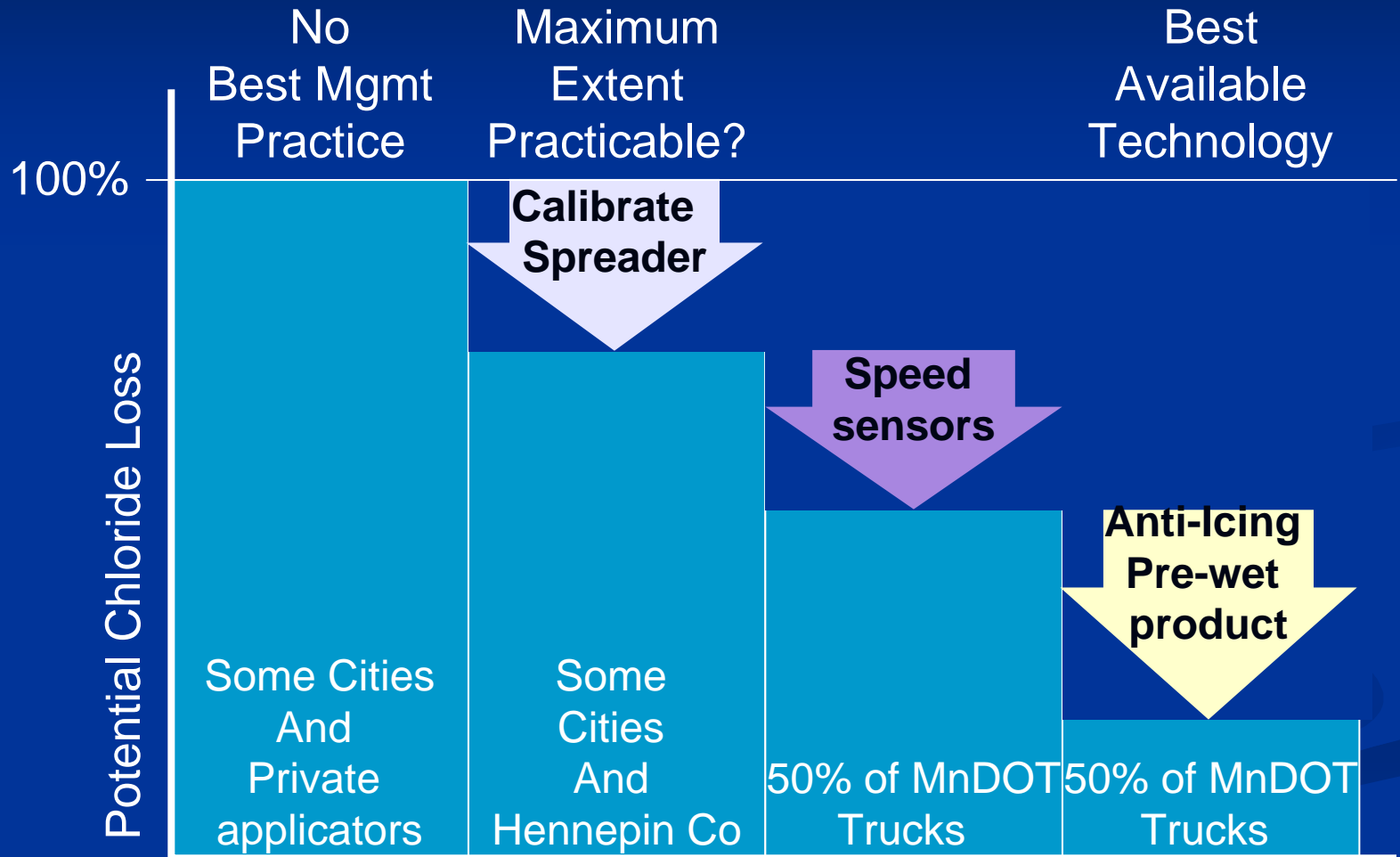
Salt Storage Pile



New Hope Salt Shed



Applied Product



Epoke Technology



Emerging Technologies

- A “zero velocity” application device is being used in Wisconsin and Pennsylvania.
- Michigan Tech University is developing a system called “Anti-Icing Smart,” which is a permanent coating that acts as a sponge for liquid deicers.
- A high technology “Highway Maintenance Concept Vehicle” is being developed at Iowa State. The “Concept Vehicle” uses infrared sensors to detect the temperature of the roadway and air.

