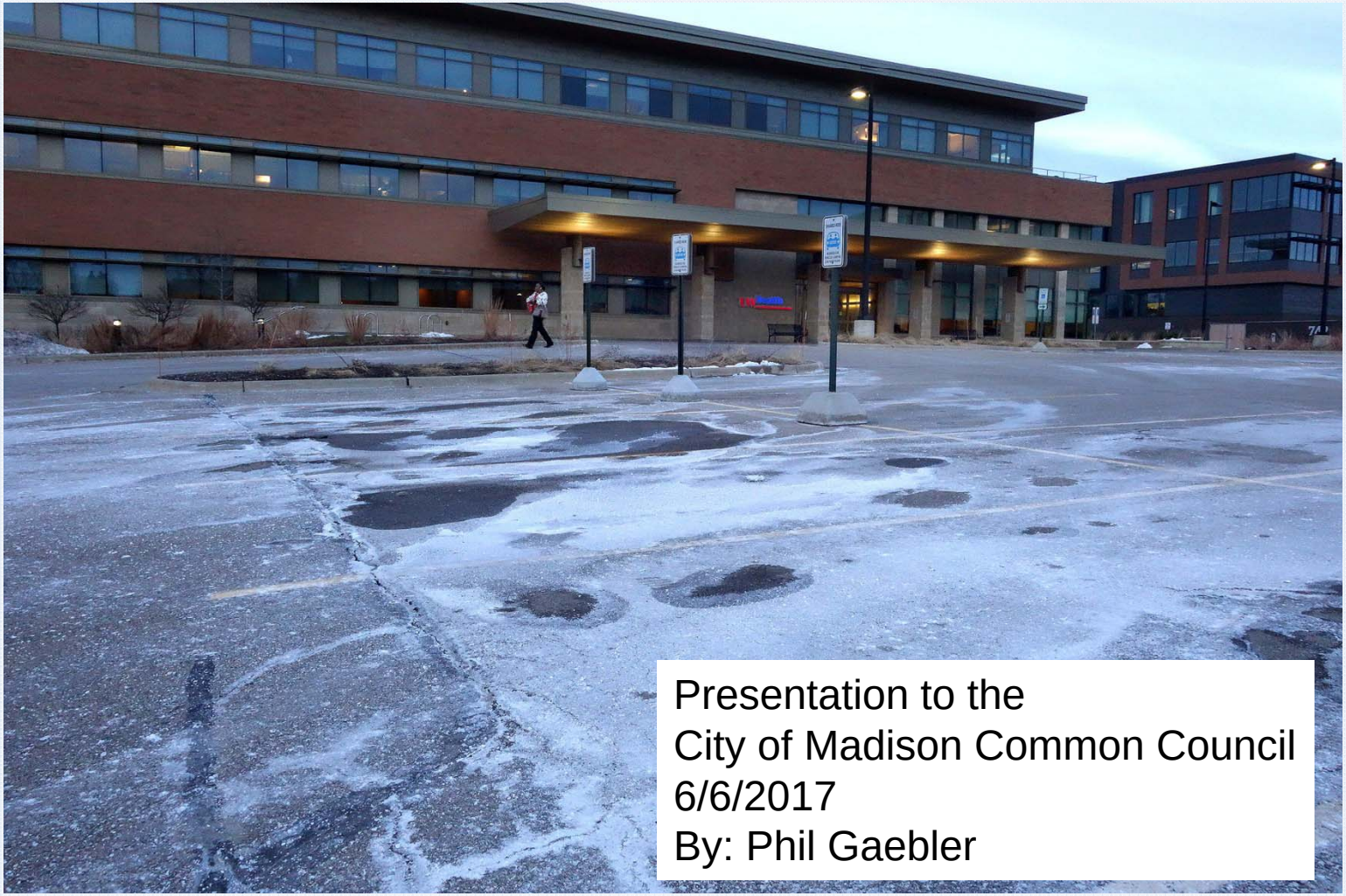
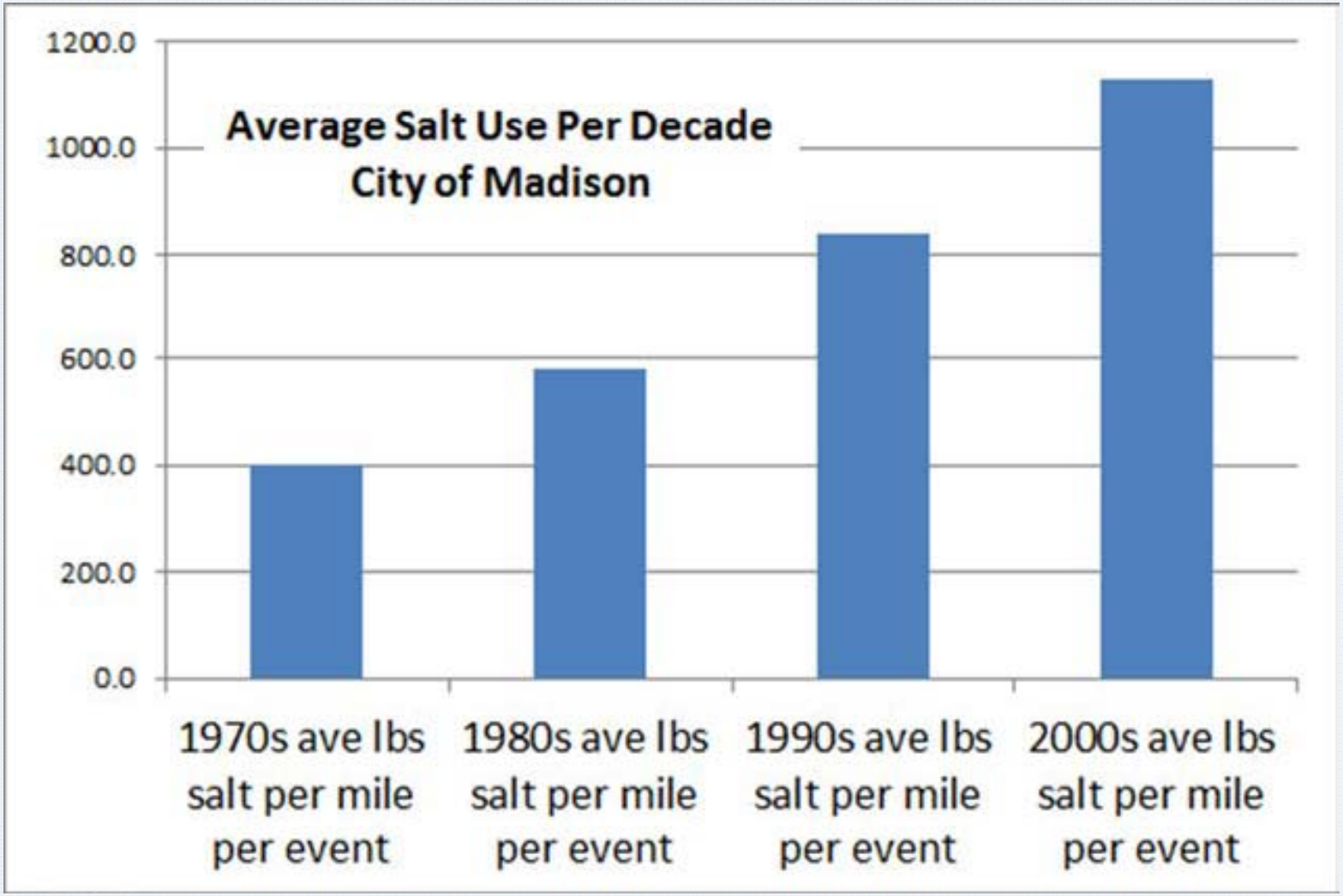
Salt Use and Effects



