

# Previous Mine Waste Disposal and ML/ARD Mitigation at Nyrstar Myra Falls

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24<sup>th</sup> MEND ML/ARD Workshop



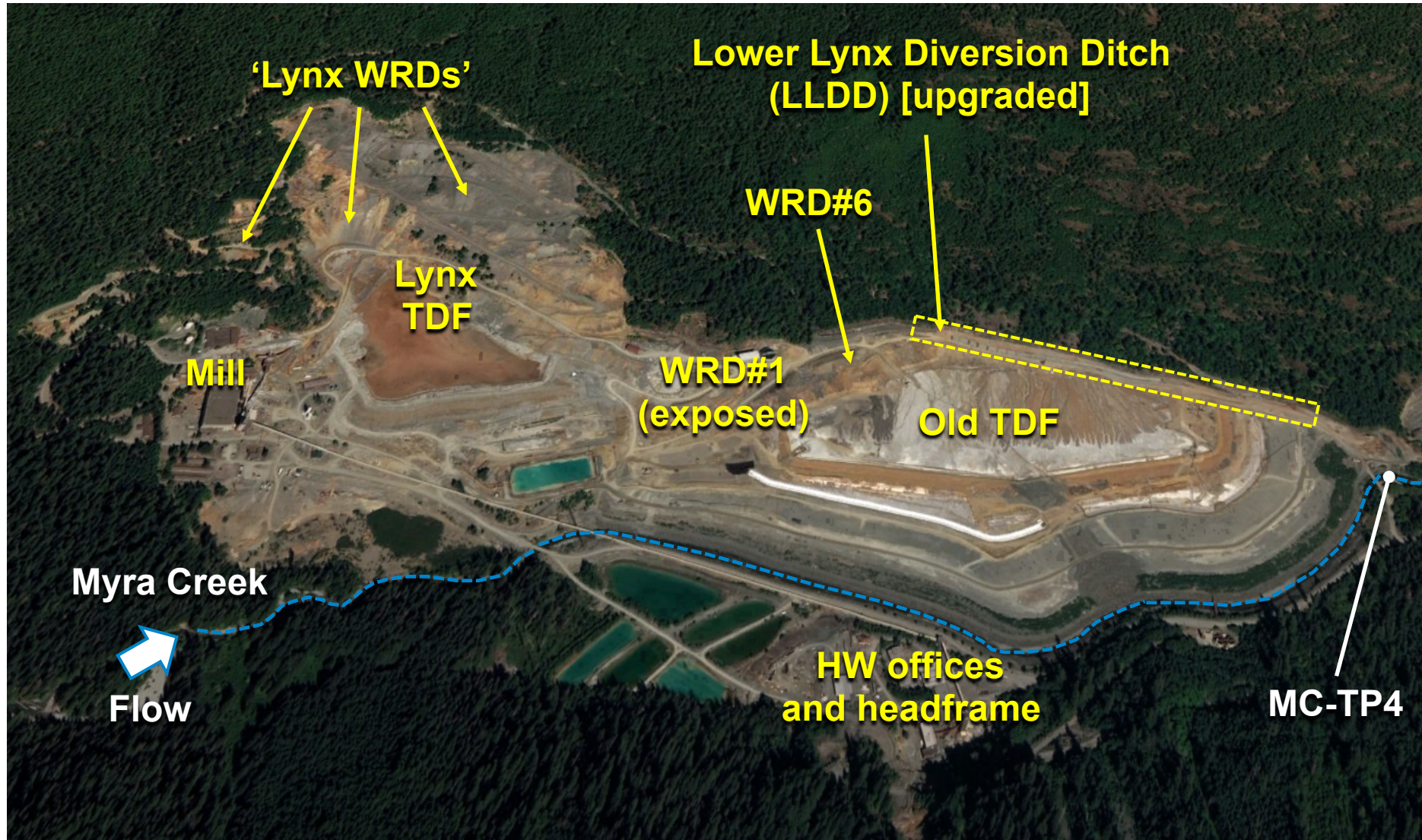
**Robertson GeoConsultants Inc.**  
Consulting Engineers and Scientists for the Mining Industry  
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- **Introduction**
- **Mine Waste Disposal Facilities**
- **Recent Water Management Upgrades**
- **ML/ARD Mitigation Approaches**
  - Drain systems
  - Hydraulic performance
- **ML/ARD Impacts to Myra Creek**

