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Managing Invasive Fish in Alberta Stormwater Ponds

Alberta Lake Management Society Conference

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Invasive Species

Goldfish (*Carassius auratus*)



Prussian carp (*Carassius gibelio*)



Photo: Jason Cooper, Alberta Environment and Parks

Goldfish

Highly adaptable

Not always orange

Eggs (1-2 mm diameter)
adhesive, stick to vegetation

Hatch 2-7 days, fry (<5 mm length) initially rest on substrate

Rapid growth (~10 cm in 1 year)

Reproductively mature after 1 year



Prussian Carp

Common east of Calgary –
irrigation canals

Survive extreme conditions (e.g.,
low DO, high temps)

Sticky eggs attach to vegetation

- Asexual reproduction (gynogenesis), 2-3 times per year
- Rapid growth (~10 cm in 1 year)
- Reproductively mature after 1-3 years



Invasive Species Potential Impacts

Compete with native fish (brook stickleback, fathead minnow)

Modify ecosystems – water quality, benthic invertebrates

Spread disease, bacteria, parasites



Regulatory Context

Canada Fisheries Act – Aquatic Invasive Species Regulations:

- Section 10 – “prohibited for any person to introduce an aquatic species....where it is not indigenous”
- Section 19 – Enables the province to act on behalf of the DFO

Fisheries (Alberta) Act

- Section 11.01 A person shall not place or keep an invasive organism in, or allow an invasive organism to enter, water of any kind.



Example Project – Brett Pond, Fort McMurray

Timeline

- 2015: Electrofishing and incomplete drawdown - ineffective
- 2021: RMWB retained multidisciplinary team to assist with goldfish removal
- 2022: Rotenone application and first fish survey
- 2023: post-application fish survey



Goldfish Removal

More than “just” killing fish!

- Risk Workshop
- Permit applications
- Eco Plan, Rotenone Safety Plan, Communication Plan, Operations Plan,
- Wildlife Survey
- Fencing, landscape repairs
- Water volume/inflow control



**INVASIVE GOLDFISH MANAGEMENT PROJECT
- BRETT DRIVE STORM POND**

There are invasive goldfish in the Brett Drive Storm Pond and they need to be removed. Invasive species pose a serious threat to the natural aquatic ecosystem and native species in local water bodies.

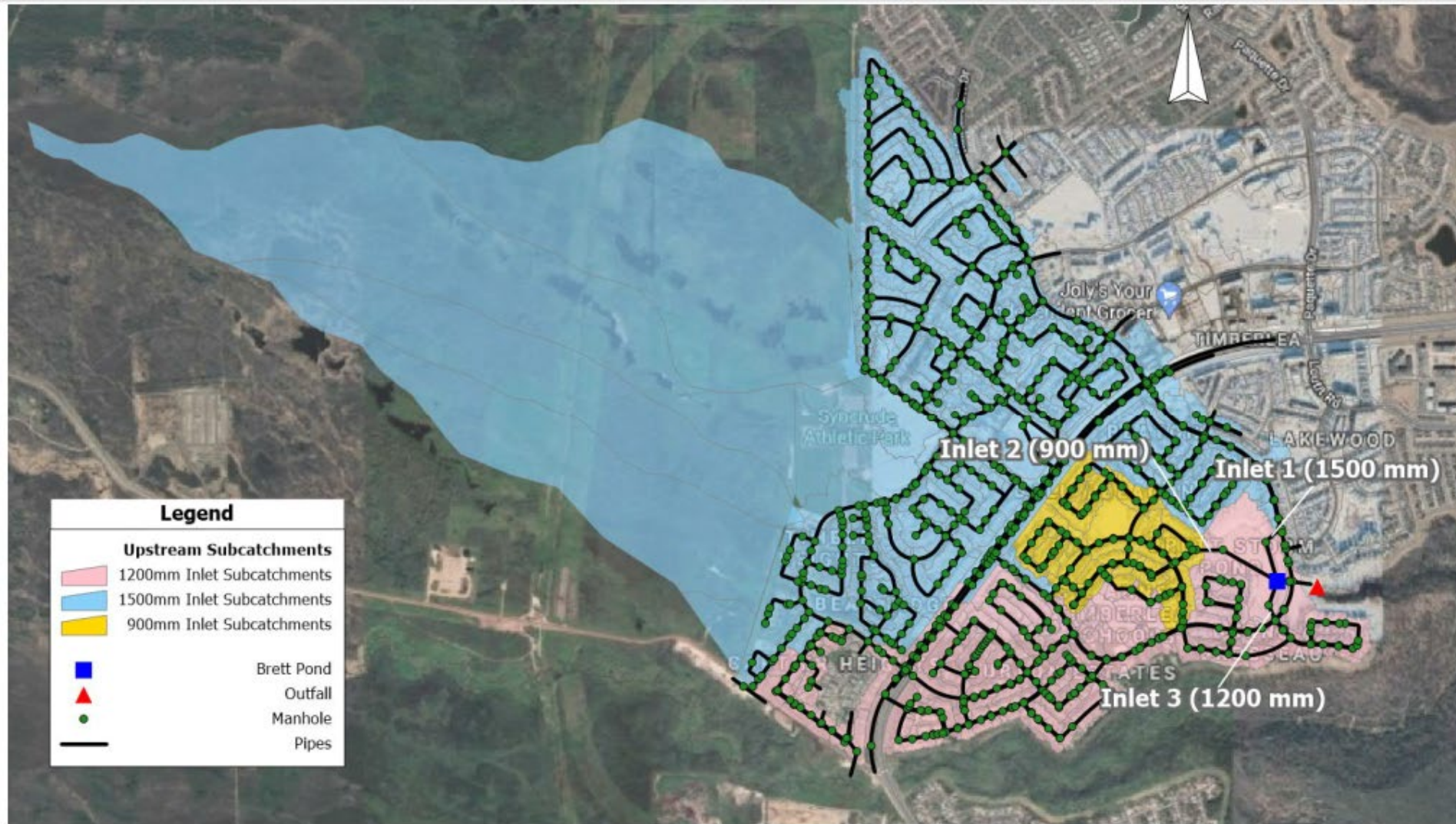
Following the regulations set by Department of Fisheries and Oceans (DFO) and Alberta Environment and Parks (AEP), Municipal staff and contractors are removing the invasive goldfish using the chemical treatment, Rotenone. Rotenone application is the only recommended eradication method and does not pose a risk to humans or animals; it only impacts gilled species.

