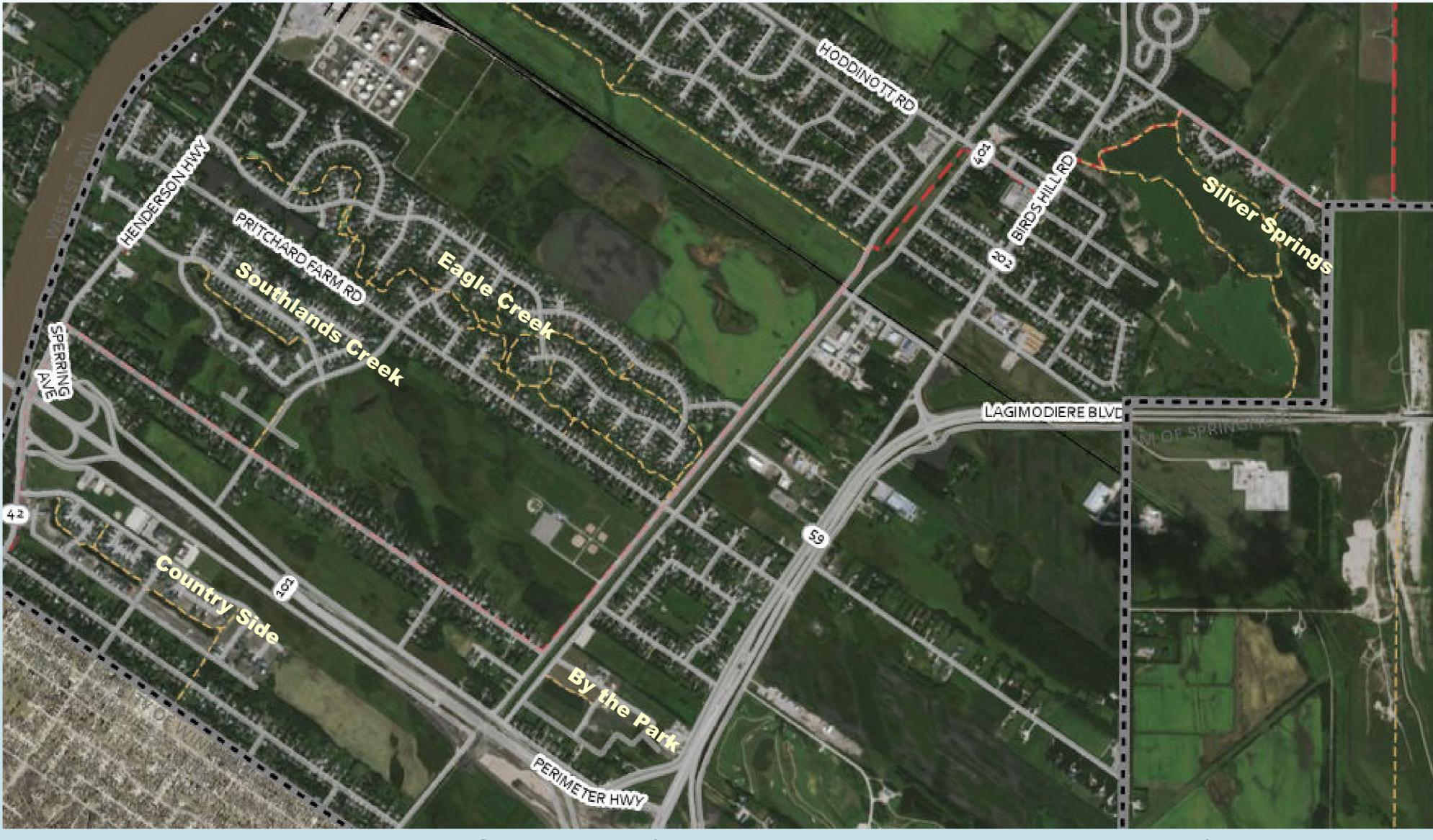
RM OF EAST ST. PAUL Healthy Ponds and Creeks