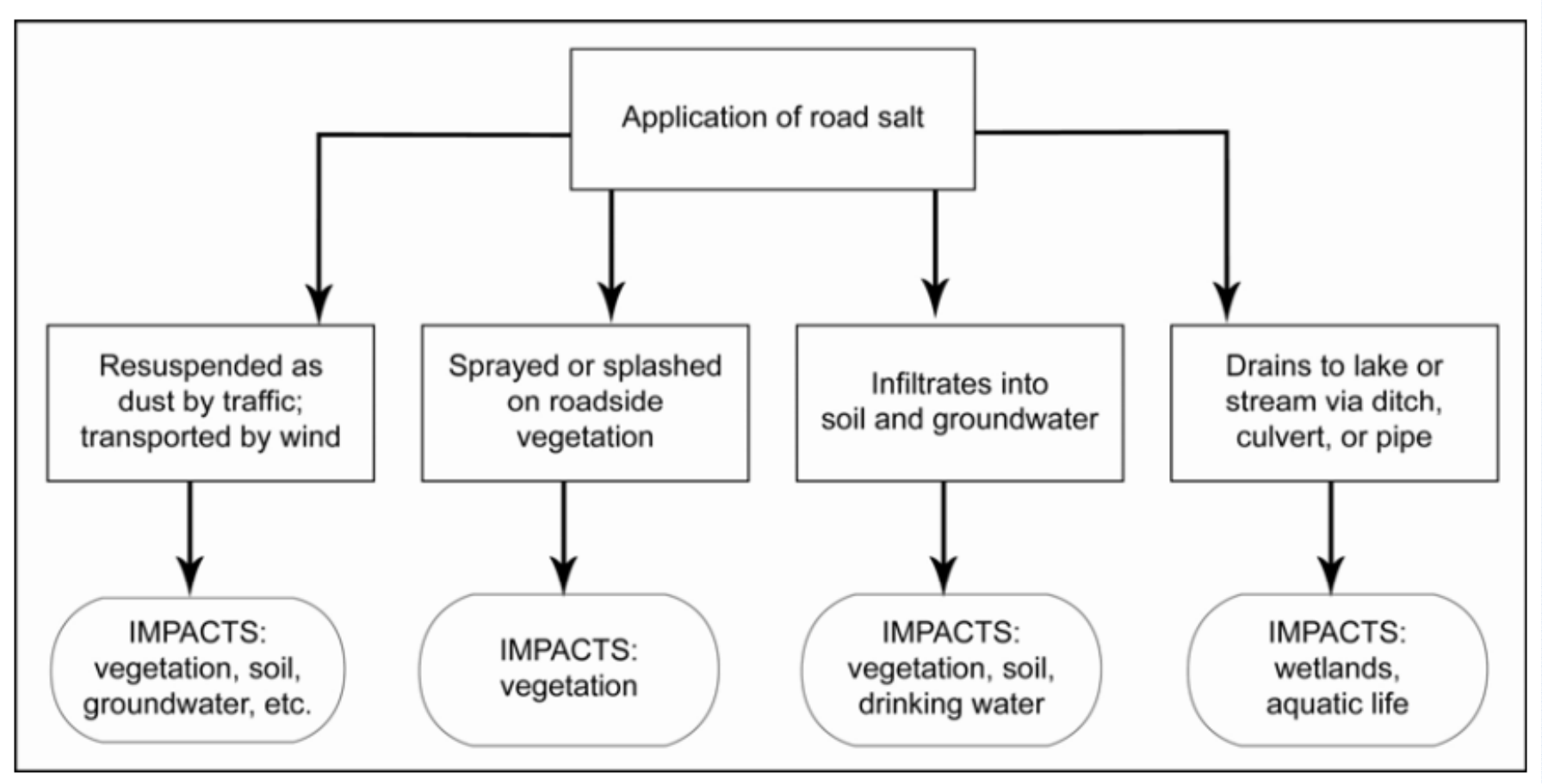
Presentation to the
City of Madison Common Council
6/6/2017
By: Phil Gaebler