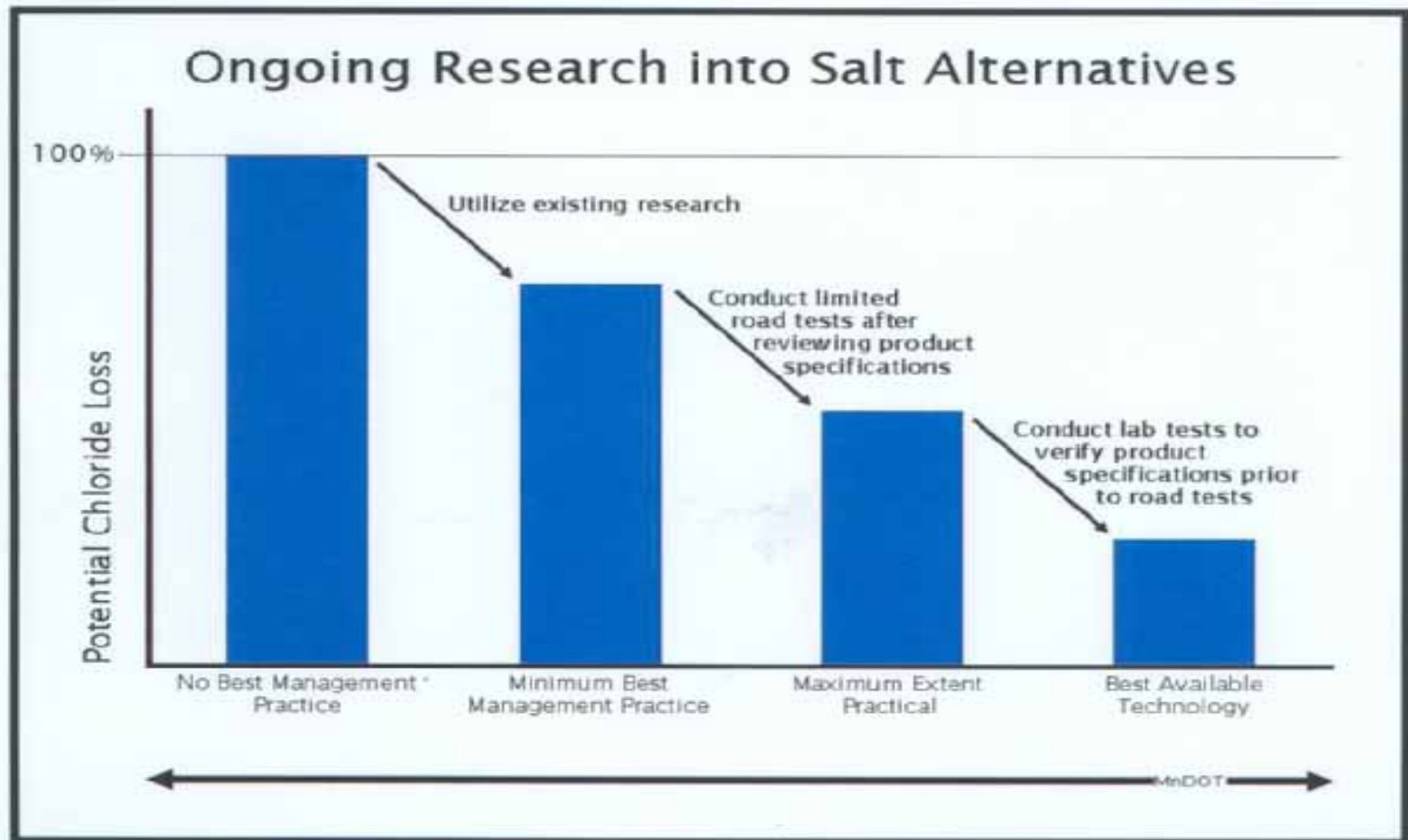
Encourage communication between applicators