RM East St. Paul Information & Feedback Session

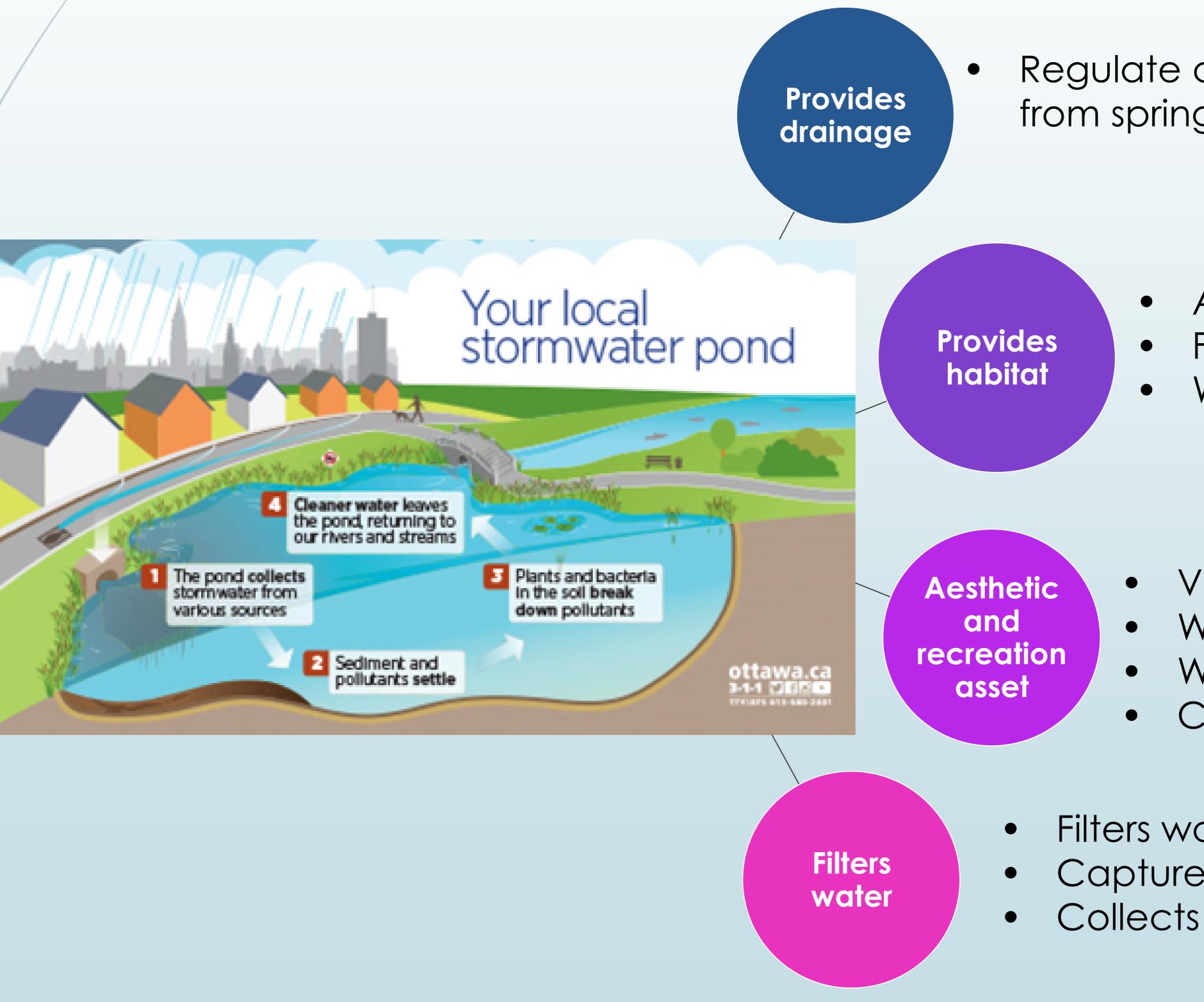


Objectives

Provide information on how the ponds function Provide an update on what the RM has learned this year Discuss possible options and solutions Gather feedback on additional information you would like and the role you would like to have

Thank you for joining us today!

What services do our ponds and creeks provide?



