2018 Watershed Update

Agenda

Thursday, March 8, 2018
Municipality of Anchorage
Alaska Department of Transportation and Public Facilities
At the BP Energy Center, Birch Room
900 E. Benson Blvd.

The Municipality of Anchorage and Alaska Department of Transportation and Public Facilities
Invite you to the APDES Watershed Update Highlighting
Anchorage Storm Water Permit Compliance Activities

Welcome Municipality of Anchorage and Alaska Department of Transportation

Refreshments provided starting at 9:00 a.m.

Program

9:30 APDES Storm Water Program

- Agency Updates
- Storm Water Utility Project Update
- Deicer Update
- Stream Setbacks

10:30
- APDES Projects

10:45
- Poster Session of Projects from 2017

11:15
- GIS Update

11:30 MS4 Condition Assessment ***Birch Room***

Or

Watershed Plan Evaluations ***Aspen Room***

Discussion – Project Team Will Be Available To Address Questions

12:00 Adjourn

We're pleased to have you join us for all or a portion of the 2018 Watershed Update

You can find additional information on the stormwater permit at anchoragestormwater.com

2018 Watershed Update

Municipality of Anchorage
Alaska Department of Transportation
and Public Facilities

A.laska
P.ollutant
D.ischarge
E.limination
S.ystem

Today's Agenda

APDES Meeting Agenda:

BIRCH Room

9:30 **APDES Storm Water Program – Term III**
- Agency Updates
- SWU Project Update
- Deicer
- Streams

10:45 APDES Projects

Poster Session of 2017 Projects — **ASPEN Room**

11:15 GIS Update

11:30 MS4 Condition Assessment

11:45 Discussion – Project Team Available for ?'s

12:00 Adjourn

11:30 Watershed Plans Update – Chester and Little Campbell

APDES Annual Meeting

Municipality of Anchorage
and Alaska Department of Transportation
and Public Facilities

Anchorage Storm Water Permit Compliance

*APDES *MS4 *Phase I *Term III

APDES Annual Meeting

Permit:

Effective August 1, 2015

Permit Programs
- ✓Illicit and Industrial Discharge
- ✓Infrastructure and Street Management
- ✓Construction
- ✓New Development
- ✓Public Education
- ✓Monitoring

Evaluate Programs
- ✓ Private Snow Disposal Site Controls
- ✓ Sand Storage Shed Assessment
- ✓ Animal Facilities Performance Standards
- ✓ Watershed Plans

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Municipality of Anchorage
and Alaska Department of Transportation
and Public Facilities

Agency Updates
and
Current Issues

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Stormwater Utility Project

Presented by:

Jason Bockenstedt
MOA Project Manager

APDES Annual Meeting

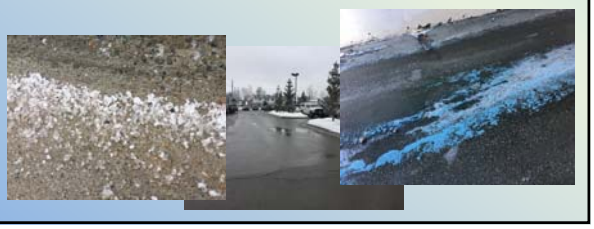
Deicers in the Community

Presented by:

Kristi Bischofberger and Jeff Urbanus
Watershed Management Services

Chemical Deicers

Over the past several winters, MOA staff and public inquires suggest a significant increase in the amount of chemical deicers being used in Anchorage for parking lot maintenance



Chemical Deicers -Background

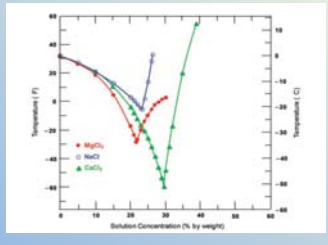
- Historically, traction sand and gravel have been primary method used for addressing winter-related vehicle and pedestrian safety concerns
- Changing wintertime weather conditions may necessitate a shift to chemical deicers
- WMS has performed some initial efforts to summarize the tradeoffs from this change

