



Avon Lake  
Regional Water

# Frazil Ice

Building Resilience to  
Extreme Weather  
July 17, 2018



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# System Background

- Supply water to ~200,000 people in parts of 7 counties
- 85% of water produced goes to bulk customers
- Supply 21 MGD on average day (50 MGD rating)
- Only charge 10% more to bulk customers
- Two major transmission lines (ETLs)
- Pressure system



# What Is Frazil Ice?

Occurs as supercooled water enters an intake and builds ice because:

- Intake surfaces in contact with supercooled water can cool below freezing.
- Once cooled, ice can adhere to surfaces.
- Frazil ice contained in water can adhere to growing ice on surfaces.
- Heat convection from frazil ice to surfaces enables further growth.





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# And so it begins...

**January 7, 2014**

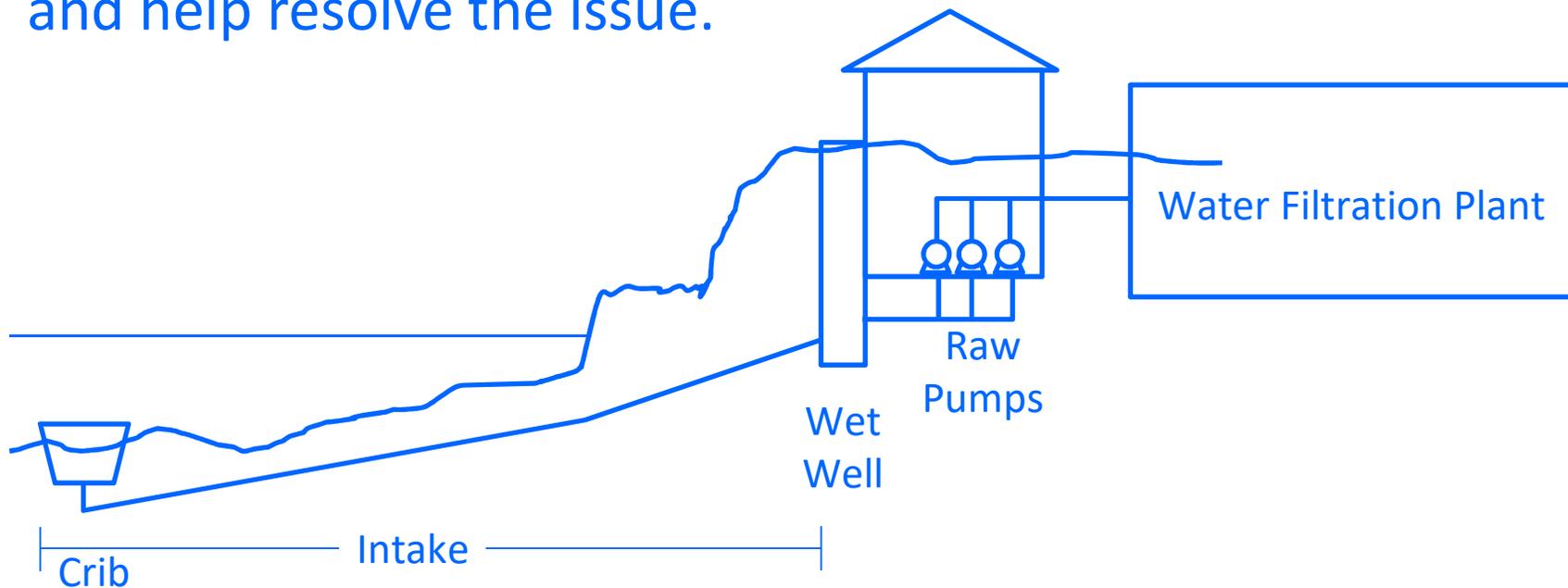
The first week of the new year and Lake Erie is experiencing low-to-normal ice coverage. Avon Lake Regional Water staff note that weather conditions could produce frazil ice.





# January 7, 2014

9:00 p.m. WFP manager is contacted because WFP is unable to draw in enough water into the wet well. Calls are made to several staff members to come in and help resolve the issue.





# January 7-8, 2014

## Overnight:

- Intake flow continues to decrease
- Plant backwashes to clear blockage but intake flow continually decreases
- Backwash used ~250,000 gallons/backwash
- Contact is made with bulk customers to alert them of situation
- Mandate switch to alternate water sources



# January 8, 2014

## Early Morning:

- Turned off ETL supply pumps to bulk customers
- Reversed flow from Sheffield Lake to draw in more water
- Issued the first “call-to-serve” for retail customers via Facebook and reverse 911 call
- Communicated with residents, OEPA, bulk customers and media throughout the day



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# Social Media!!

 Avon Lake Regional Water  
January 8

ATTN ALL AVON LAKERS: H2O EMERGENCY. Lake ice has decreased the amount of water we're able to bring in from Lake Erie. Please reduce usage!

Like · Comment · @AvonLakeWater on Twitter · Share    4   5   23 Shares

555 people reached    [Boost Post](#)

 Find us on  
**Facebook**

 Avon Lake Regional Water  
January 8

Tips for reducing water usage: Save the laundry for later. And this is an excellent excuse to skip the shower!

Like · Comment · Share    3   2 Shares

2,191 people reached    [Boost Post](#)



# The Solution...

## Bypass Pumping:

- Determined to be best solution
- Focused all resources on implementing
- Xylem Dewatering Solutions (Painesville), Kendera Construction (Avon Lake), Lake Erie Diving (Mentor) all worked with staff to implement solution
- At approximately 11:00 p.m. the first bypass pump was operational supplying ~2 MGD



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# All Hands on Deck





# January 9, 2014

- 2<sup>nd</sup> & 3<sup>rd</sup> bypass pumps online at ~2:00 a.m.
- ~7 – 8 MGD intake to WFP
- During the next couple of hours, intake ice dislodged/melted due to bypass pumping
- Bypass pumping not only supplied water but assisted putting extra head on intakes
- 5:00 a.m. pumping ~25 MGD
- 6:00 a.m. First message to Avon Lake residents to resume normal water consumption
- Entire event lasted <36 hours



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# Path Forward

- Design permanent solution to prevent intake freezing
- Explore interconnection with other municipalities
- Additional storage capacity
- **LEARN FROM OUR MISTAKES!!**



# System Improvements

- ❖ Air burst system installed on intake pipe
  - Short bursts of air keeps water agitated
  - Prevents ice from forming
- ❖ New clear well and elevated storage tank
  - Added an additional 5 MGD to storage capacity
- ❖ Interconnect agreements with other agencies
  - ALRW/RLCWA/Elyria Interconnect – Mutual aid agreement that allows for 8 MGD to flow in both directions. 4 MGD to RLCWA and 4 MGD to ALRW.
  - Actively seeking mutual aid agreements with other agencies



# What worked?

- Social media for communicating with residents/community
- Relationships with vendors, contractors, OEPA, bulk customers
- Communication, Communication, Communication

***“Those that fail to learn from history, are doomed to repeat it.” ~ Winston Churchill***



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Questions?



**Avon Lake**  
**Regional Water**

**Serving the region,  
protecting our resource.**

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