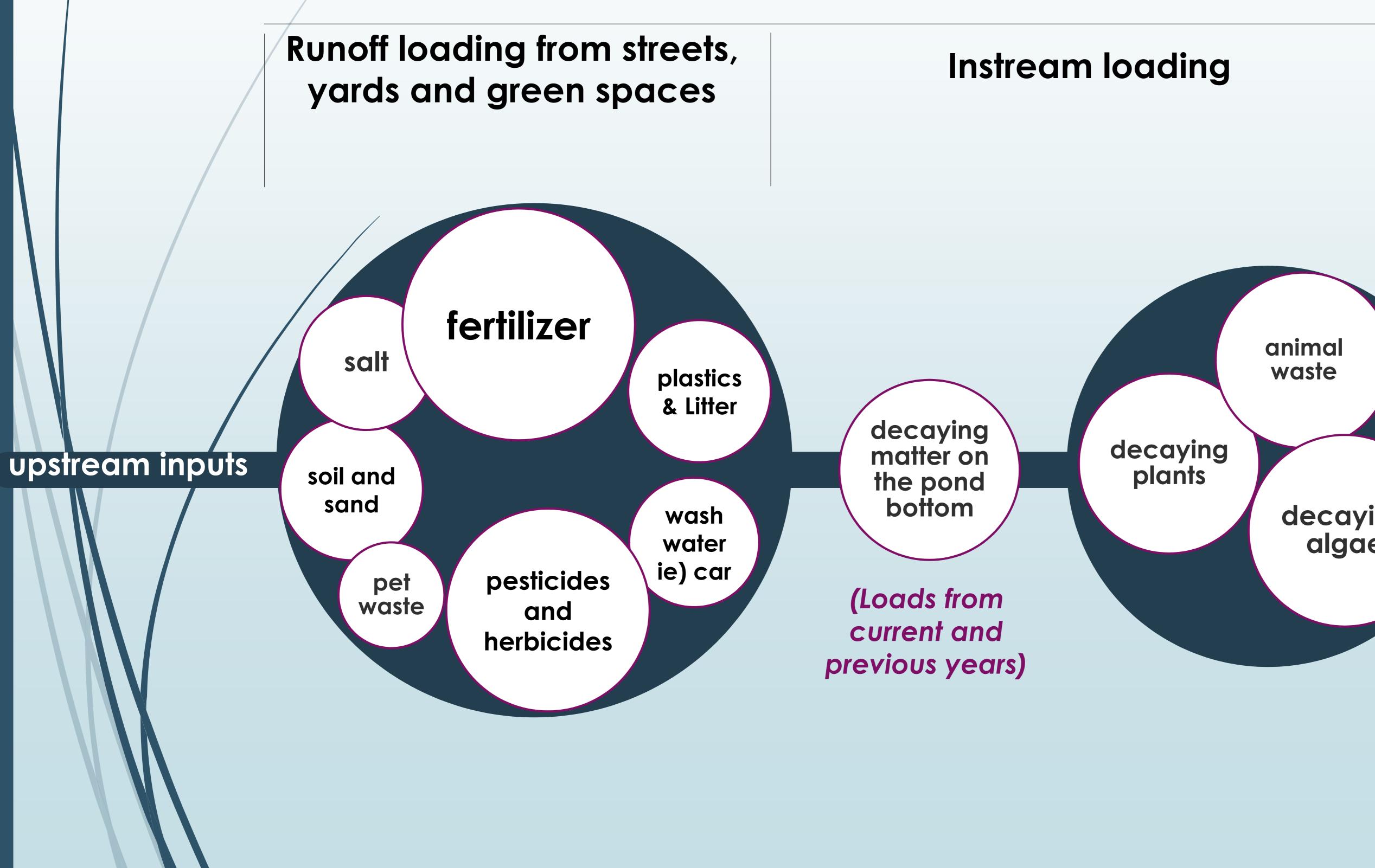
Regulate and temporarily store runoff from spring melt water and rain

Aquatic and shoreline plants Fish and other aquatic species Wildlife – birds, aquatic mammals

Vistas Walking paths Winter ice rinks Catching frogs

Filters water before released to Red River Captures soils, sand and gravel Collects and processes nutrients

What influences pond health?



river to lake

decaying algae

Background - Water Quality in the Ponds: parameters of interest

Dissolved Oxygen –

- 6mg/L

► pH -

- 9.5.

measure of oxygen available for fish and other organisms including the bacteria that decompose organic material.

Provincial guideline is above

A measure of the alkalinity (acidic) or basic (caustic). Ideally levels remain between 6.5 and

Levels above 10 can adversely influence plants and organisms.

Water temperature -

Influences aquatic plants and the bacteria growth. In warmer temperatures, the rate of growth increases.

As temperatures rise, the rate of decomposition increases. If the rate of decomposition is too fast, the oxygen in the water can be used up, stressing fish and other aquatic organisms.

Warmer water also holds less oxygen.

Shaded water temperatures are 3-5 degrees lower than nonshaded water.