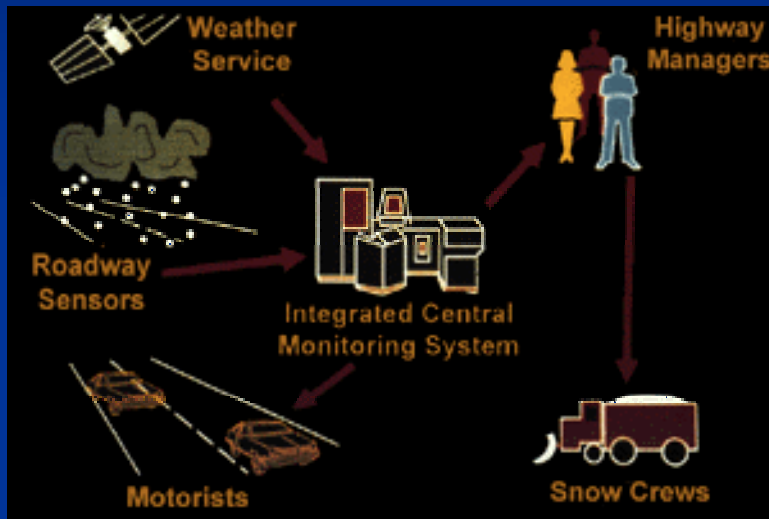
- Commission road salt workshop
 - Discuss activities
 - Share ideas and experiences
 - Propose new solutions
- Mn/DOT and Hennepin County Participation
 - Increases knowledge base

Best Available Technology On-Going Research

Figure 9 - Continuum of best management practices for on-going research.



Foster stewardship through improved applicator awareness



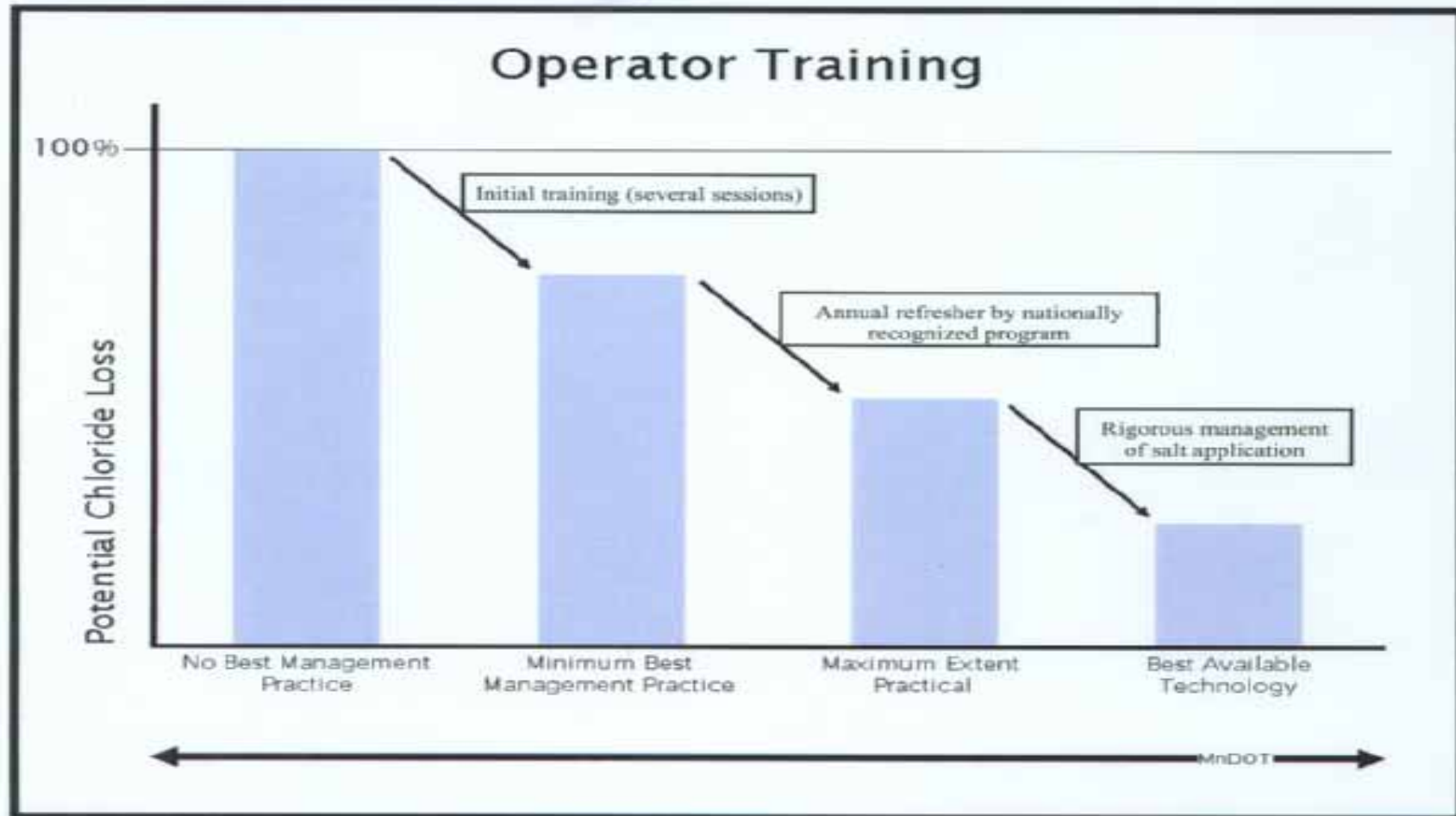
- Increase applicator training
 - How to maintain safety and use less salt