Photo Credit: David Thompson

Road Salt Trends in Madison



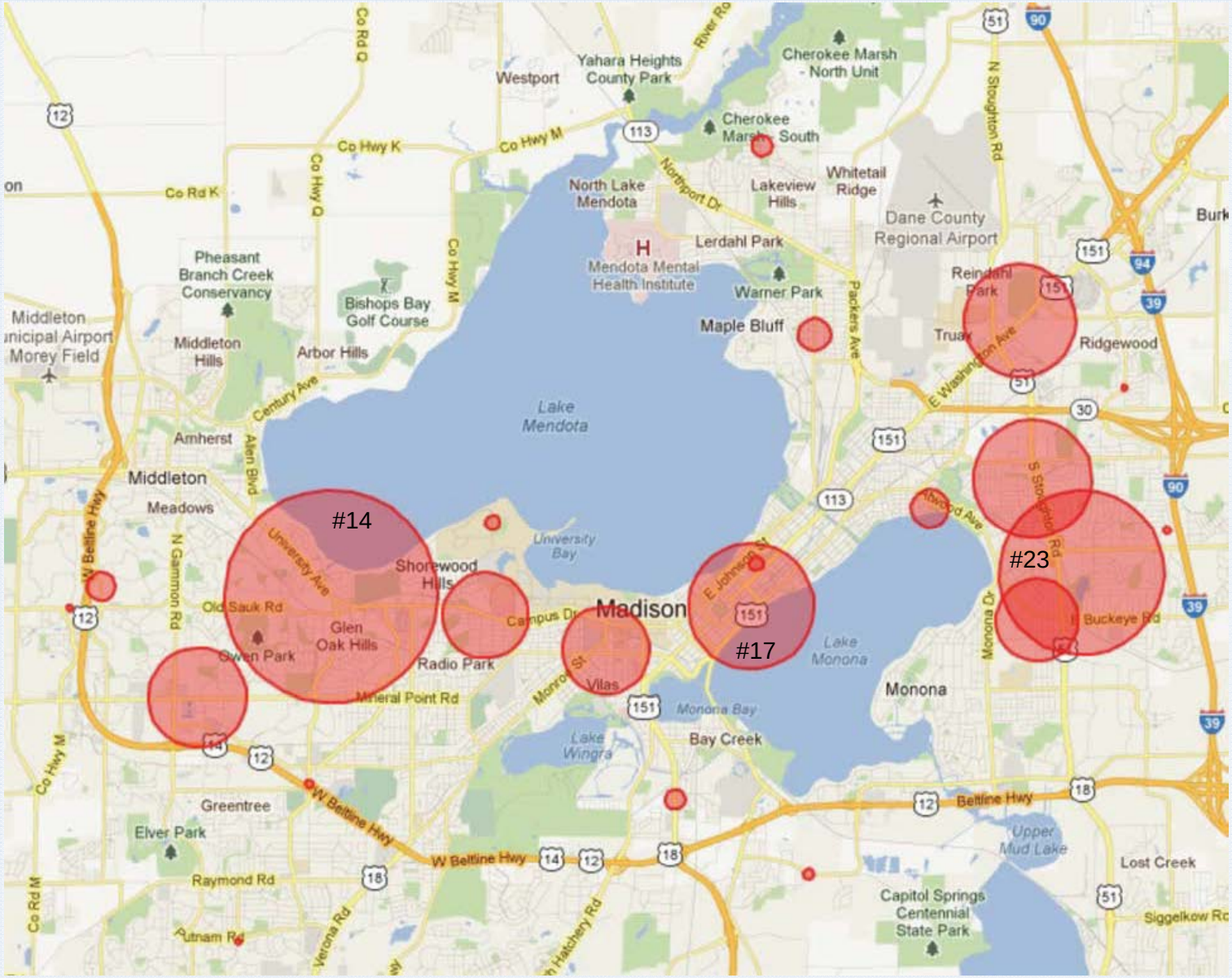
Where the salt goes…



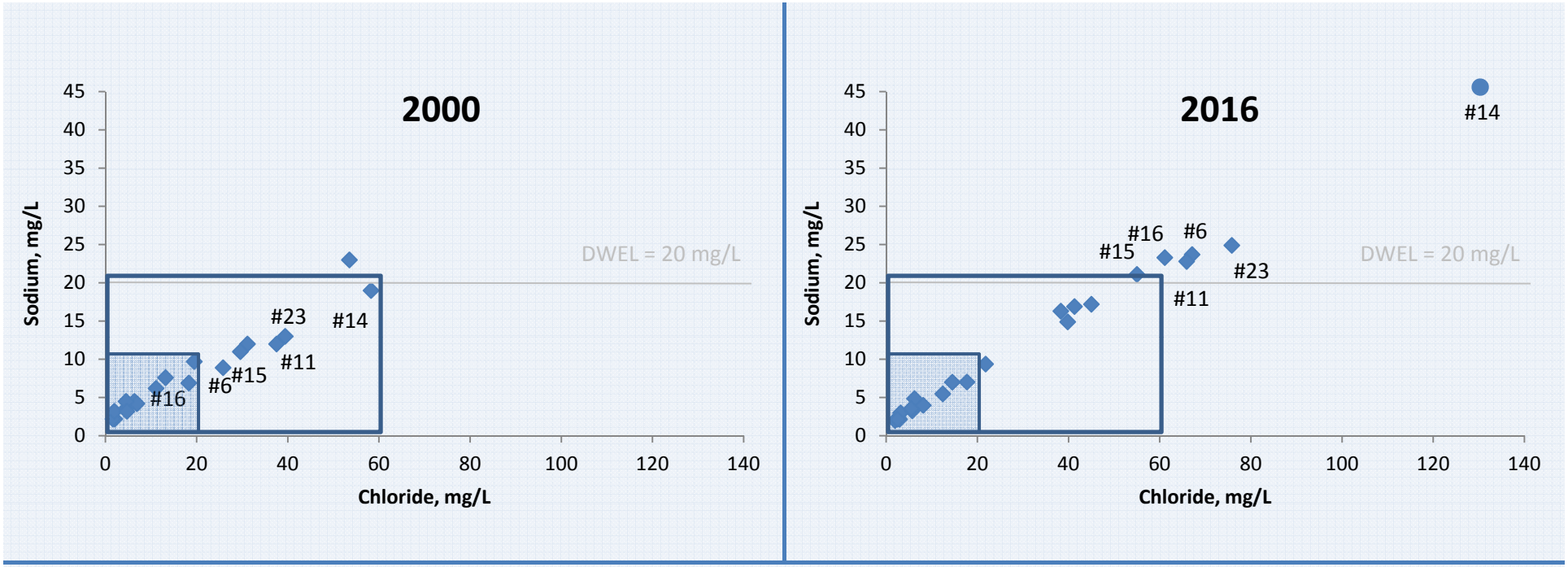
Salt in the City's Water Supply

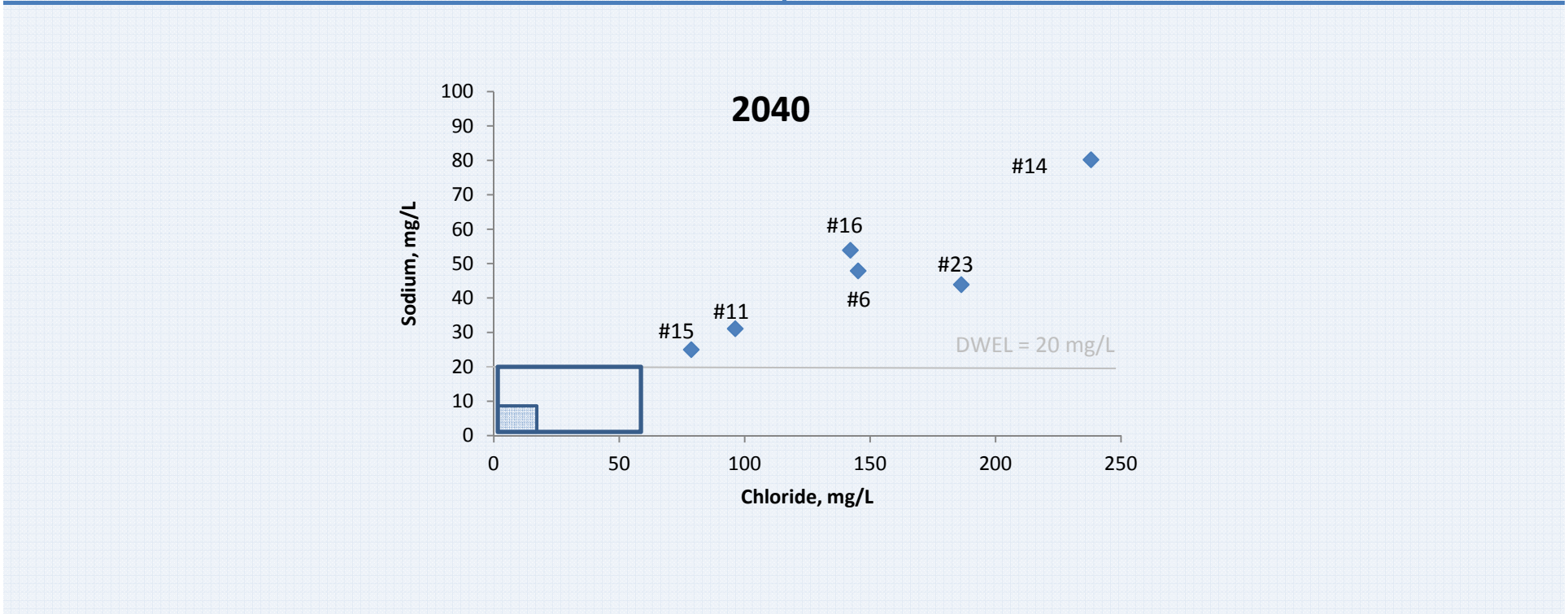
- Road salt is contaminating local water bodies and the aquifer – our drinking water source
- Alarming increases in chloride levels have been observed at five drinking water wells; the most dramatic rise is occurring at Well 14