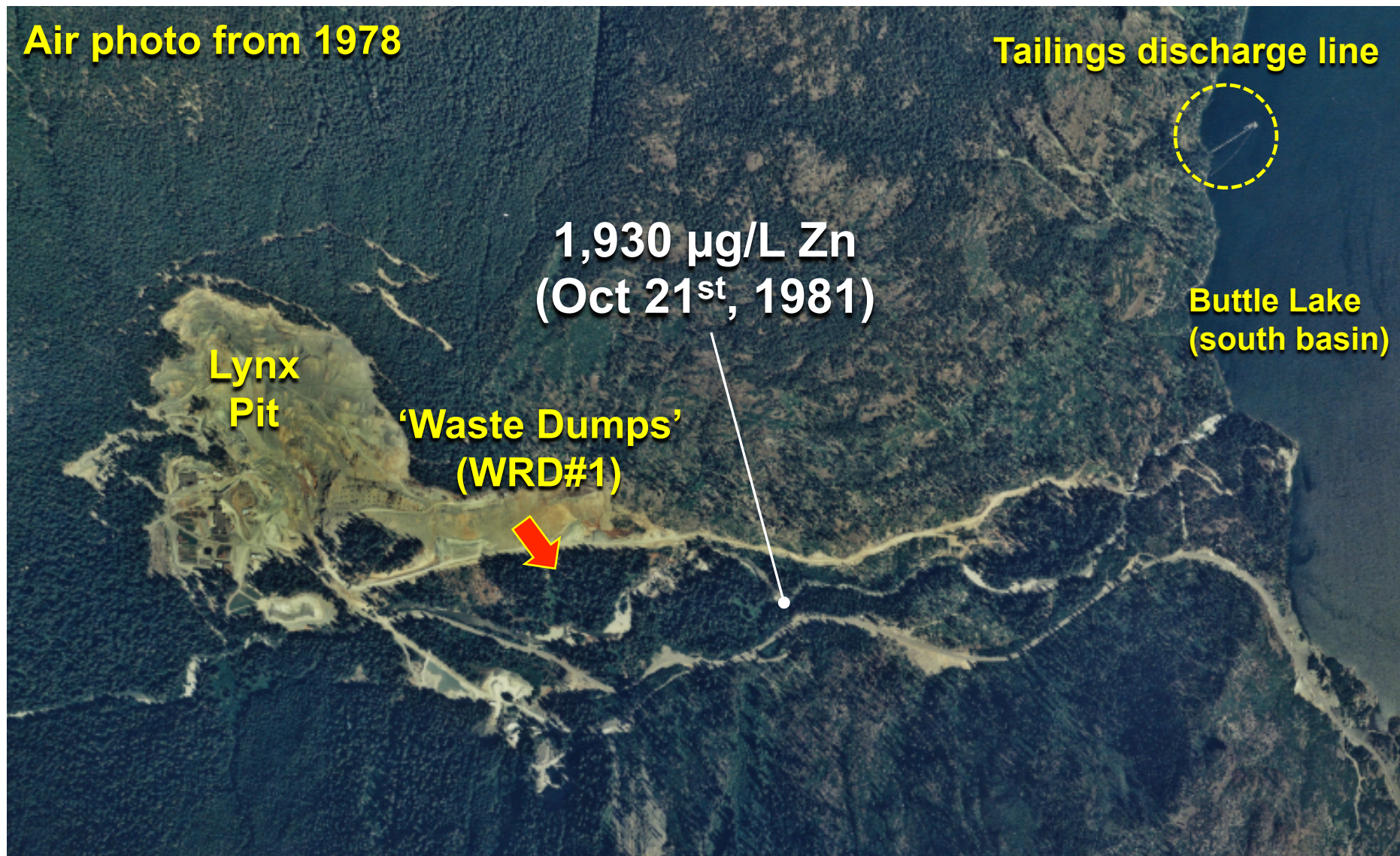
# Site Location and Physical Setting



# General Mine Arrangement



# Conditions Prior to Seepage (ARD) Collection



# Original Drains (1985), Old TDF

## Inner Drain

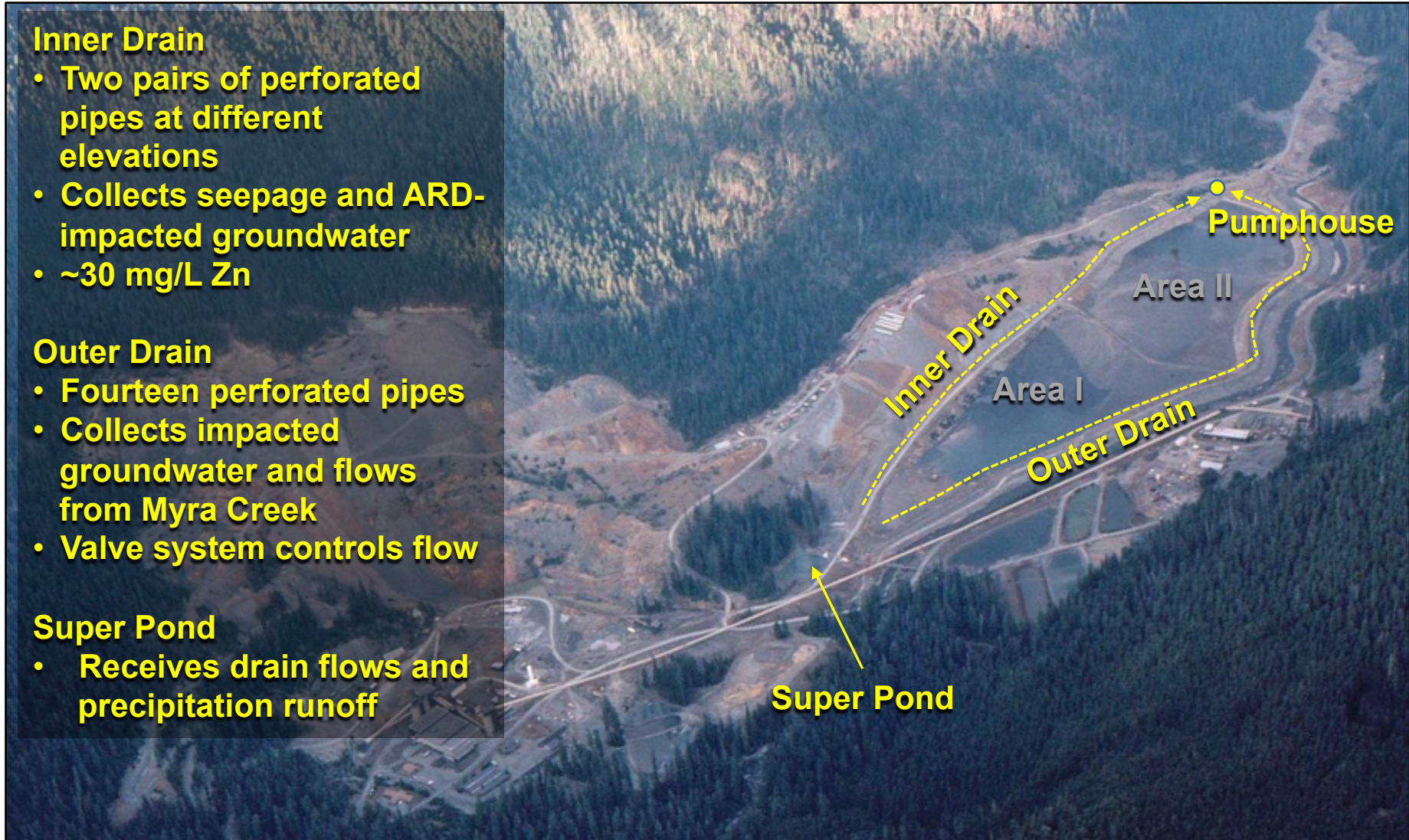
- Two pairs of perforated pipes at different elevations
- Collects seepage and ARD-impacted groundwater
- ~30 mg/L Zn

## Outer Drain

- Fourteen perforated pipes
- Collects impacted groundwater and flows from Myra Creek
- Valve system controls flow

## Super Pond

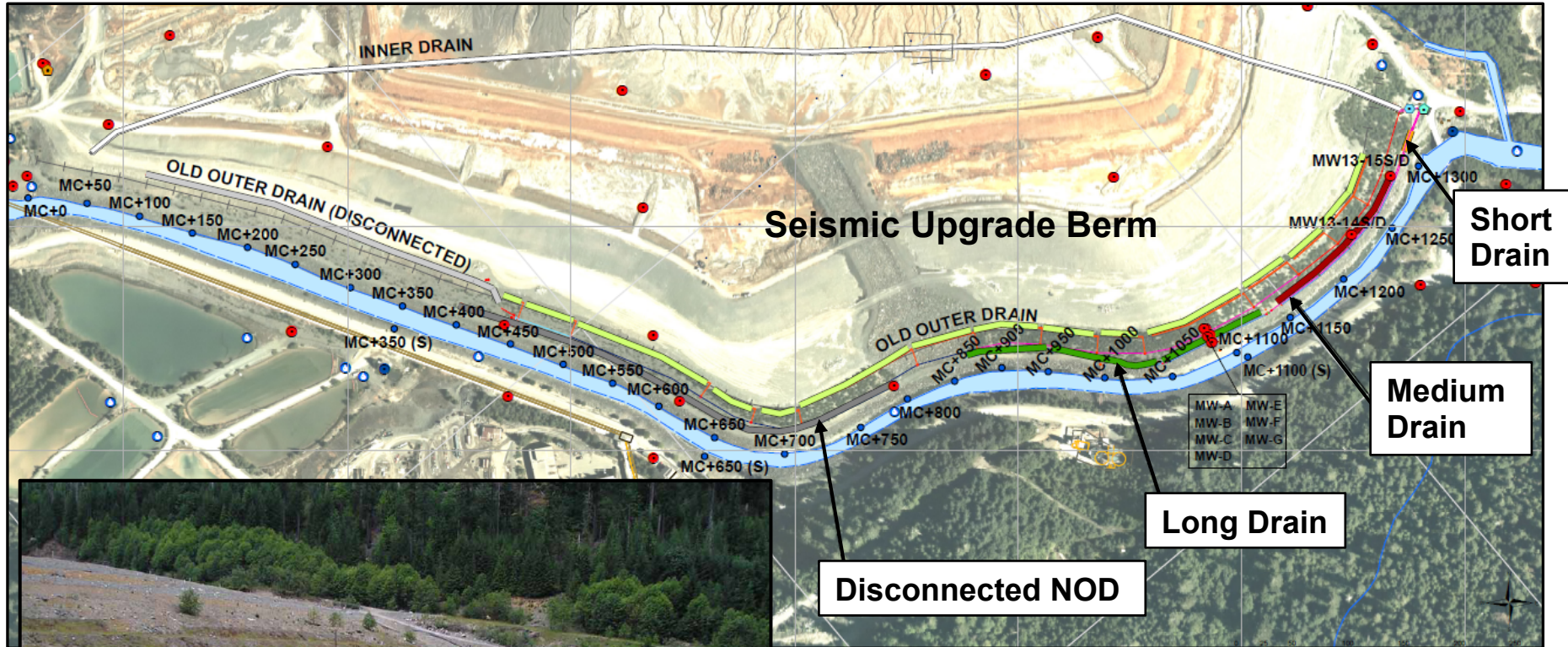
- Receives drain flows and precipitation runoff



# Old (Original) TDF



# New Outer Drain (NOD), Seismic Upgrade Project





# Lynx TDF



## Lynx TDF

- Centreline embankment berm around the former Lynx Pit
- Paste (de-watered) tailings
- 2008 to 2015 (active facility)