Chemical Deicers –How "Salt " Works

- Deicing chemicals lower the freezing point and use the available heat to melt snow and ice
- Typically, chloride salts, most predominately NaCl (Rock Salt) are used.
  - Low temperatures and low solar insolation have limited the effectiveness and use of salt – "cold salty snow"
  - The increased availability of $MgCl_2$ and $CaCl_2$ and warmer winter temperatures have led to the increase in use of chemical deicers

Chemical Deicers – Salt Comparisons

NaCl vs. $MgCl_2$ vs. $CaCl_2$ - Temperature



Lowest Practical Melting Temperature	
NaCl	15° F
$MgCl_2$	-10° F
$CaCl_2$	-20° F

Chemical Deicers – Salt Comparisons

NaCl vs. $MgCl_2$ vs. $CaCl_2$ - Impacts

	Metal Corrosion	Concrete Corrosion	Water Quality	Soil	Vegetation
NaCl	High	Low	Moderate	High	High
$MgCl_2$	High	Moderate/High	Moderate; More Chloride Loading	Low	Moderate/ High
$CaCl_2$	High	Moderate	Moderate; More Chloride Loading	Low	Moderate

Chemical Deicers – Salt vs. Sand

Tradeoffs - Salt vs. Sand

Sand	Salt
Requires Sweeping	No Sweeping
Non-Corrosive	Can Damage Concrete/Metal Corrosion can be Mitigated with Additives
Effective Across a Wide Temperature Range	Varies by Chemical
Not harmful to Vegetation	Harmful to Vegetation
Fine Sediment has Potential Negative Aquatic/Water Quality Impacts	Chlorides are a Potential Aquatic/Water Quality Concern
Ice can Accumulate over the Winter Season	Can Completely Melt Snow and Ice to Bare Pavement
Usually Requires Reapplication after Snowfall	May need Reapplication to Prevent Dilution; Particularly with Mg and Ca

Chemical Deicers – Recommendations

General Recommendations

- Lightly apply just before/just as snow falls
- Do not apply during snowfall
- Apply at the end of the storm for ice/snow removal
- Remove any slush/meted snow to prevent refreezing
- Consider limiting application to handicap parking, sidewalks, entrances

Chemical Deicers - Final Thoughts

- Deciding which strategy is best for controlling ice should be done by assessing site-specific concerns
  - How much ice do you need to melt at zero degrees?
  - Cost of sweeping vs infrastructure life?
- The effectiveness and impacts of each are best controlled by adoption of best management practices
- WMS will be developing an educational handout on managing parking lot ice using sand and chemical deicers

APDES Annual Meeting

Stream Setback Ordinance

Presented by:

Jeff Urbanus
MOA Project Contact

Stream Setback

Project to update the stream setback provisions is underway

- Various housekeeping changes
- Increase in setback size
- Currently working it way through the Planning and Zoning Commission –Assembly in May?

Stream Setback

WHY ARE WE PROPSING CHANGES?

The current version of the code contains language directing the MOA to revisit the issue of stream setbacks and to:

A.) To provide wider stream protection setbacks; and

B.) to provide relief for property that would be impacted or rendered nonconforming by such wider setbacks.

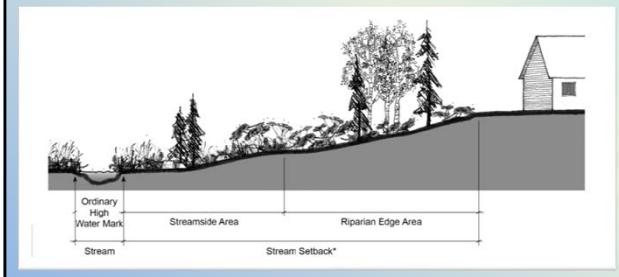
Stream Setback

WHAT ARE WE PROPSING?