Background - Water Quality in the Ponds: parameters of interest

- Nutrients -
 - Fertilizers are nutrients that are used by plants to fuel growth.
 - Fertilizers that are not fully taken up by the grass and flowers in our yards or by agricultural crops run into the storm drains during rain events or during spring melt.
 - These fertilizers are then taken up by aquatic plants including duckweed and algae which fuels their growth.
 - When plants die, the nutrients are released through the decay process to be used again in this way nutrients build up within the ponds.

Nitrogen

- Nitrogen is non limiting converts to a gas and is available from the air for uptake by plants and algae.

Phosphorus:

- - column.

Key driver of excessive aquatic plant growth and algae blooms.

It can accumulate in sediments and be suspended in the water

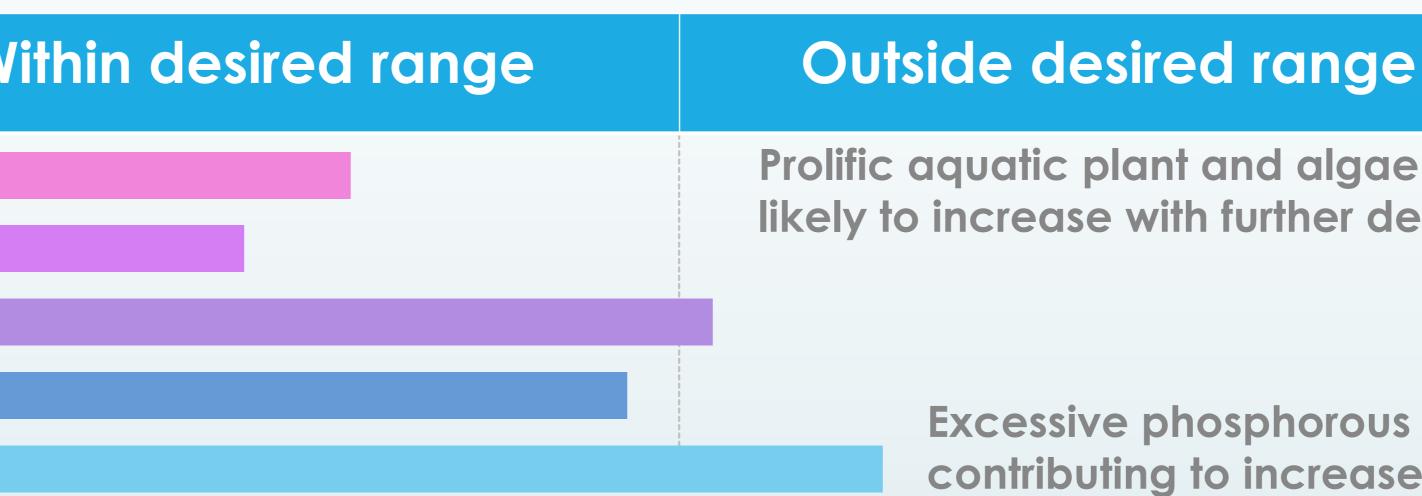
New Ponds

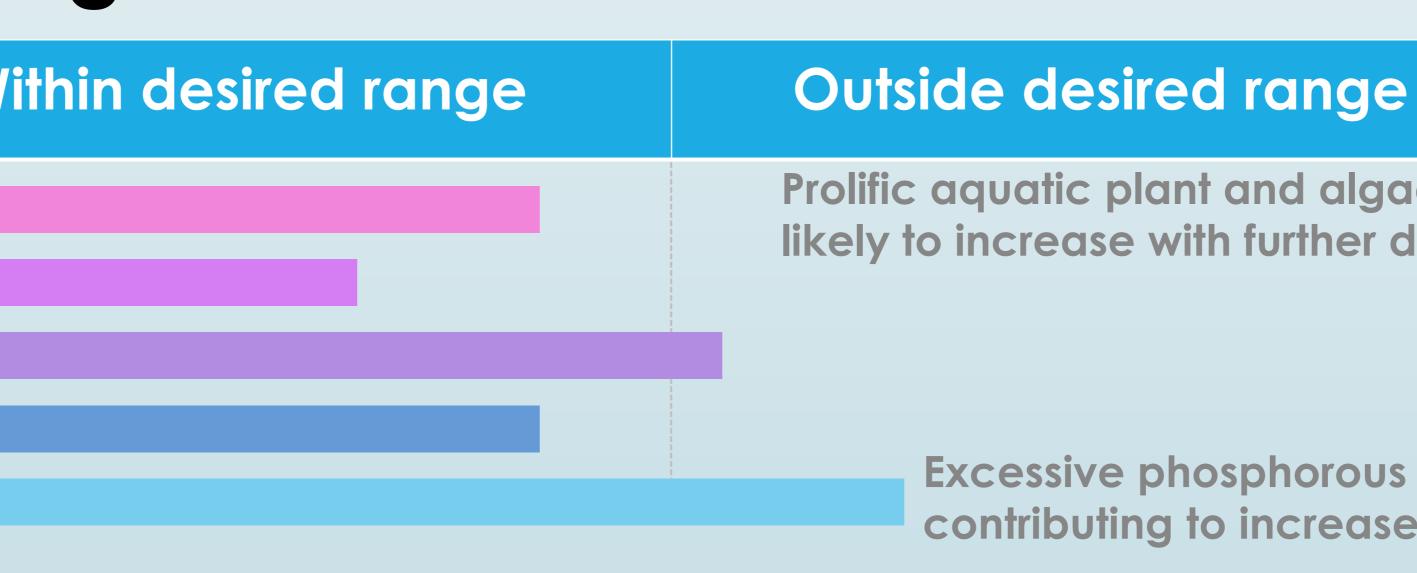
By the Park

Parameter	W
Algae	
Aquatic Plants	
рН	
Oxygen	
Nutrients	

Countryside Crossings

Parameter	Wit
Algae	
Aquatic Plants	
рН	
Oxygen	
Nutrients	





Prolific aquatic plant and algae growth is trending upwards and is likely to increase with further development

> Excessive phosphorous in the pond system is likely contributing to increased plant growth