## Embankment berm

- 60 m design height (2H:1V slope)
- Requires 2.3 Mm<sup>3</sup> of PAG rock

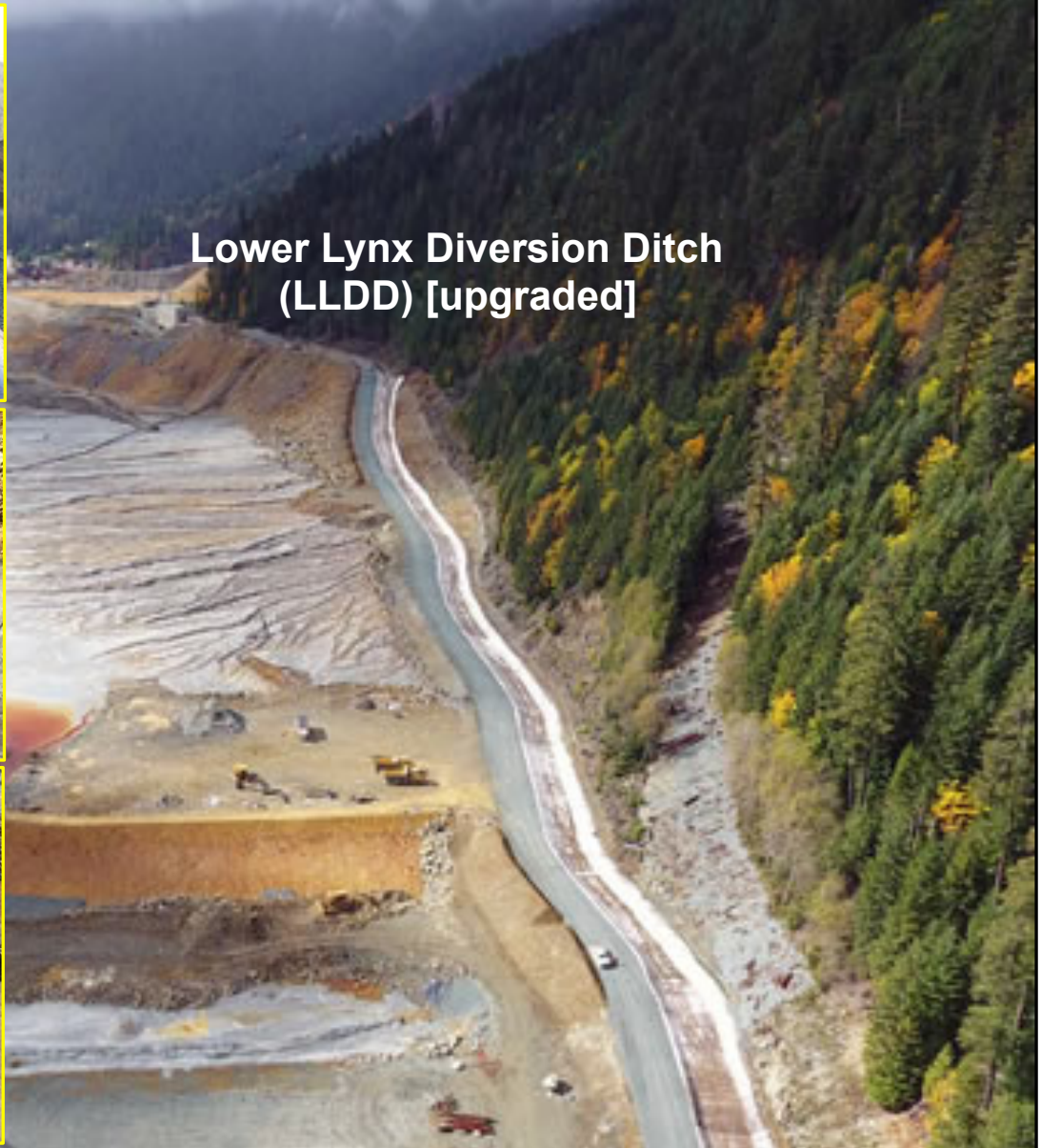
Tailings capacity: 2.6 Mm<sup>3</sup> or ~4.7 Mt  
(~50% of the Old TDF capacity)

Photo from 2014 (see Amec Foster Wheeler, 2015)