- Stream setbacks are no longer uniform but are based on stream size, stream characteristics, and the pattern of adjacent development
  - Large, undeveloped stream= large setback
- A two-zone setback
  - 25 foot Streamside Zone
  - Variable (25 or 75 foot) Riparian Edge Zone

Stream Setback

Streamside Zone and Riparian Edge Zone



Stream Setback

- Streamside Zone
  - First 25 feet from ordinary high water
  - Essentially a non-disturbance zone
  - Exceptions for trail, road, and utility crossings
  - Expressly allows things like stream gages, monitoring equipment, fish platforms, etc.
  - Unpaved trails only
  - Essentially the same as the existing 25-foot setback

Stream Setback

- Riparian Edge Zone
  - Starts at the outer edge of the streamside zone and extends out an additional 25 or 75 feet (in some areas only the streamside zone applies)
  - An area reserved for natural stream functions, with some allowance for temporary and/or pervious uses, up to ½ of riparian edge zone area
    - Paved trails
    - Decks
    - Accessory structures 150 square feet or less on non-permanent foundations
    - Lawns

Stream Setback

WHAT STAYS THE SAME?

- EXISTING USES BECOME GRANDFATHERED
- Small streams and tributaries stay at 25 feet (i.e. streamside zone ONLY)
- Channelized streams with encroaching urbanization stay at 25 feet
- Lots less than 10,000 square feet stay at 25 feet

Stream Setback

MORE INFORMATION

Anchoragestormwater.com/maps

Proposed Stream Setbacks

- Map of proposed changes
- Links to relevant documents

APDES Annual Meeting

Deicers in the Community

Presented by:

Kristi Bischofberger and Jeff Urbanus
Watershed Management Services

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Stream Setback Ordinance

Presented by:

Jeff Urbanus
MOA Project Contact

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Municipality of Anchorage
and Alaska Department of Transportation
and Public Facilities

2017 Audit
and
APDES Projects

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Municipality of Anchorage
and Alaska Department of Transportation
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2017 Audit

- Link permanent controls documents to GIS map
- Demonstrate training for staff and contractors
- Develop inspection checklist for permanent controls
- Modify construction inspection checklist for SWPPP reviews
- Demonstrate DCM applicability to ADOT projects as appropriate
- Improve reporting functions of construction permitting system

APDES Audit

APDES Training

Your Name Here

	Illicit Discharge	ESC	LID/GI & other Source Controls	Operations & Maint	Project Specific	General Storm Water
Plan Reviewer	X	X				X
Inspector	X		X			X
Operator	X			X		X
Trainer						X
Monitoring Crew					X	X
Project Engineer		X	X			X

Pollution Prevention

AMC 21.07.040 – Regulates Discharges to MOA storm drains

Defines specific prohibited discharges, but also defines "illicit discharge" as "pollutants or any materials other than storm water".

- Streets drain to creeks
  #1 public outreach message
- Storm drain flows DO NOT go to the sewage treatment plant

Pollution Prevention

Free Disposal for Household Hazardous Waste

Welcome to the APDES Annual Meeting!

Municipality of Anchorage
and Alaska Department of Transportation
and Public Facilities

2018 APDES Projects

- Pesticides
- Animal Facilities
- Snow Disposal Sites
- Covered Sand Storage

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Poster Session

- Wet Weather Monitoring
- Dry Weather Monitoring
- Pesticide Monitoring
- Low Impact Development and Rain Gardens
- Drainage Design Criteria Implementation
- WMS Mapping
- Construction Erosion & Sediment Control
- Snow Site Design

Return at 11:15

APDES Annual Meeting

GIS Update

Presented by:

Tina Miller
Geographic Information Officer
Office of Economic and Community Development

APDES Annual Meeting

ASPEN ROOM

Watershed Plan Updates

Presented by:

Cherie Northon
Executive Director
Anchorage Waterways Council

APDES Annual Meeting

BIRCH ROOM

Drainage Design Criteria Update and MS4 Condition Assessment

Presented by:

Janie Dusel, P.E.
AWR Engineering


Q&A Discussion
Anchorage MS4 Permit

2017 Dry Weather Screening

Municipality of Anchorage

2017 HDR Field Team: Lynn Spencer, Alena Gerlek, Anson Moxness, and Sam Grosenick

Program Objective

Identify illicit discharges of pollutants to the MS4 within the Municipality of Anchorage

Methods

- Screen 15 outfalls/year for parameters indicative of potential illicit discharges
- Identify 30 alternate sites
- Sample after 48 hours of dry weather
- Field and laboratory analysis of 7 parameters
- Follow-up screening if threshold is exceeded

Parameter	Threshold
pH	≤ 4 or ≥9
Total Chlorine	≥ 1.0 mg/L
Detergents	≥ 1.0 mg/L
Total Copper	≥ 1.0 mg/L
Total Phenols	≥ 0.5 mg/L
Turbidity	≥ 250 NTU
Fecal Coliform	≥ 400 cfu/100 mL

cfu = colony forming unit

Watershed Prioritization

The 12 watersheds within the MS4 permit area are prioritized based on four criteria:

- Impaired waters (Category 4 or 5)
- Previously documented illicit discharges
- Impervious area within the watershed
- Commercial and industrial land use

3 watersheds are targeted for sampling each year

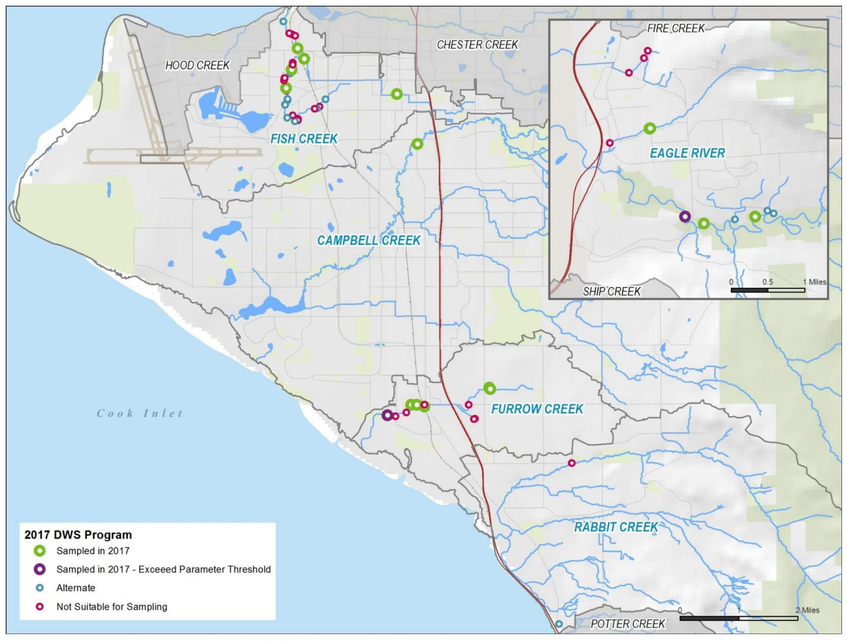
Watersheds within the Municipality of Anchorage

2017 Sampling and Reconnaissance

17 outfalls screened and an additional 36 outfalls examined in **Fish Creek**, **Furrow Creek**, **Campbell Creek**, **Rabbit Creek**, and **Eagle River** watersheds. Sampling occurred on June 12, June 19, August 1, and August 7. Reconnaissance occurred between May 19 and May 31.