- The chloride ion is responsible for the salty taste of water; water begins tasting salty to most people when the chloride level reaches about 250 mg/L

Effects to Public Health



Circle diameter proportional to chloride concentration


2000
Sodium, mg/L
Chloride, mg/L
DWEL = 20 mg/L
#14
#23
#11
#15
#6
#16
0
5
10
15
20
25
30
35
40
45
0
20
40
60
80
100
120
140

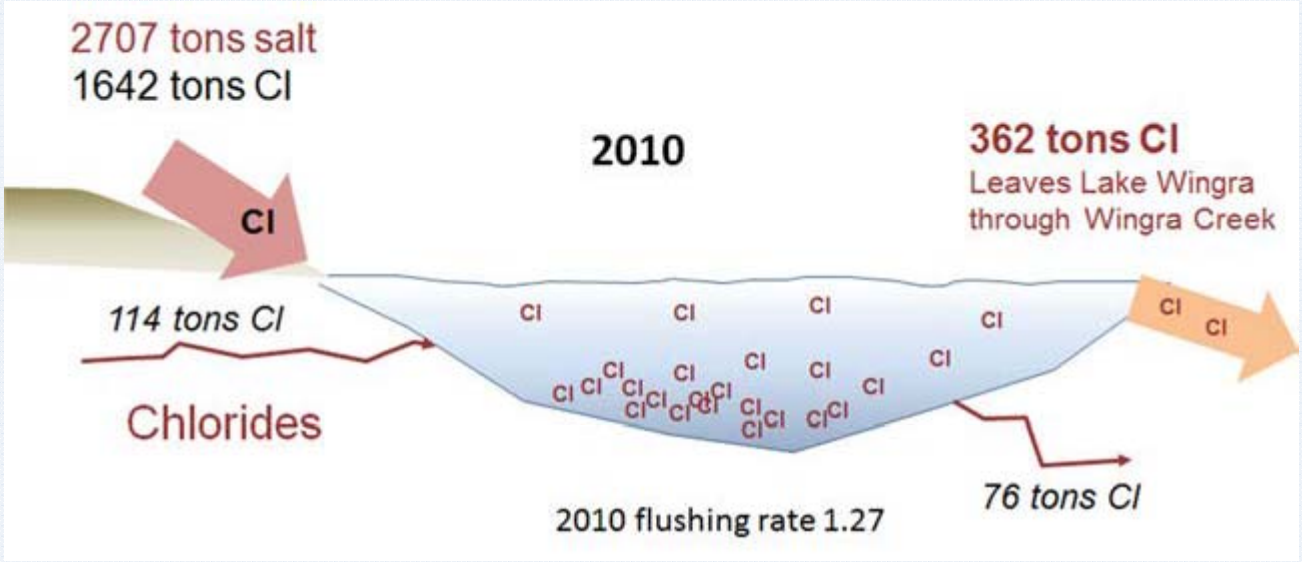

2016
Sodium, mg/L
Chloride, mg/L
DWEL = 20 mg/L
#14
#16
#6
#15
#23
#11
0
5
10
15
20
25
30
35
40
45
0
20
40
60
80
100
120
140