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Established Ponds

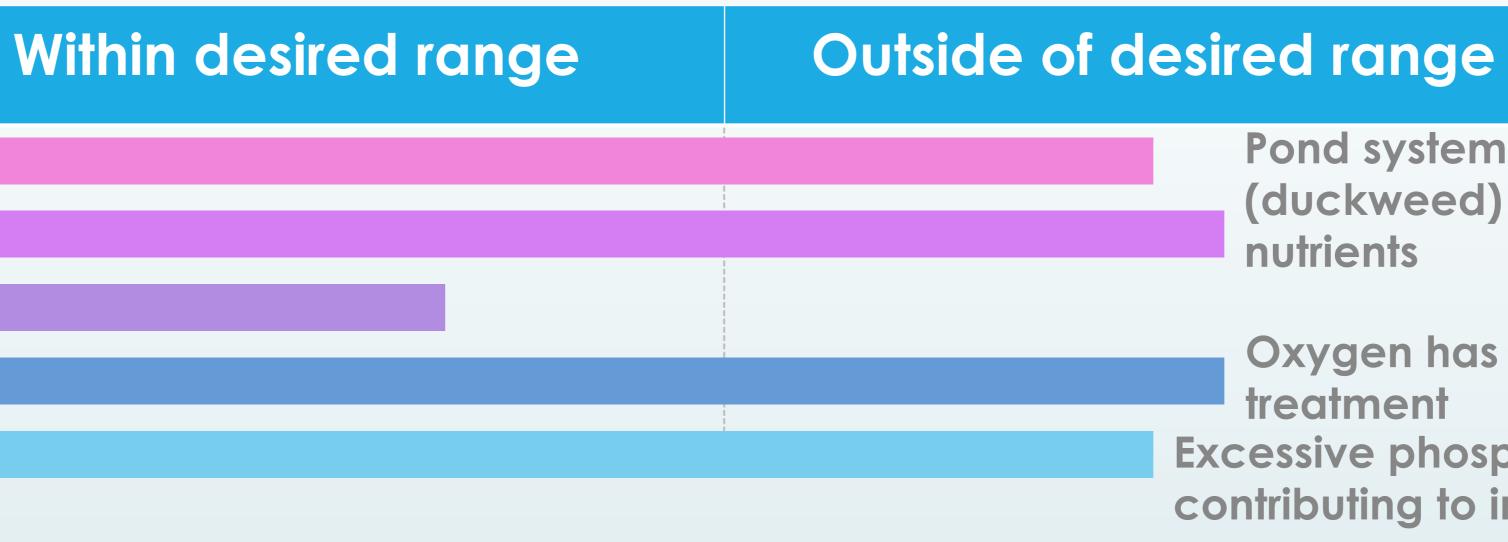
Eagle Creek

Parameter Algae

- Aquatic Plants
 - pН
 - Oxygen
 - Nutrients

Southlands

Parameter	With
Algae	
Aquatic Plants	
рН	
Oxygen	
Nutrients	





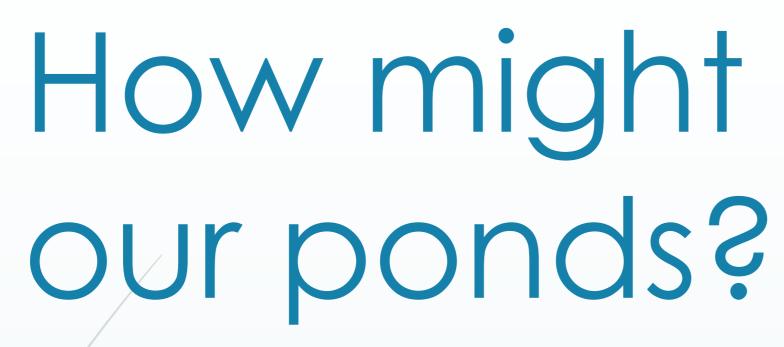
Pond system is dominated by aquatic plant (duckweed) and algae growth from excess nutrients

Oxygen has decreased due to biological treatment

Excessive phosphorous in the pond system is likely contributing to increased plant growth

Prolific aquatic plant and algae growth is trending upwards due to high temperatures and excess nutrients

Excessive phosphorous in the pond system is likely contributing to increased plant growth