# Water Management Upgrades



# Lower Lynx Diversion Ditch (LLDD) Upgrades

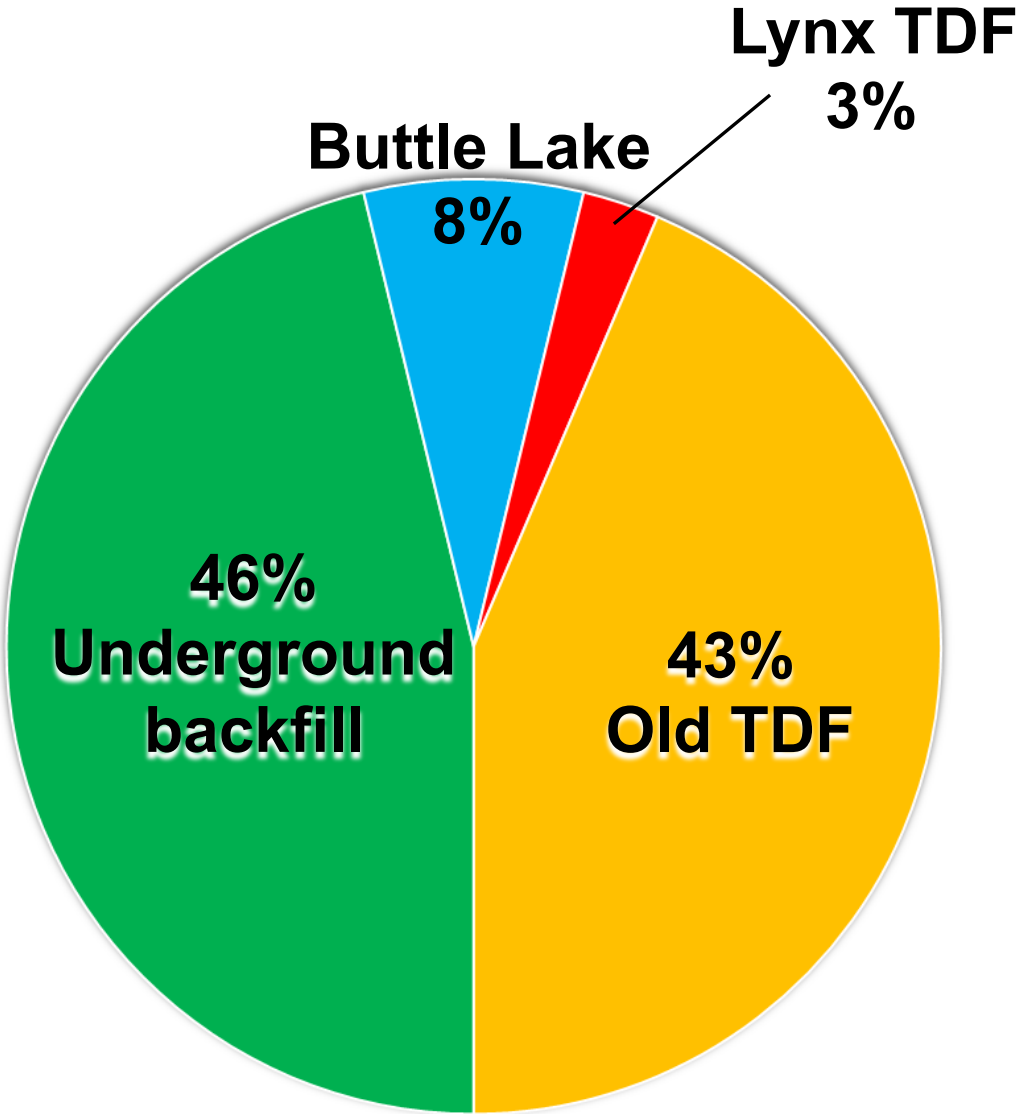


# Tailings Inventory

**30 Mt**

**(1966 to 2015)**

No production in 2016 or 2017

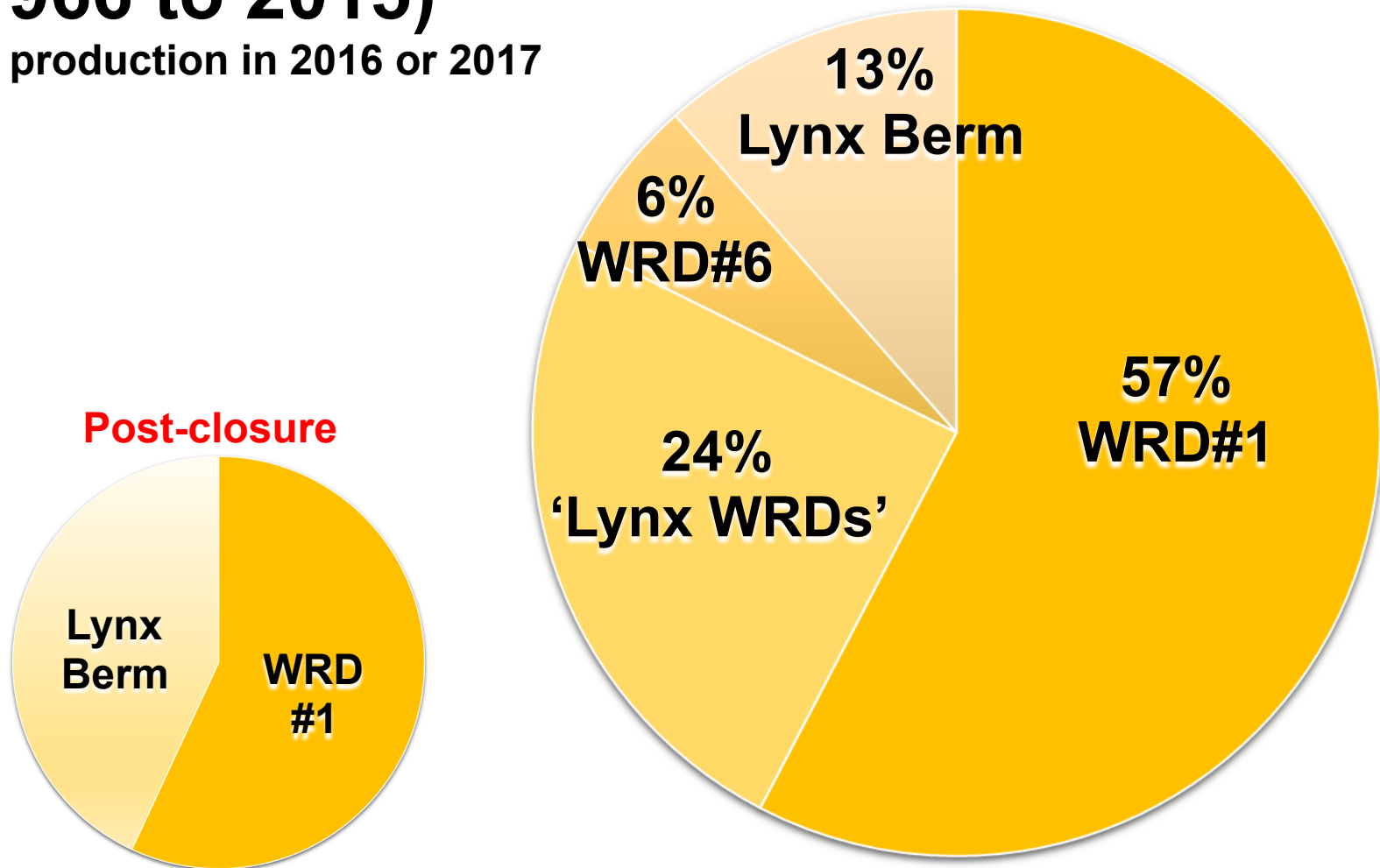


# Waste Rock Inventory (Surface)

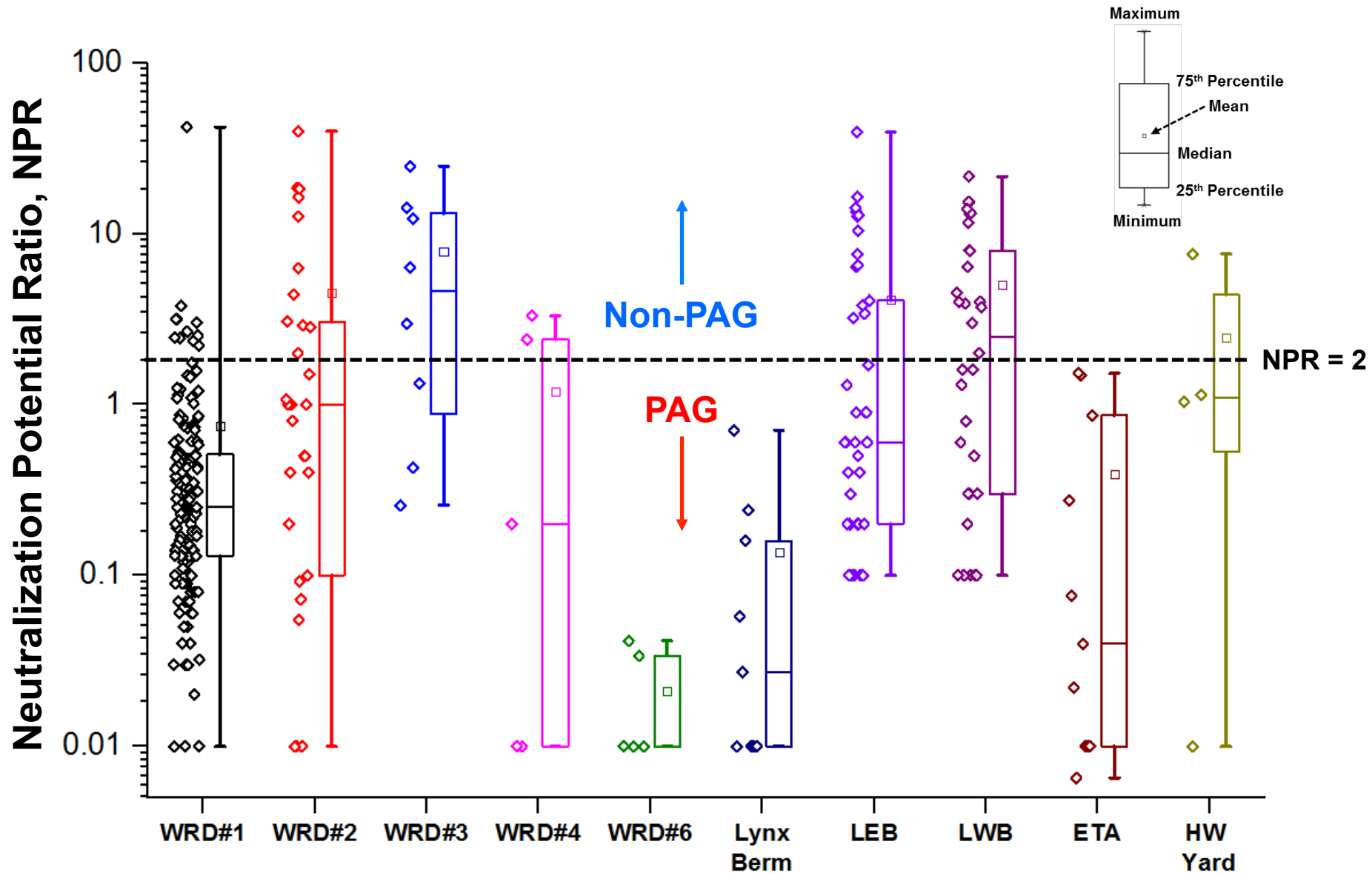
12 Mt

(1966 to 2015)