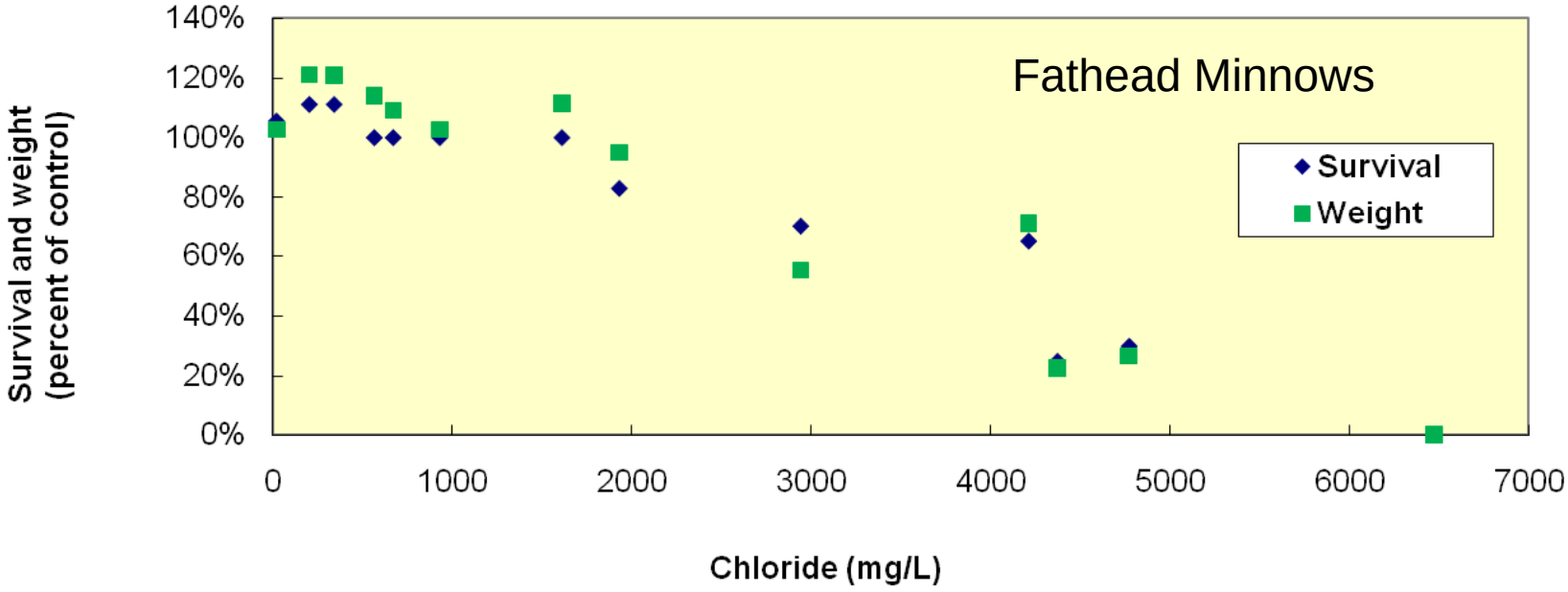
2040
Sodium, mg/L
Chloride, mg/L
DWEL = 20 mg/L
#14
#16
#23
#6
#11
#15
0
10
20
30
40
50
60
70
80
90
100
0
50
100
150
200
250

Salt in the City's Water Supply

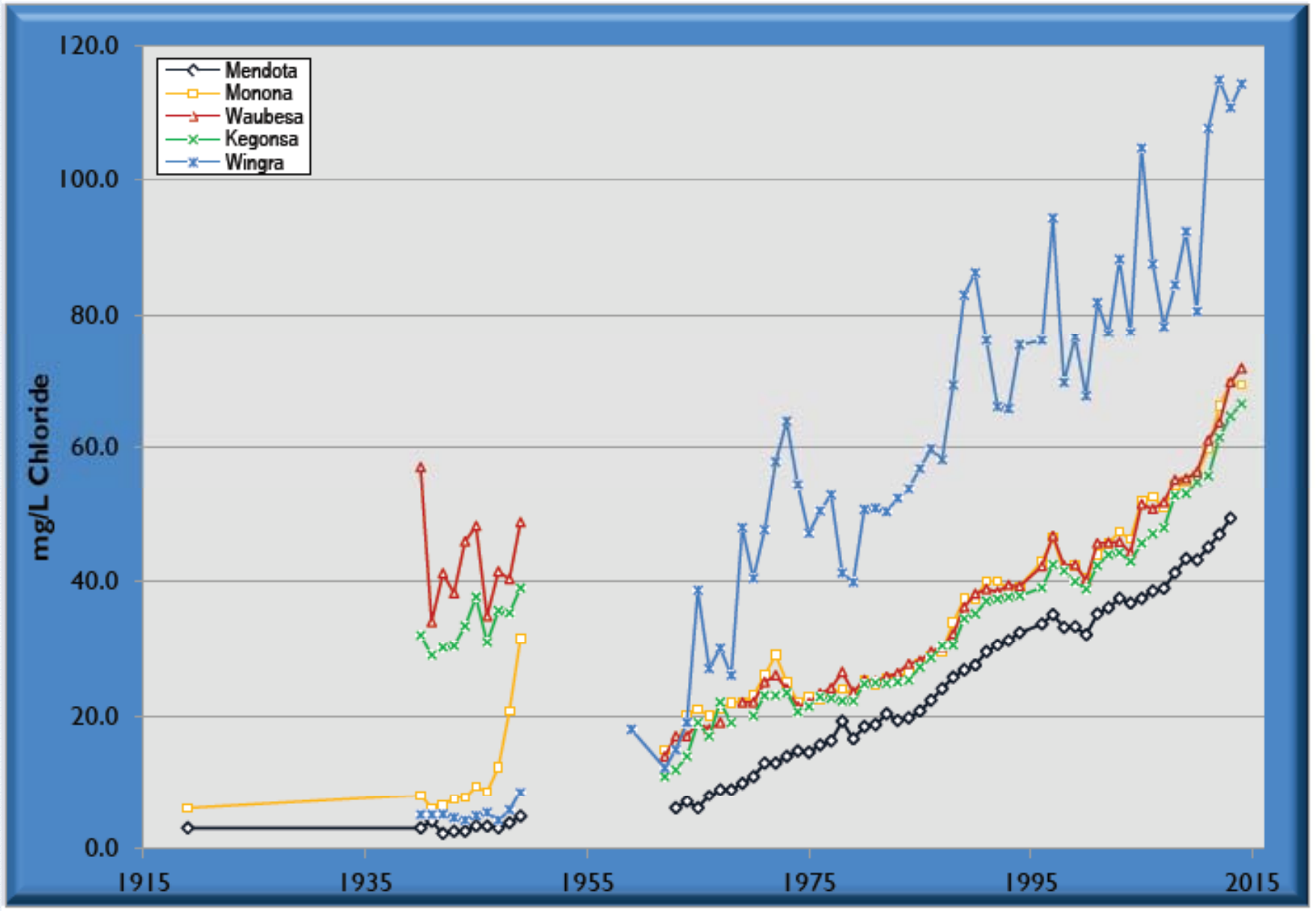
- Water from three wells is expected to exceed this aesthetic threshold within the next 40 years; two other wells may exceed the limit within 60 years
- Elevated chloride does not affect human health, however, it does degrade the aesthetic quality or taste of the water
- Chloride removal technology is available – think reverse osmosis or ion exchange – but it is costly to install and even more expensive to operate