- Add context to training
 - Environmental risks

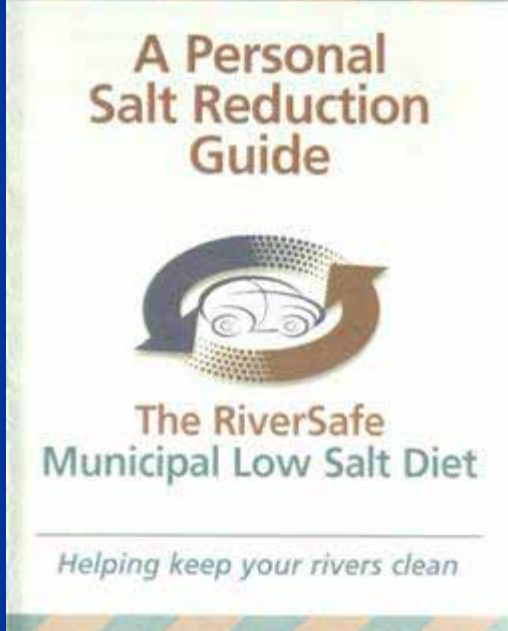


Best Available Technology Operator Training

Figure 4 - Continuum of best management practices for operator training.

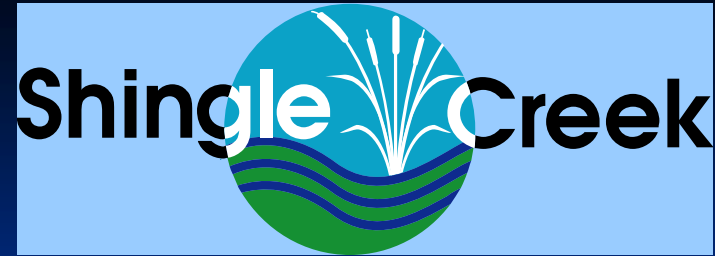


Communicate with the public



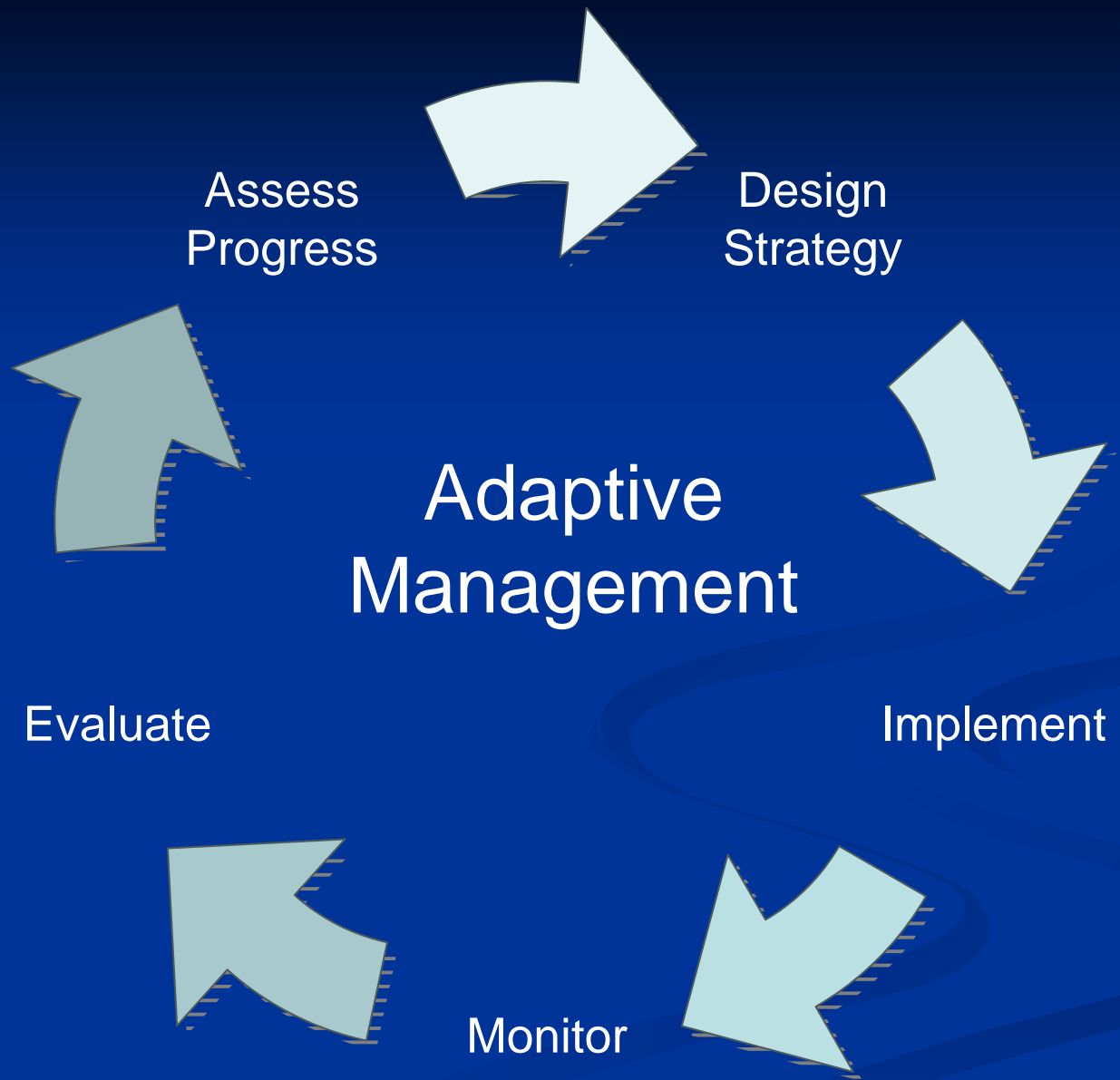
- Public education
 - Brochures
 - Signage
 - Public meetings
 - Articles in newsletters