Watershed	Sampled	Alternate	Not Suitable for Sampling	Could Not Locate	Total
Fish Creek	5	12	10	6	**33**
Furrow Creek	6	0	6	0	**12**
Eagle River	5	3	4	0	**12**
Rabbit Creek	0	1	0	1	**2**
Campbell Creek	1	0	0	0	**1**
Total	**17**	**16**	**20**	**7**	**60**

Additional alternate outfalls identified on Campbell, Ship, and Chester creeks in 2016.



Outfalls sampled or examined in summer 2017

Results

In 2017, **two outfalls exceeded the threshold for fecal coliform**. No parameter at any other outfall exceeded the assigned threshold. Follow-up samples did not exceed the fecal coliform threshold and no additional follow-up action was required.

Watershed	Outfall	Exceedance Results	Follow-Up Results
Furrow Creek	5-1	**890 cfu/100mL**	4.9 cfu/100mL R = 6.6 col/100mL
Eagle River	1335-1	**690 cfu/100mL** R = **410 cfu/100mL**	19 cfu/100mL R = 18 col/100mL

R = replicate sample

Outfall 105-1 to Campbell Creek exceeded the fecal coliform threshold in 2016 and was resampled in 2017. No parameter was exceeded.

Outfalls targeted for sampling:

- Flowing
- Previous exceedance/illicit discharge
- Odor, scum/sheen, soapy suds, color, cloudiness, etc.
- Evenly distributed throughout watershed

Outfalls selected as alternate sites:

- Low flow
- Difficult to sample (access, outfall condition)
- Drain less extensive networks
- No previous exceedance/illicit discharge
- Discharging apparently clear, clean water

Field teams also documented outfalls that are submerged, clogged, or otherwise damaged and may require maintenance.

Erosion below Outfall 27-1 to Fish Creek

Outfall 686-1 submerged in Fish Creek

Fecal coliform exceedances documented at outfalls 5-1 (left) and 1335-1 (right)