Aquatic Life

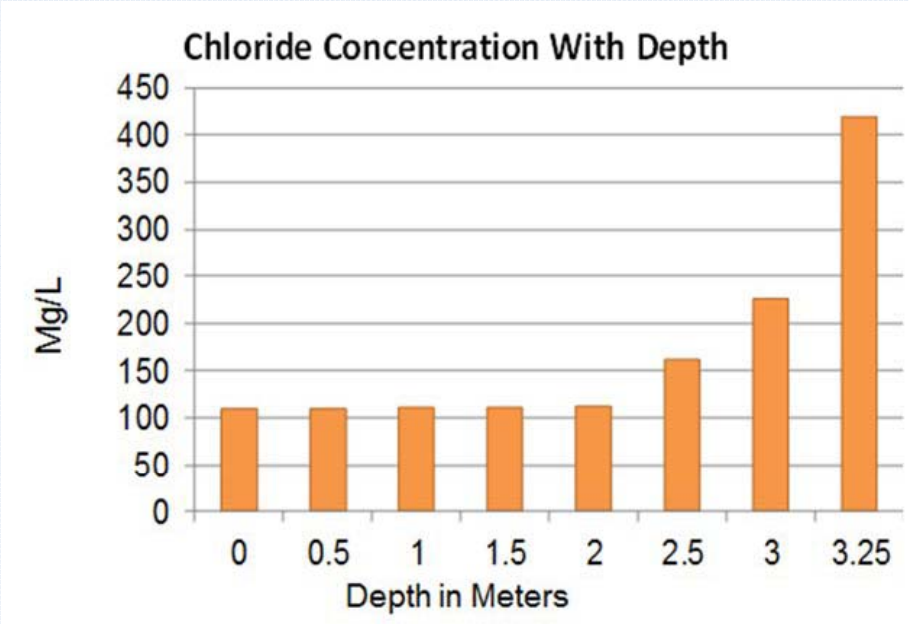




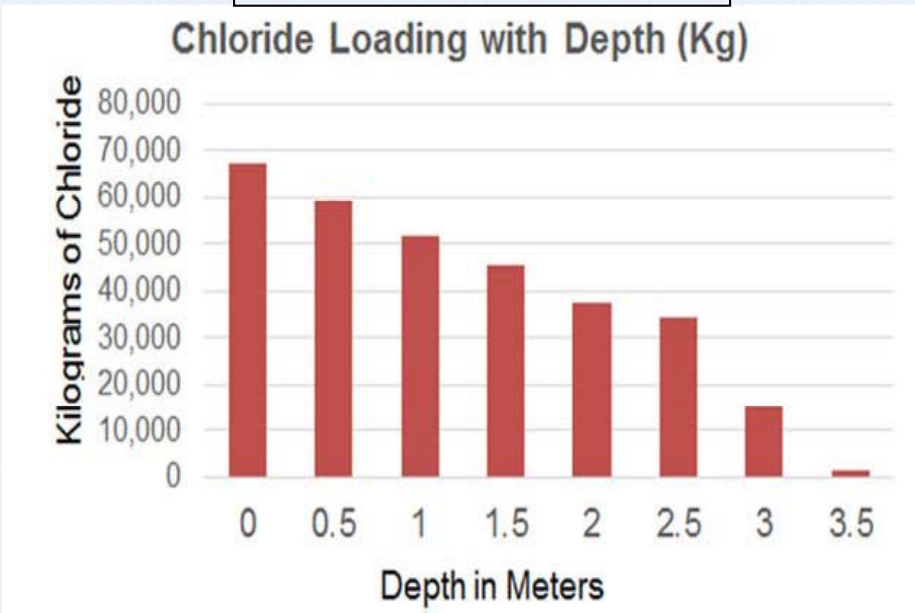
Salt and Water Quality



Salt and Water Quality



Lake Wingra – Madison, WI



Environmental Impacts

Photo Credit: Roger Bannerman

Photo Credit: RCPW

Photo Credit: Natalie Hammerich

- Soil
- Vegetation
- Wildlife
- Pets

Economic Costs

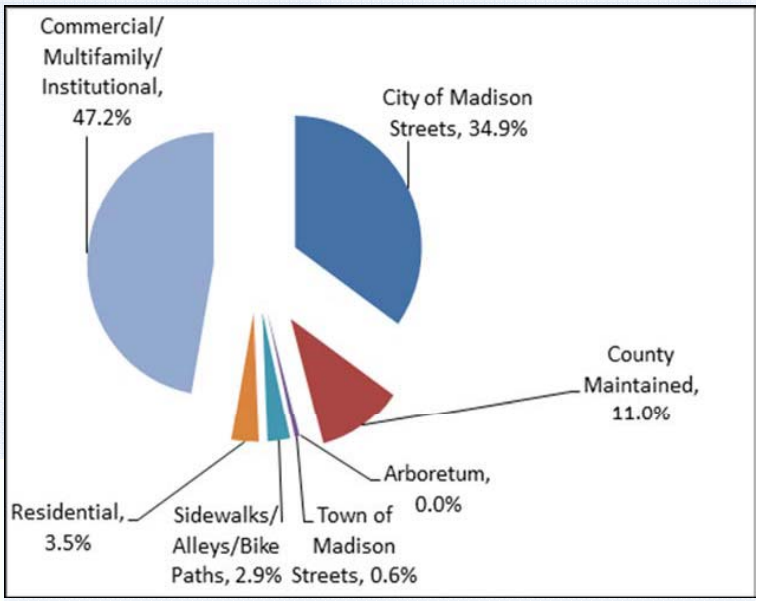
- Replacement of private or municipal wells is expensive
- Corrosion of concrete reinforcing rods in:
  - Roads
  - Bridges
  - Parking structures
- Automobile industry
  - Corrosion protection costs