Commission Activities

- Annual Applicator Workshop
 - Formalized annual discussion of issues, techniques, technologies
- Private Applicator Education
 - Brochures
 - Permit Requirements (Salt Management Plan)
 - Consider private (commercial) snow management rules
- Official Education
 - Educate City Councils and Officials
- Monitoring & Reporting
 - Annual Monitoring Report
- Public Education and Outreach
- Salt Management Plans



Mn/DOT Costs - Prewetting

Metro District Prewet / Anti-icing 10 Year Implementation Plan

01/06/2005

developed by-- Norm Ashfield

Year of Implementation	Prewet Equipment	Units to Retrofit	Anti-icing Equipment	Support Equipment	Needed funds per year
2005-2006	18 units @ \$63000	4 units @ \$14000	Tanker with controls @ \$35000	Storage tank @\$10500	\$123,000
2006-2007	18 units @ \$67000	4 units @ \$15000	1 st Response @ \$35,000	Storage Tank @ \$11025	\$128,000
2007-2008	18 units @ \$69000	4 units @ \$15000		Storage tank @ \$11576	\$96,000
2008-2009	18 units @ \$73000	4 units @ \$16000		Storage Tank @ \$12155	\$101,000
2009-2010	18 units @ \$76000	4 units @ \$17000		Storage Tank @ \$12762	\$106,000
2010-2011	18 units @ \$80000	4 units @ \$18000	Replace 5 units @ 10K ea. = \$65000	Storage tank @ \$13400	\$176,000
2011-2012	18 units @ \$84000	4 units @ \$19000		Storage tank @ \$14071	\$117,000
2012-2013	18 units @ \$88000	4 units @ \$20000		Storage tank @ \$14775	\$123,000
2013-2014	18 units @ \$93000	4 units @ \$21000		Storage tank @ \$15513	\$130,000
2014-2015	18 units @ \$97000	4 units @ \$22000	Replace 5 units @ 10K ea. = \$78000	Storage tank @ \$16289	\$213,000

NOTE: Calculations are based on purchasing 18 units, (9 Tandems, 9 Single axle trucks), and retrofitting 4 units, (2 tandems, 2 single axle trucks per year. All calculations are also based on a 5% inflation indexed per year, rounded to the nearest 000's. Total funds needed over the 10 year period is \$1,313,000; price of pre-wet does not include the cost of the truck equipped with snow plow etc)

Prewetting Equipment Grant Clean Water Legacy Act

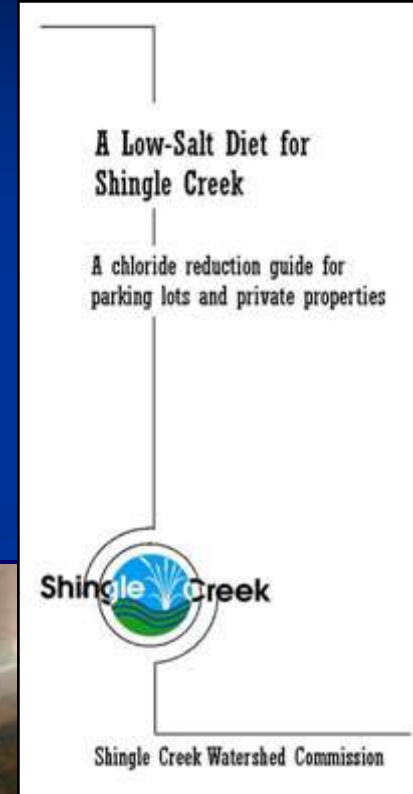
- Total cost = \$477,000; grant request = \$238,500
- Retrofit:
 - 23 Hennepin County trucks
 - 10 city trucks + brine tanks
 - Try out different types of equipment
- Continue to collect salt application data, monitor conductivity
- Evaluate ice control and public safety impacts; equipment effectiveness

2008 APWA Profession Awards

- Excellence in Snow and Ice Control
- Recognizes partnership of Commission, 9 cities, Hennepin County, Mn/DOT, and the MPCA
- Importance of multi-faceted approach



Training



Information



Equipment