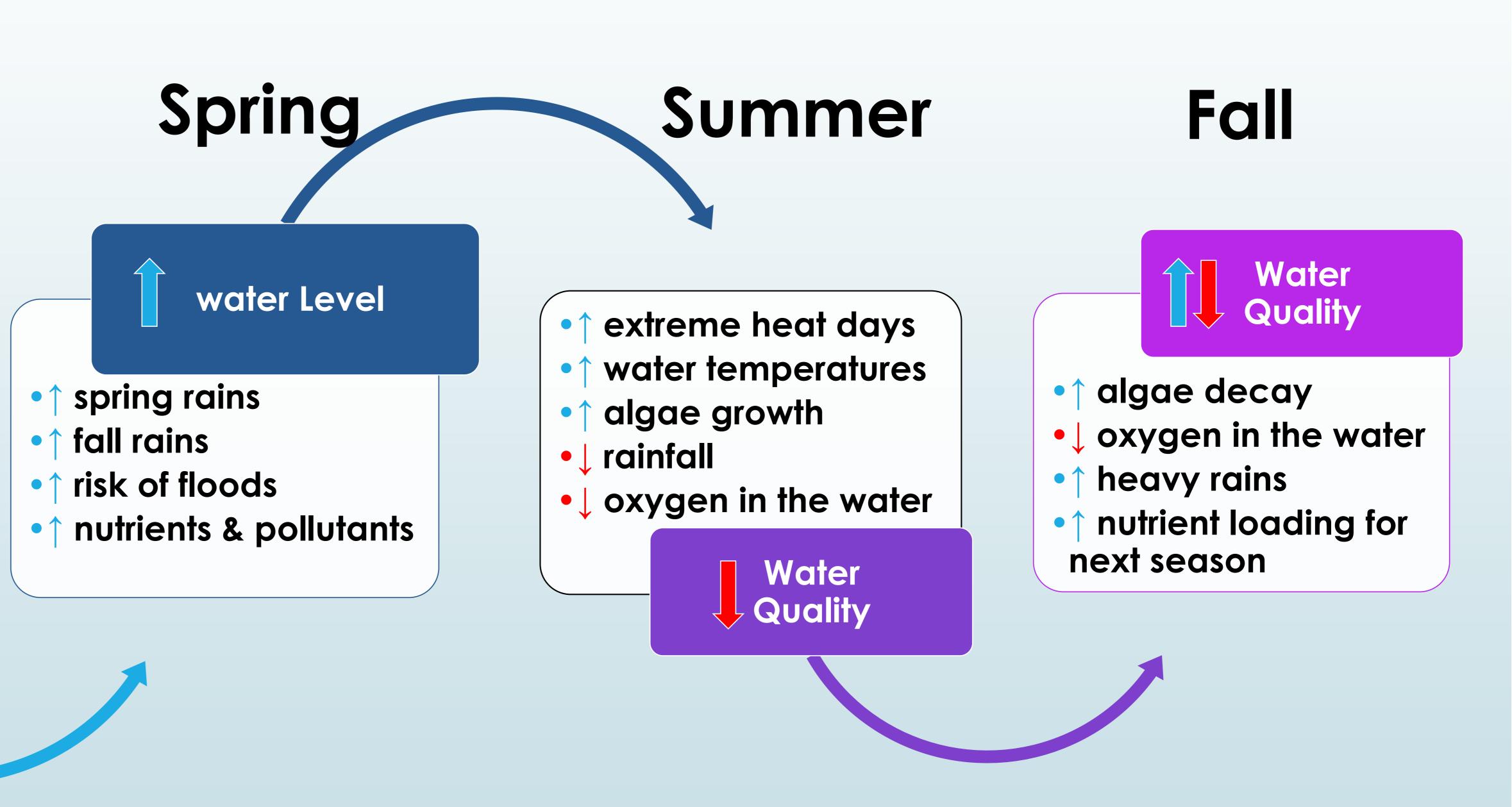


Winter

precipitation snow pack • \constraints warm spells

Ice Safety

How might climate change affect



RM Efforts

This year have instituted a detailed investigation program to understand what drives changes in the ponds such as:

RM has been actively working on pond health for 3 years: Pilot programs to test methods of reducing algae and other plant growth. Aeration to raise oxygen levels to support natural decomposition.

Weekly sampling of pond water quality and visual inspections;

Lab analysis of water quality every two weeks;

Reviewing observations and data with aquatics specialists;

Research into possible opportunities to improve conditions; and