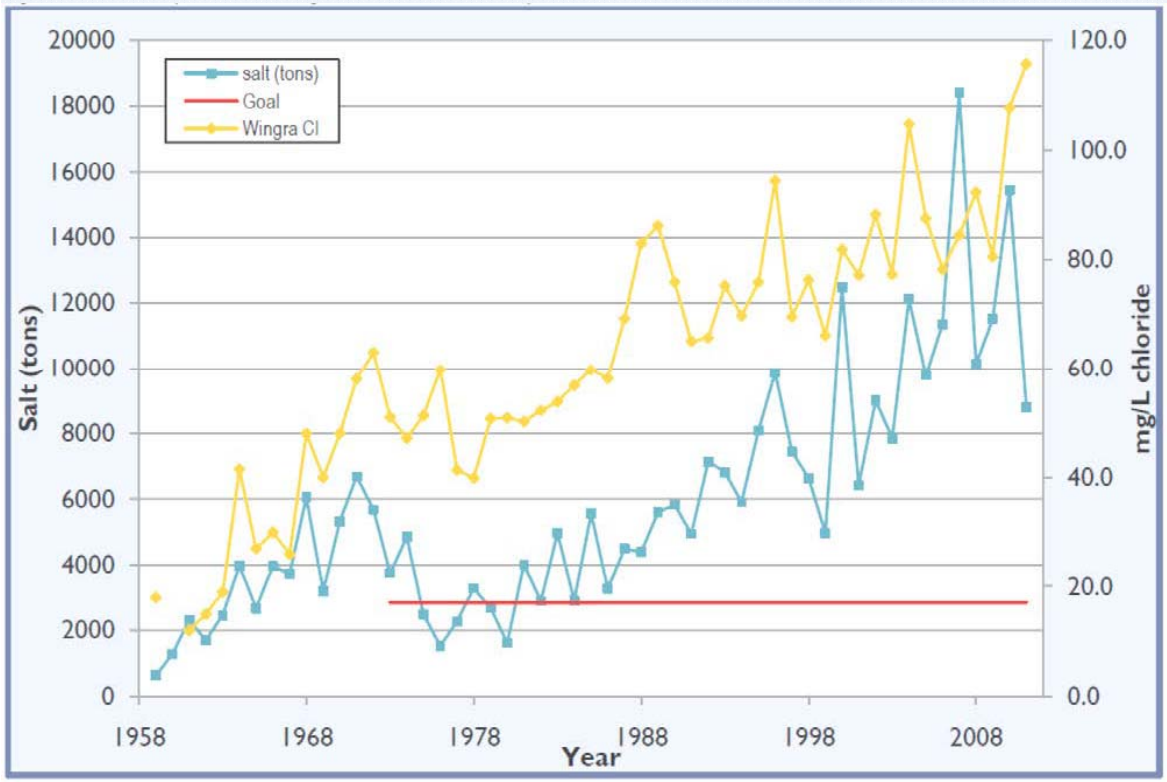
  $4 billion/yr
- Highways
  - Corrosion protection estimated