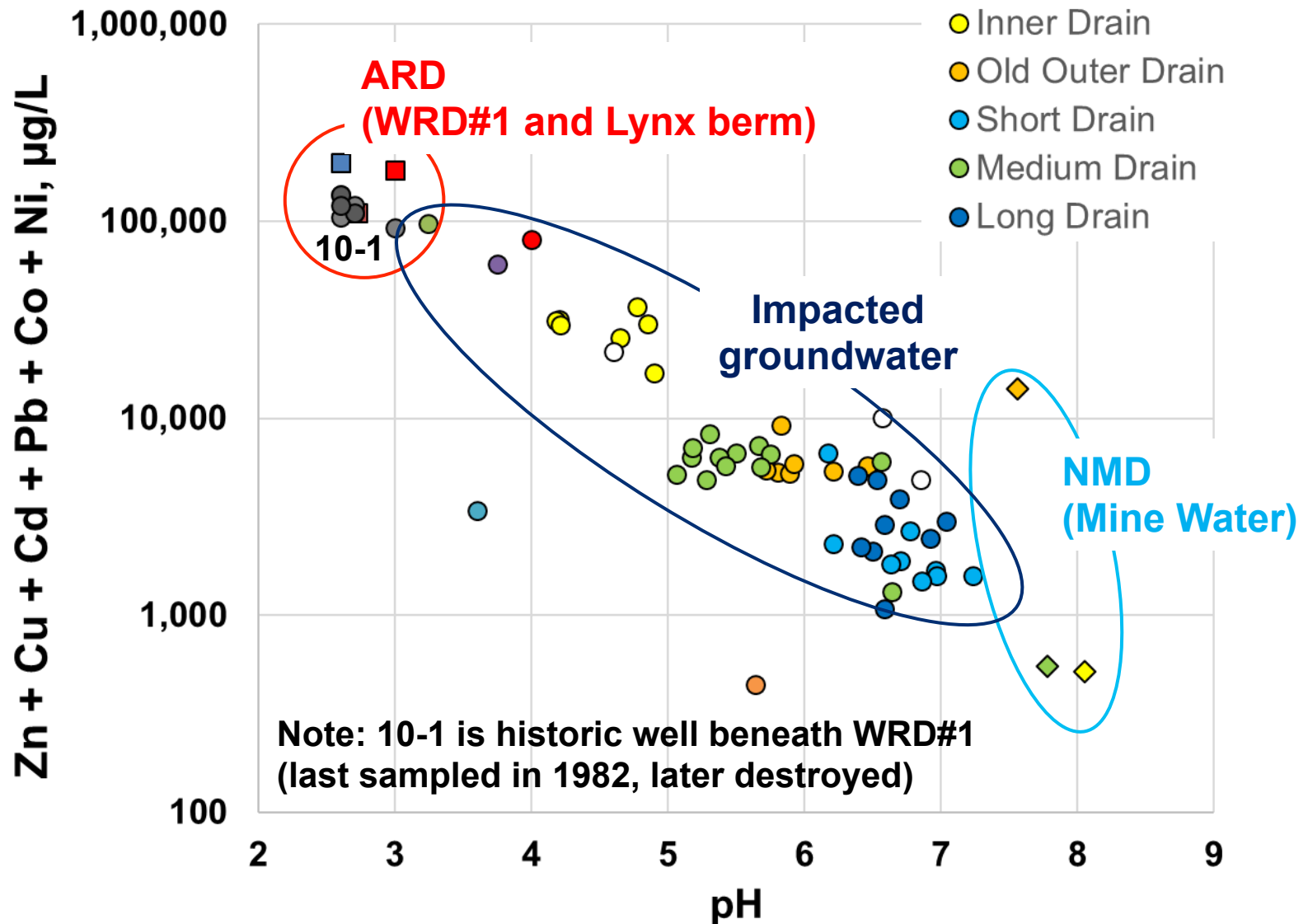
No production in 2016 or 2017



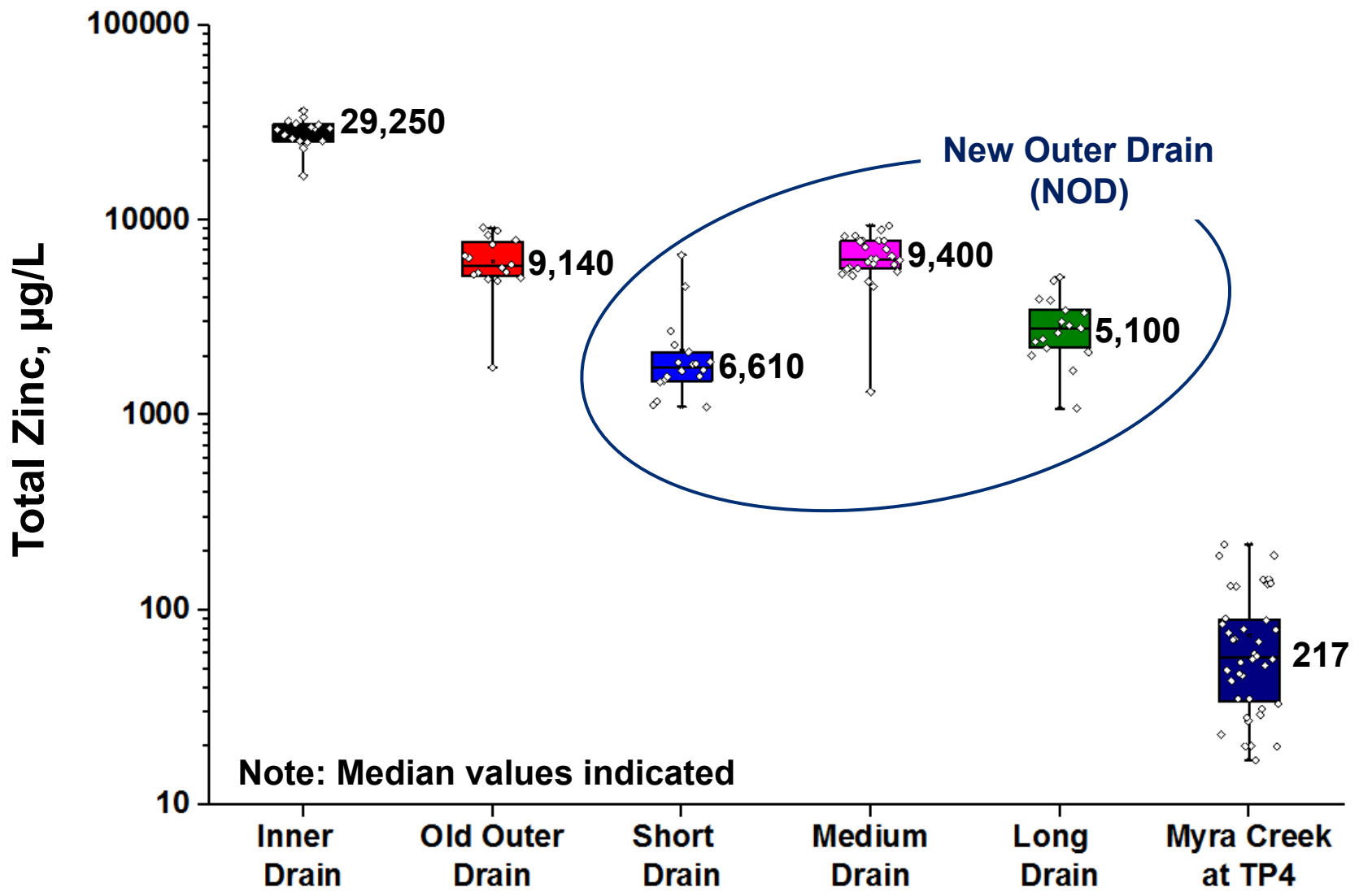
# ABA Characterization of Waste Rock (Surface Samples)