Targeted pilot tests with detailed monitoring to check effectiveness.



ponds

- Ponds are complex systems
- Change over the season:

 - respond to temperature, light and moisture Change over time:
 - Older ponds are further evolved than newer ponds
 - Vegetation along the bank (riparian zone)has a positive effect on water quality:
 - banks

What we have learned about our

Native grasses draw nutrients, anchor the soils and protect the

Trees and shrubs draw nutrients, shade the water and keep it cooles Cattails draw out nutrients Drainage water Filters out sediment



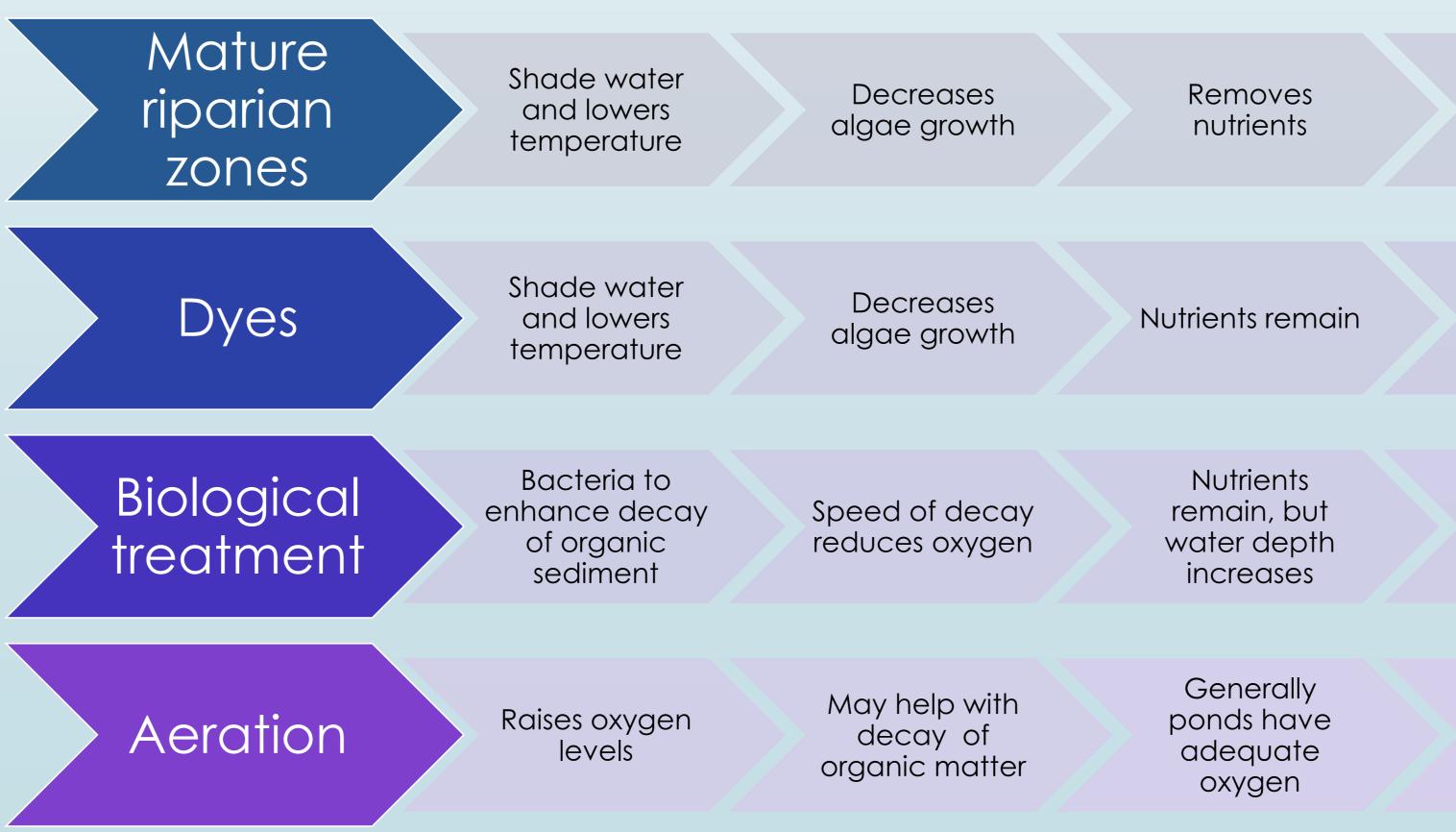
Vegetation along the bank is called the riparian zone