STAY OUT OF FENCED AREA

 Project Inquiries:
780-743-7000
rmwb.ca/pulse



Large Inflows - High risk of rotenone release!

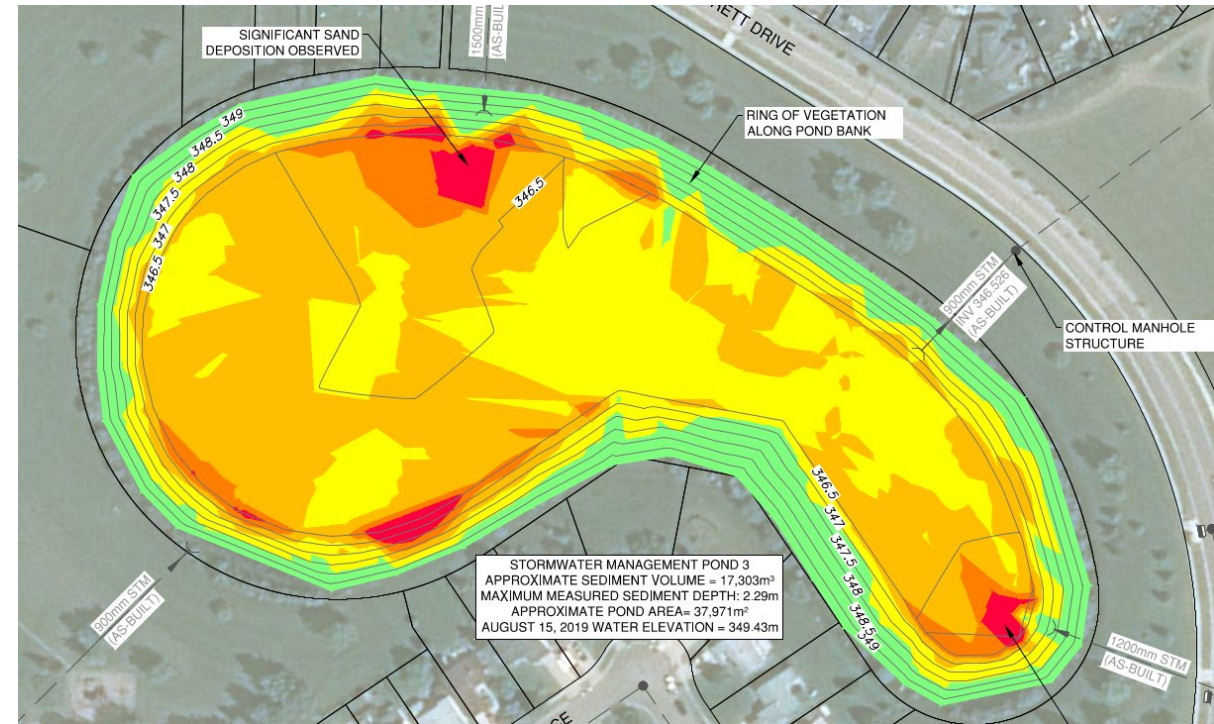


3 Inlets draining 629 ha catchment, plus Snow Storage Site



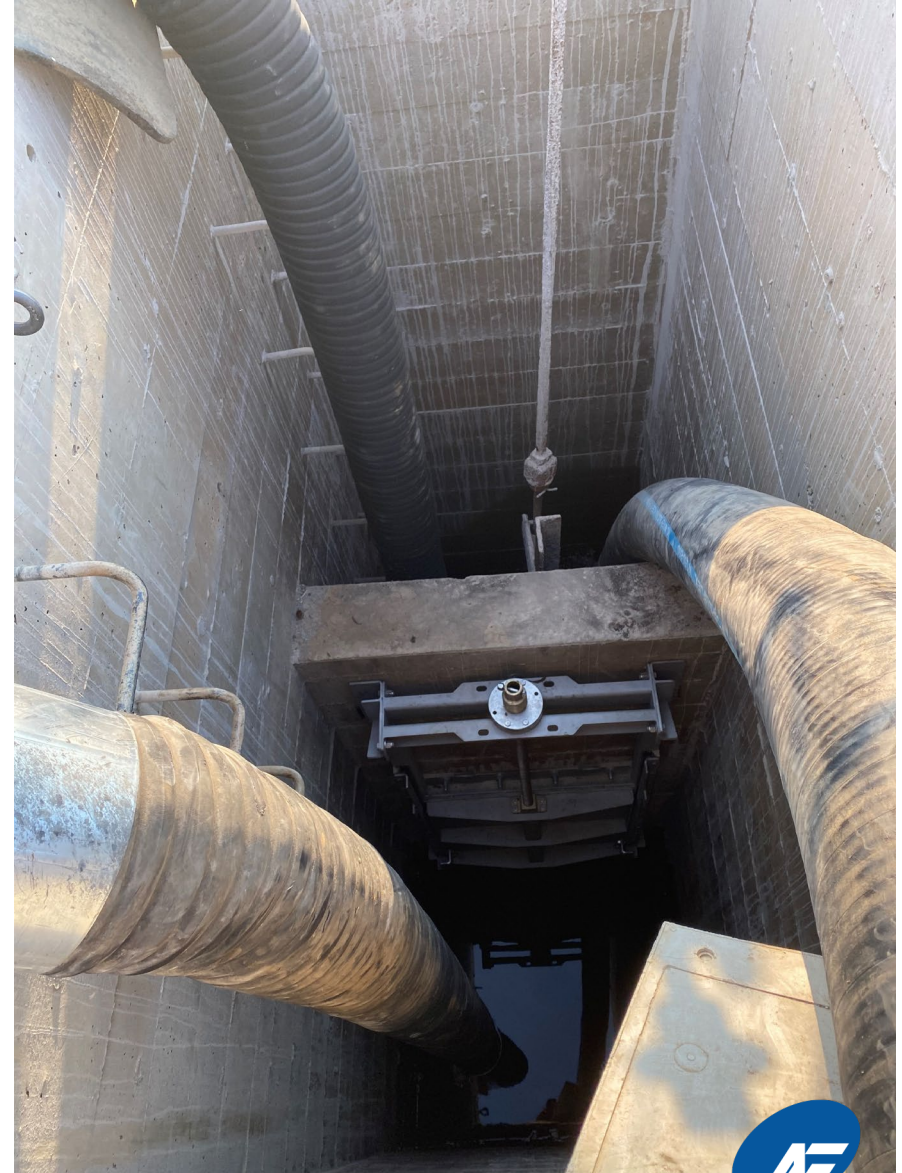
Inflow Control Planning

- Pond volume calculations based on bathymetry
- Stormwater modeling to estimate time to fill up pond
- Minimum depth required for boat navigation
- Literature review to estimate rotenone degradation time based on water temperature



Inflow Controls

- Plugged pond outlet (sluice gate)
- Pumped down pond to increase storage capacity
- Interrupted Snow Storage discharge to storm pond during treatment
- One rotenone application to fit time frame



Planned Treatment - Rotenone

Chemical derived from roots/stems of subtropical plants

Inhibits oxygen uptake – fish suffocate

Only affects gill-breathing animals

Applied under the ponds water surface

P.S. 2023: Limited Rotenone supply (not commercially available)



Goldfish Removal

- Day 1: Rotenone (Certified Pesticide Applicator)
- Days 1+2: Fish collection
 - Fish identification, enumeration, some euthanizing and disposal
- Days 1-5: Water Sampling for Rotenone Testing



Did it work?

- Collected ~3,900 Goldfish, over 100,000 overall
- Post-application fish surveys:
 - 2022 Survey: 0 goldfish
 - 2023 Survey: 1 goldfish 😞!!



Alternative Solutions

Pilot Project

- Exploring alternatives to rotenone
 - Residents may re-release fish after treatment
 - Fish may be introduced by other means (e.g., birds)
- Reviewed management approaches from nearby jurisdictions
- Control measures implemented during operations preferred



Fish Control - Dewatering and Freezing



eDNA

eDNA Sampling



Acknowledgments

- Regional Municipality of Wood Buffalo
- CORTEX Management – pesticide application
- Wilson Industries - contractor
- Blue Sky Analytical – rotenone analysis
- AEPA, City of Red Deer, City of St. Albert for advice
- University of Alberta (Patrick Hanington) - eDNA





Questions?