# Seepage, Mine Water, and Groundwater Quality

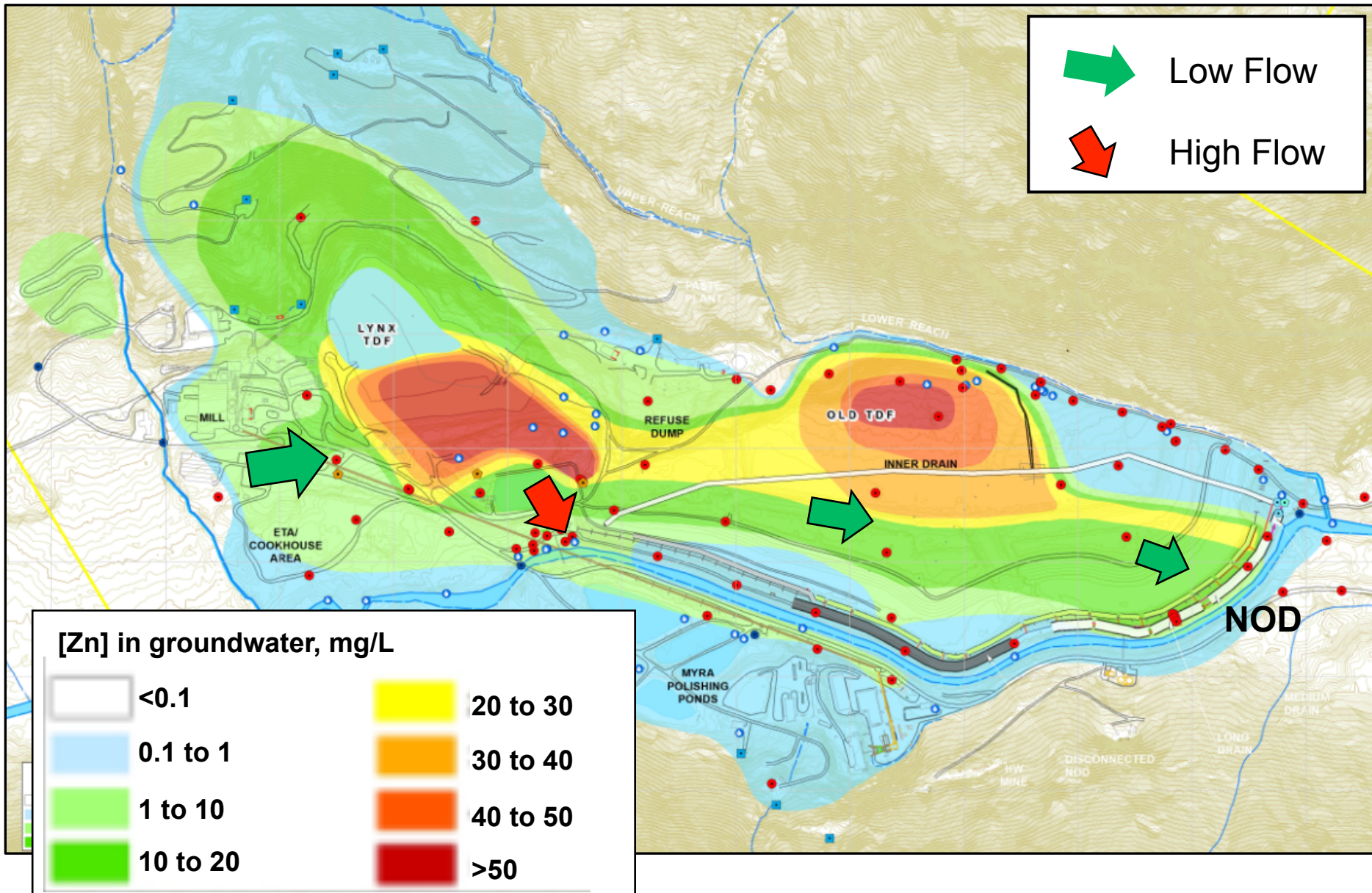


# Water Quality – Drain Flows and Myra Creek, 2010 to 2015

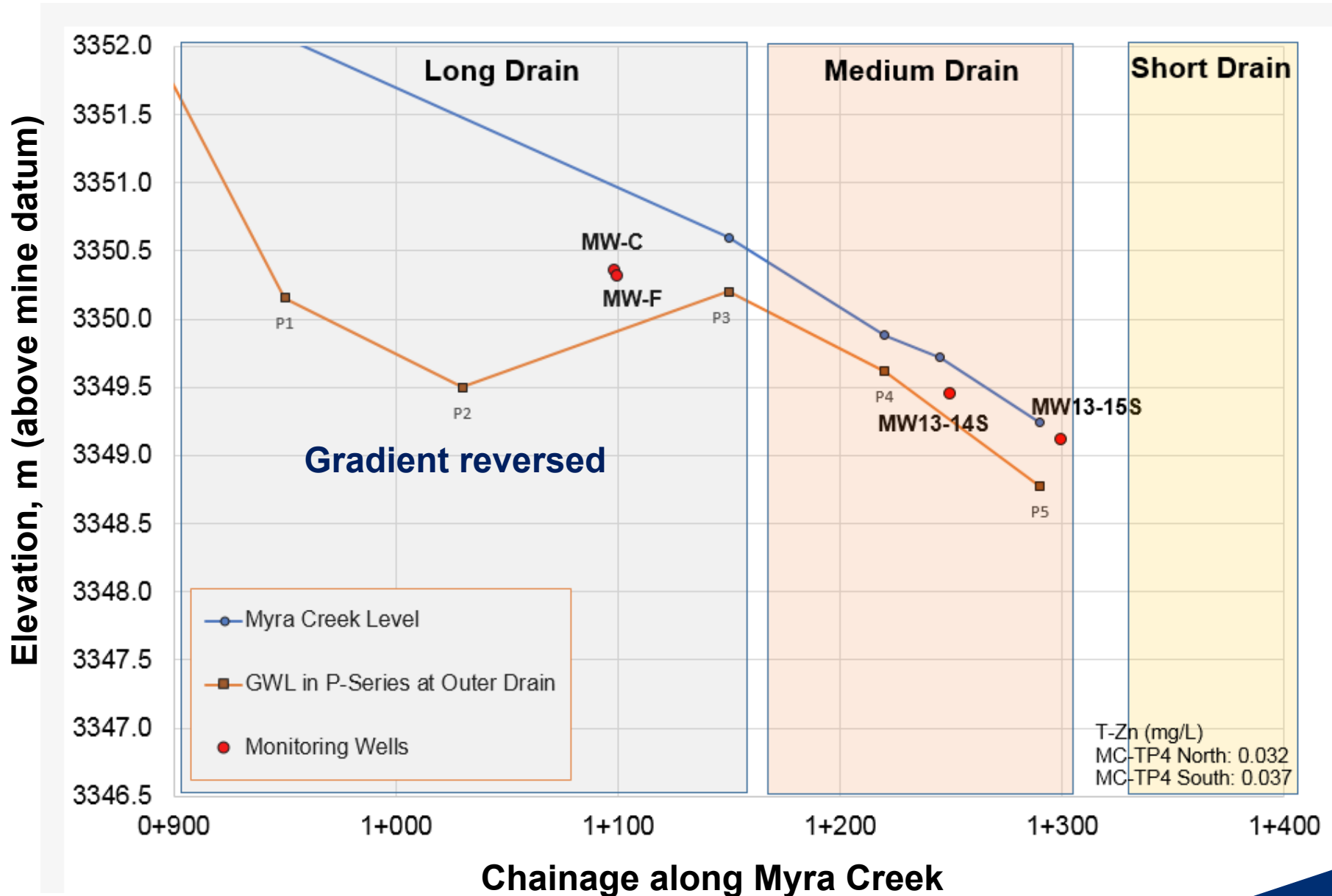




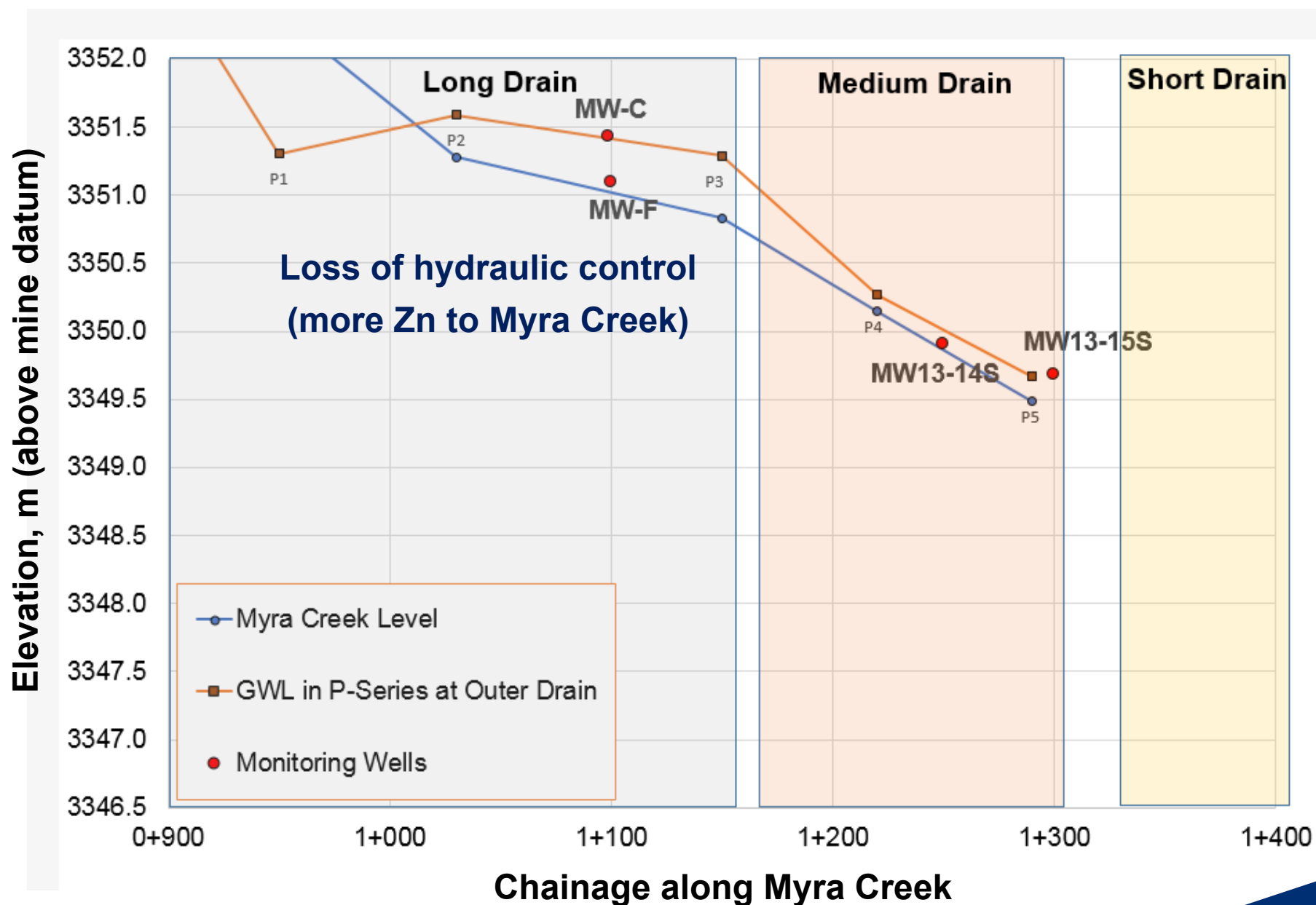
# Inferred Zn Plume (Current Conditions)