  at $8.3 billion/yr, $109 billion/yr for epoxy coating

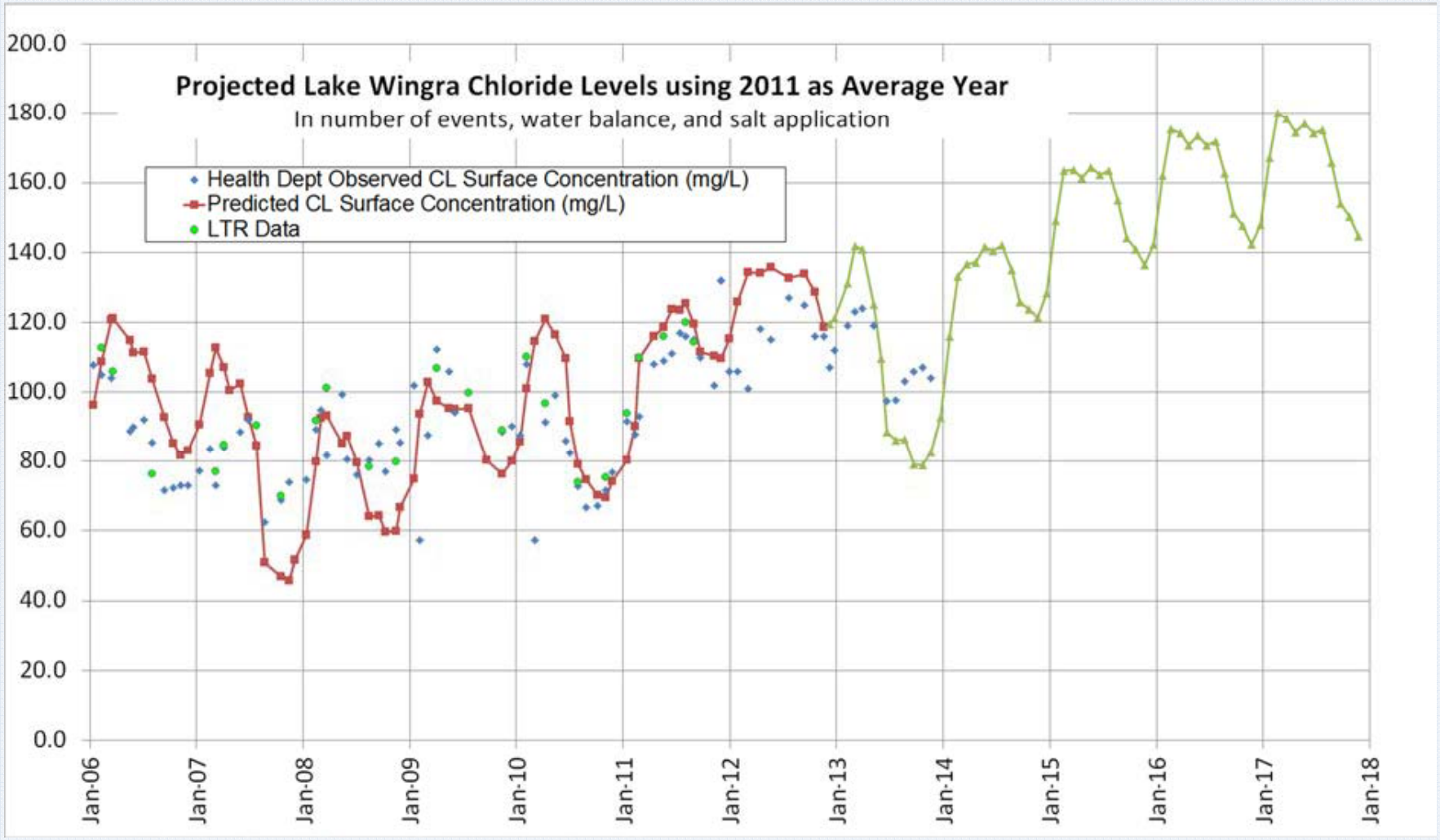
Photo Credit: Roger Bannerman

Lake Wingra Watershed Management Plan

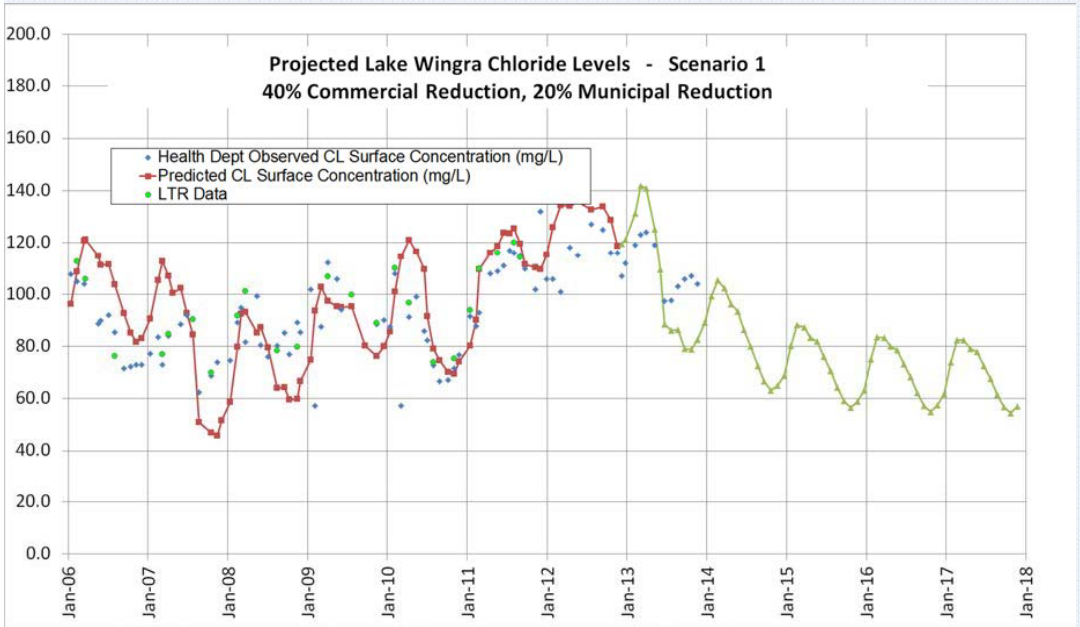




Lake Wingra Watershed Management Plan



Lake Wingra Watershed Management Plan

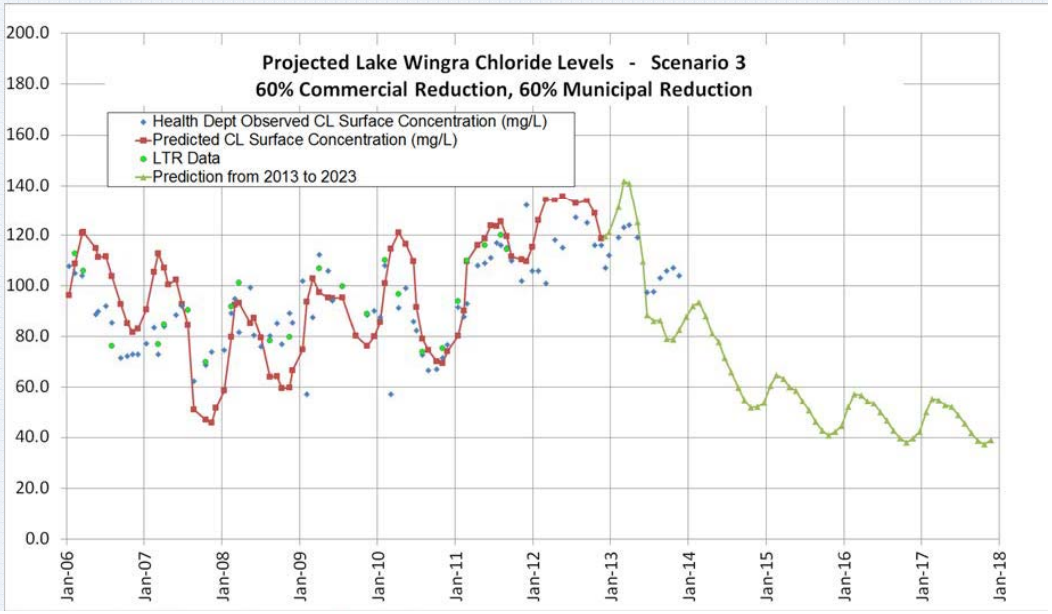


Reduction Scenario 1

- Reduce Commercial/Residential Application Rates by 40%
- Municipal Application Rates by 20%

Reduction Scenario 3

- Reduce Commercial/Residential Application Rates by 60%
- Reduce Municipal Application Rates by 60%



Water Utility Actions

- Founding member of the Wisconsin Salt Wise Partnership, a collaboration of government and not for profit environmental groups that advocates for wise use of road salt including
  - Pre-event application of anti-icing liquid brine
  - Physical removal of snow and ice always first
  - Matching salt application rates with pavement temps and weather conditions
  - Switch to an abrasive (sand) or other alternative when temps drop below 15 degrees – road salt does not work

Shovel – Scatter – Switch

Volunteer Salt Applicator Certification

- Training with a test aimed at educating all applicators.
- Industry is motivated to over apply based on risk reduction
- There is a lot of room for improvement without additional risk

GET A GRIP ON SALT

Be Wisconsin

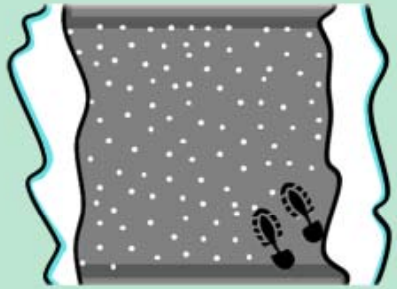
Salt Wise

www.WiSaltWise.com

1. Shovel

Clear walkways and other areas before the snow turns to ice. The more snow you remove manually, the less salt you will have to use and the more effective it will be.

2. Scatter



If you apply salt to pavement, aim for a pattern like this, leaving space between salt grains. A coffee mug full of salt is enough to treat a 20-foot driveway or 10 sidewalk squares. A hand spreader can help create this pattern.

3. Switch

When the pavement temperature is below 15 degrees, salt won't work. Switch to a different ice melter (like a blend) that works at a lower temperature, or use sand for traction.

4. Love the Lines

Stripes on roads before a storm are anti-icing. They show that your professional maintenance crew is concerned about safety and is saving money, time and protecting our environment!

5. Salt Wise All Year

Water softener salt ends up in local freshwater bodies. If your household softener uses more than 1 bag of salt per month, have a professional tune it up or replace it with a high-efficiency model.

Questions?