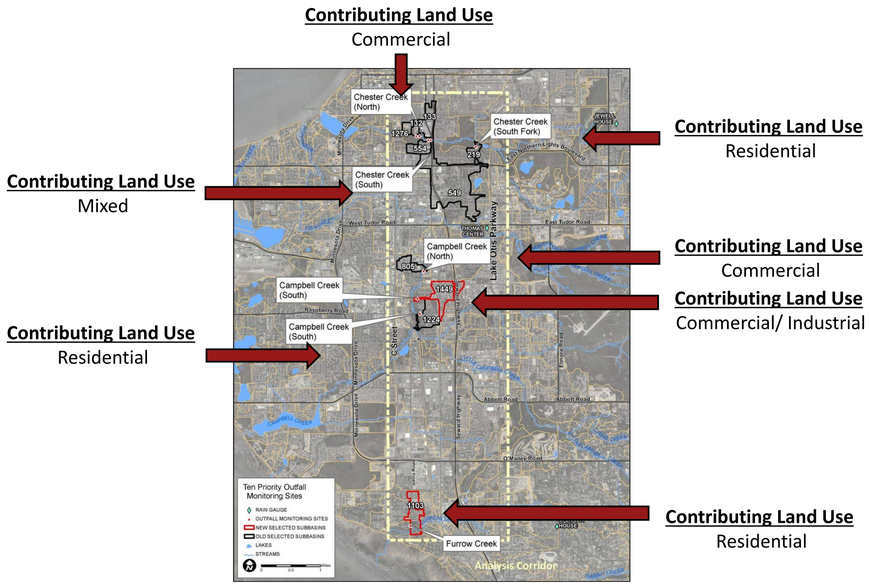
2017 Storm Water Outfall Monitoring

Year 7 of a Multi-year Study of Pollutants in Storm Runoff

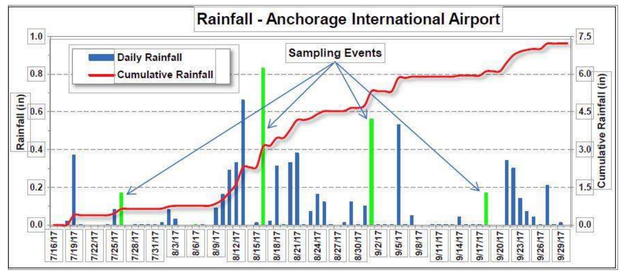
KINNETIC LABORATORIES INCORPORATED

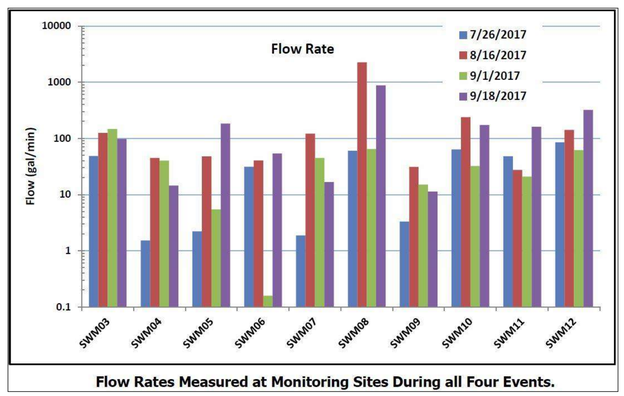
HDR

Ten Outfalls Monitored…



During Four Storms…





Flow Rates Measured at Monitoring Sites During all Four Events.

For Eleven Parameters

Flow (gal/min)	BOD_5 (mg/L)
DO (mg/L)	Fecal Coliform (CFU/100mL)
pH	TSS (mg/L)
Turbidity (NTU)	TAH (µg/L)*
Temperature (^{0}C)	TAqH (µg/L)*
Dissolved Copper	*sampled at SWM02, SWM05, SWM07, SWM09

Wet Weather Team

Mark Savoie, Kinnetic Laboratories
Gary Lawley, Kinnetic Laboratories
Lynn Spencer, HDR Alaska
Sam Grosenick, HDR Alaska
Alena Gerlek, HDR Alaska

Objectives of Study

- Broadly estimate the annual pollutant loading for fecal coliform and petroleum hydrocarbon to specific watersheds
- Assess the effectiveness of existing stormwater controls
- Prioritize portions of the MS4 that need additional controls
- Provide feedback on whether Total Maximum Daily Load (TMDL) objectives are being met.

Methodology

- Stormwater outfall sampled after >0.1 inch of precipitation in 24 hours preceded by 24 hours of ≤0.1 inch of precipitation. Discharge from outfall calculated.
- Temperature, pH, dissolved oxygen, specific conductance, turbidity, and flow velocity measured with field probe.
- Water quality samples collected for biological oxygen demand (BOD), total suspended solids (TSS), fecal coliform, and total aqueous hydrocarbons.
- Visual observations recorded.

Outfall SWM10 (525-2), Eagle Street at Chester Creek.

Outfall SWM03 (1224-1), Fairweather Loop off Sylvan Drive.

Outfall SWM05 (207-1), East 56th Avenue at Save School.

Key Findings

- Fecal Coliform results: the highest levels at each site were spread across all four sampling events; the new stations SWM11 and SMW12 recorded the highest concentrations while WSM04 had the lowest levels.
- Fecal coliform levels exceeded AK Water Quality Standards at all 10 locations in 2017, however levels were similar to EPA estimates for median concentrations in cold climates.
- Hydrocarbon concentrations and loading were found to be low at all four sampling locations; there did not appear to be any noticeable differences in levels at the two sites with OGS vs. the two non-OGS sites.
- SWM07 and SWM12 had some of the highest TSS and Turbidity results. Both sites drain sub-basins with high impervious surfaces areas.
- From 2011 through 2017, other than TSS and turbidity, no clear patterns of corresponding fluctuations between multiple parameters across locations or years emerged.

Results