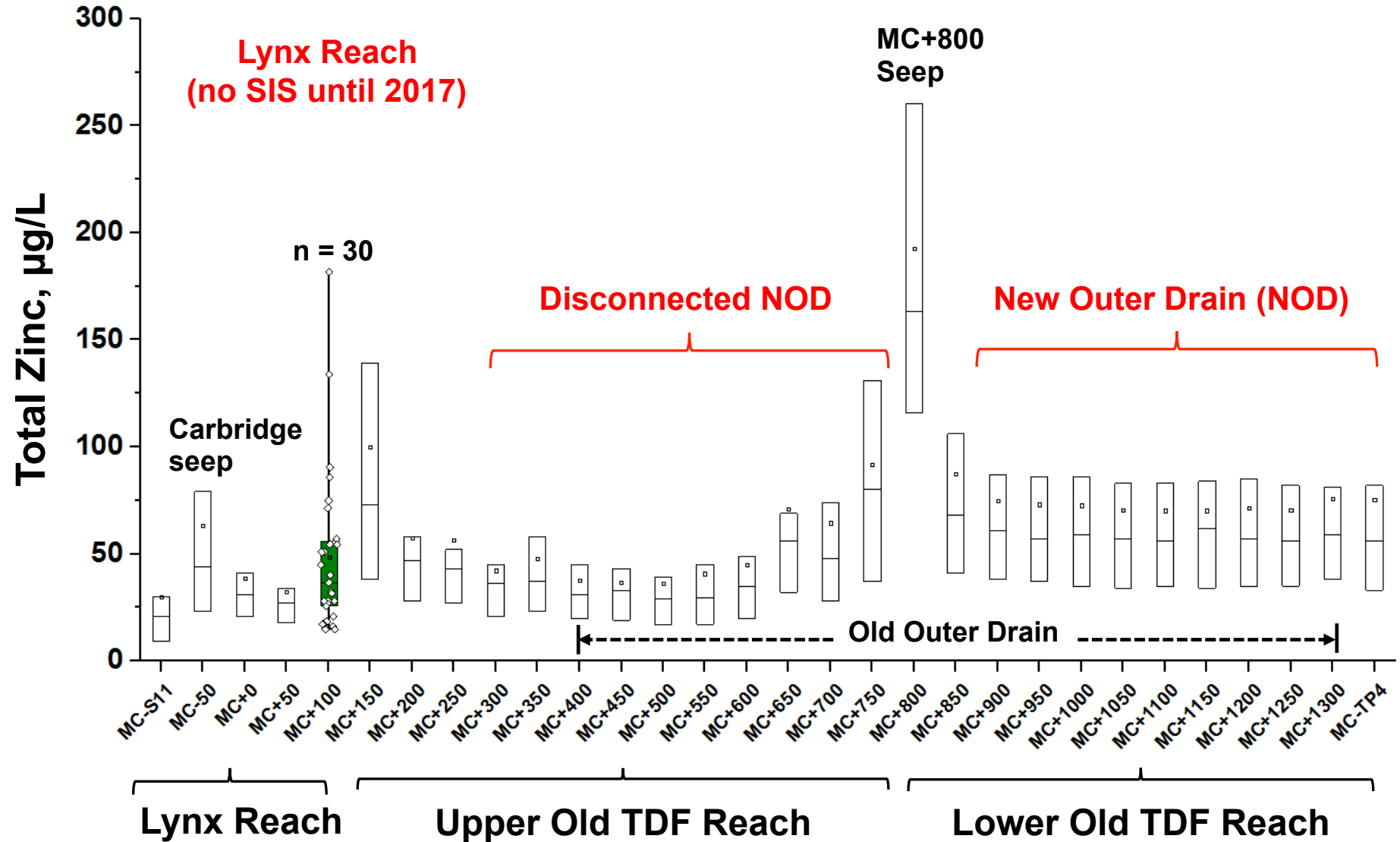
# Hydraulic Performance (NOD), May 10<sup>th</sup>, 2016 (10-0-10)



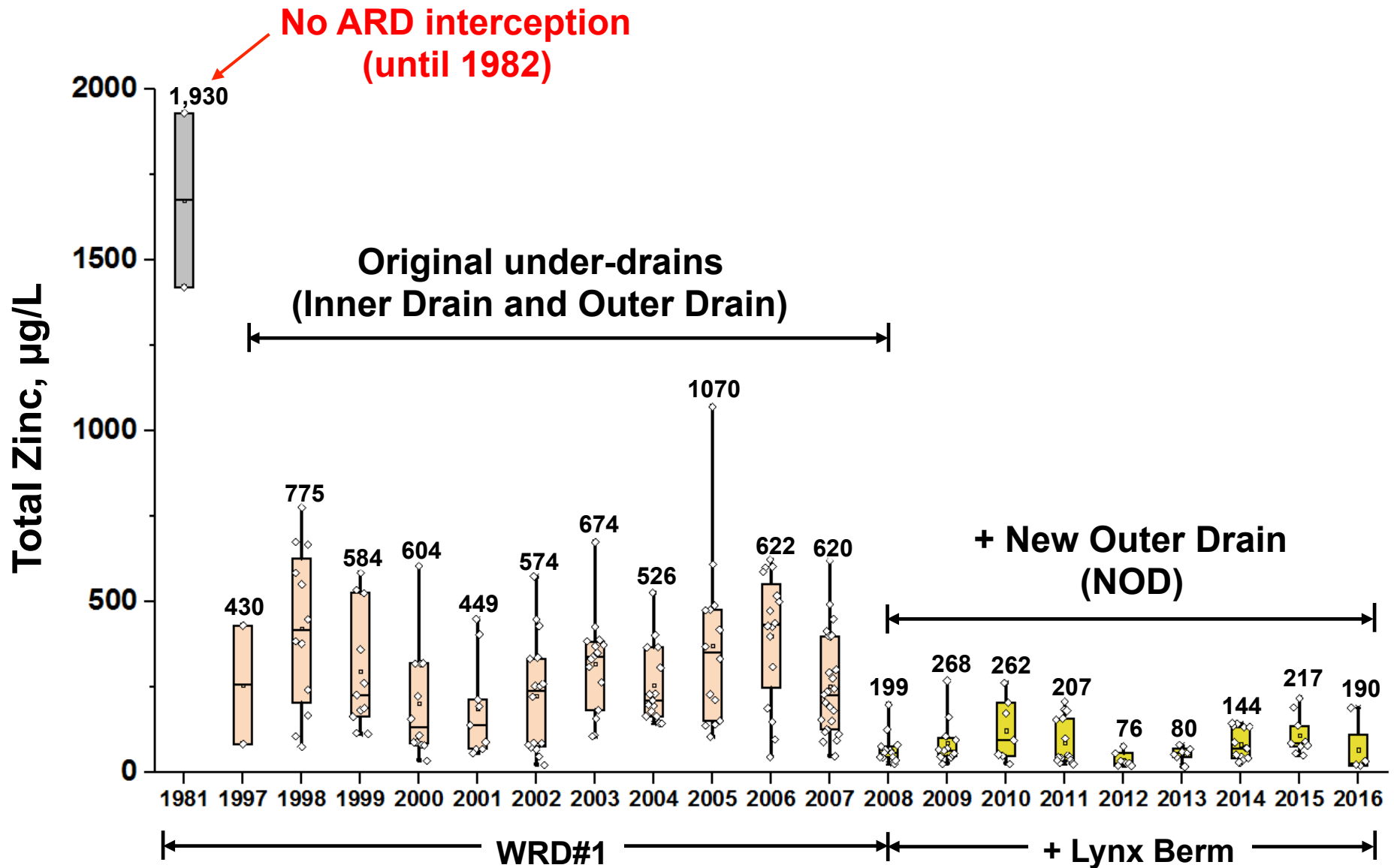
# Hydraulic Performance (NOD), December 10<sup>th</sup>, 2016 (5-0-5)



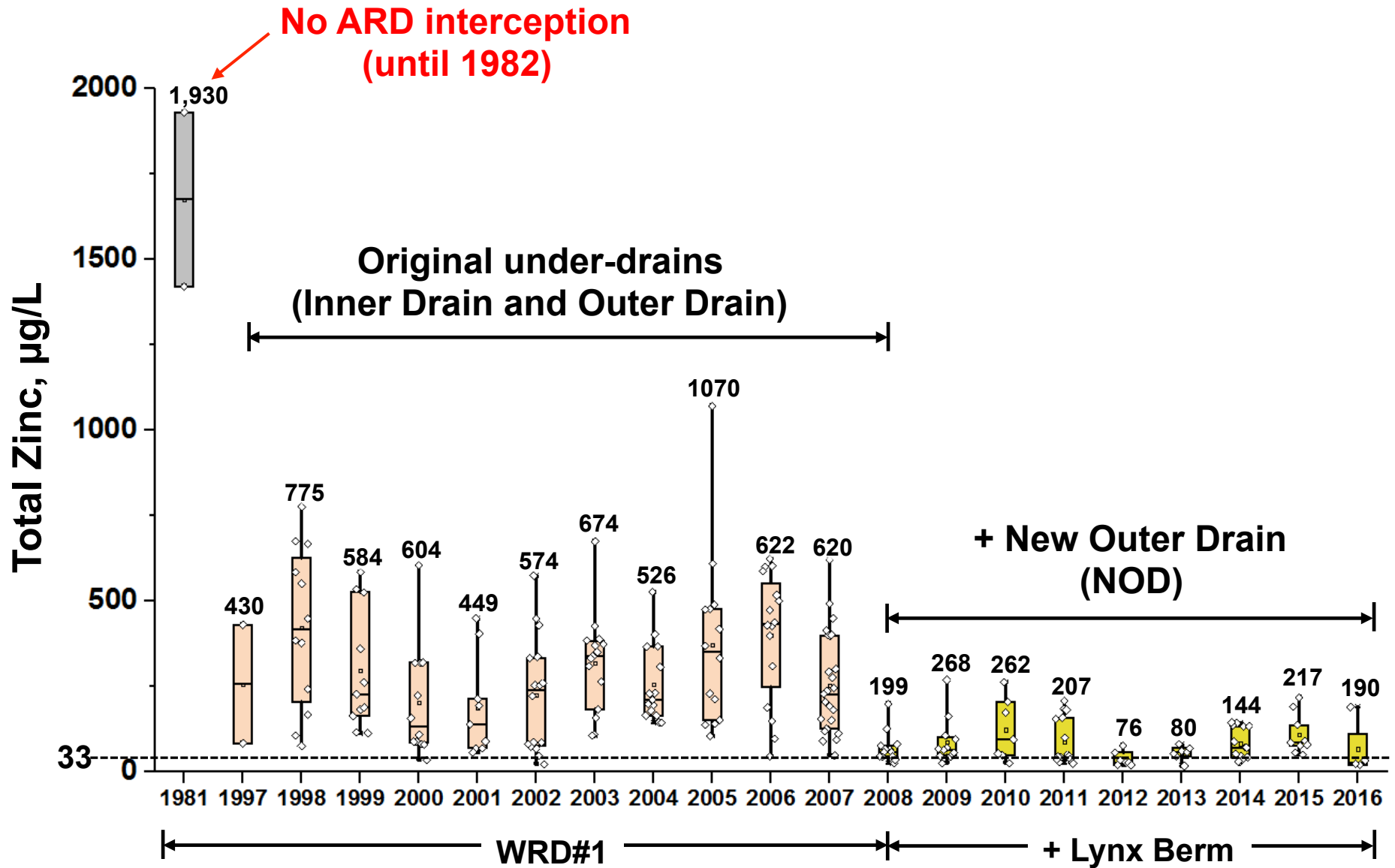
# Zn Profile for Myra Creek, 2010 to 2015



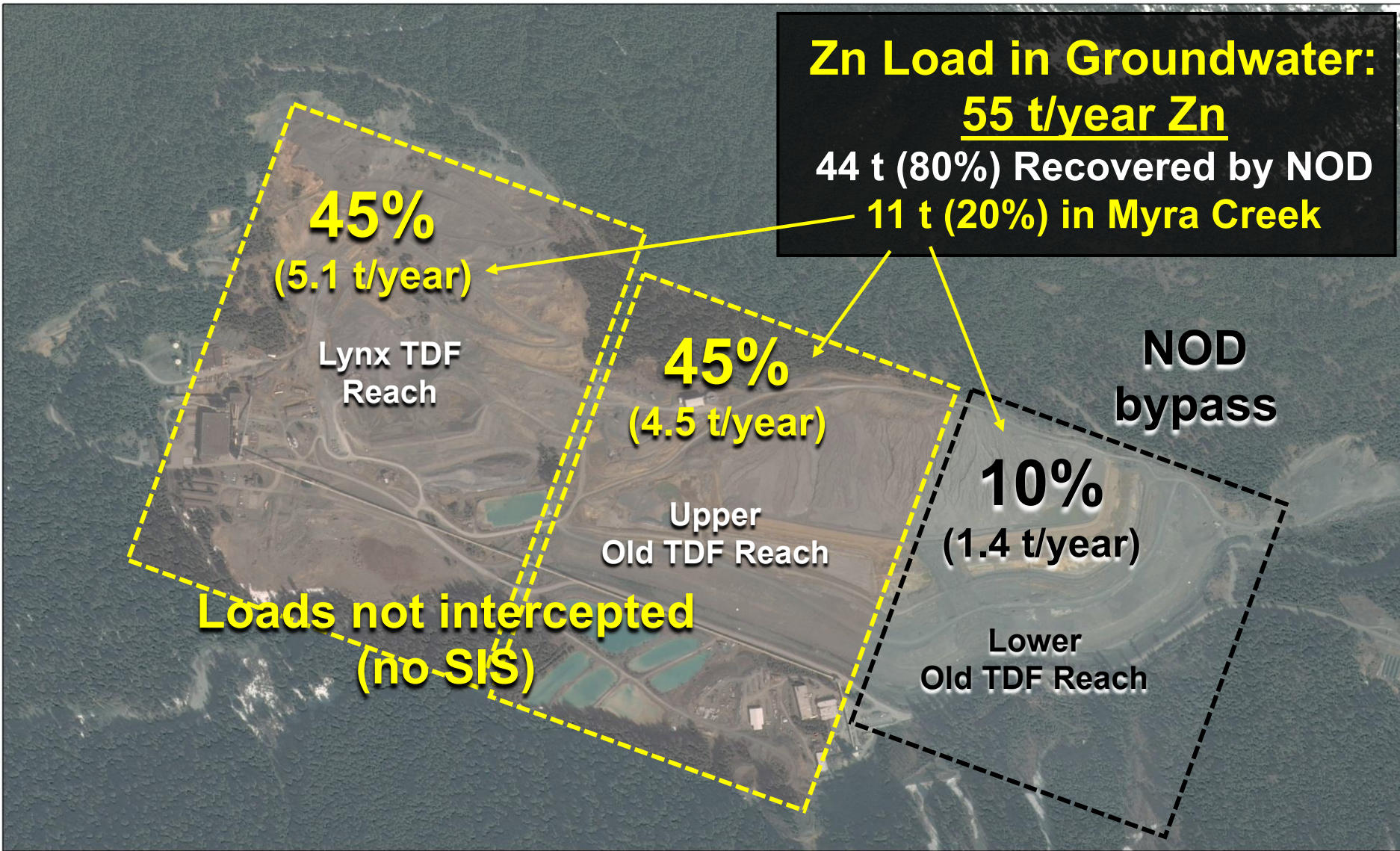
# Zn Concentrations in Myra Creek at TP4, 1981 to 2017



# Zn Concentrations in Myra Creek at TP4, 1981 to 2017



# Summary – Average Zn Loads in Myra Creek (2012 to 2016)



**Zn Load in Groundwater:**  
**55 t/year Zn**

44 t (80%) Recovered by NOD

11 t (20%) in Myra Creek

**45%**  
(5.1 t/year)

Lynx TDF Reach

**45%**  
(4.5 t/year)

Upper Old TDF Reach

**NOD bypass**

**10%**  
(1.4 t/year)

Lower Old TDF Reach

**Loads not intercepted  
(no SIS)**

**Questions or Comments?**