Carbon dioxide (heat and light) Predators and insects Invertebrate Detritu

Evaluation of management options

What we have learned from this year's monitoring:

- There is no single solution.



The actions of individual property owners are just as important as the steps taken by the RM.

Conditions change over the season - weather influences conditions (i.e., temperature, rainfall).

Ponds are ecosystems – P=ponds change as they mature and Mother Nature tries to find an equilibrium based on the resources on hand (water levels, nutrients, etc.).

Healthy riparian vegetation improves water quality

It has taken a long time for the ponds to evolve to this point and any improvements will take a long time

Creates habitat Duckweed growth increases Benefits depend on circumstances Required if using biological treatments

How can residents protect our creeks and ponds?

Minimize use of fertilizers

Time fertilizer application so that rain does not wash it into the ponds



tamilton <u>nilton.ca/home</u> <u>elopment/wat</u>

Keep yard waste like grass clippings out of the ponds

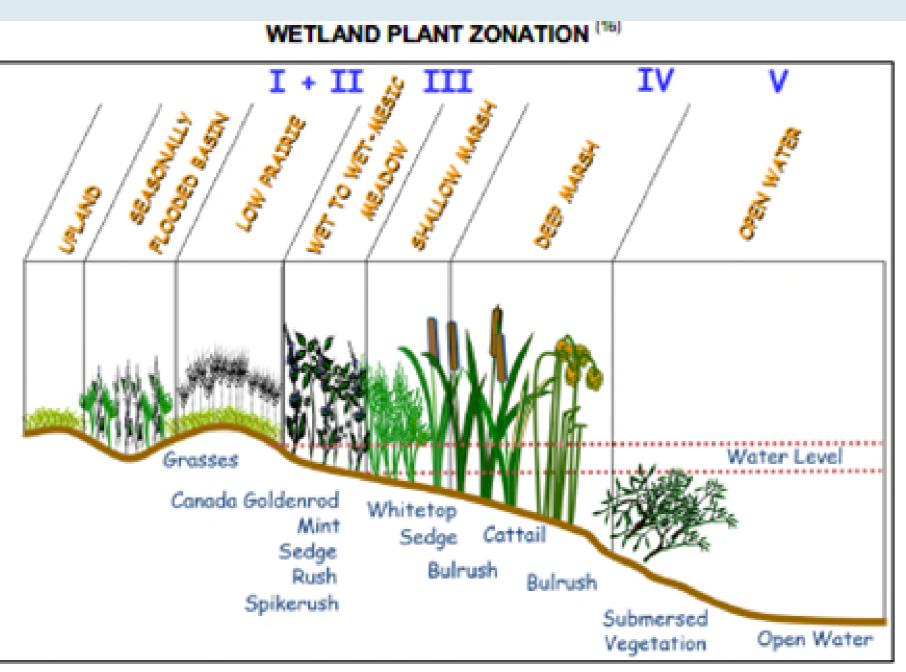
Discourage geese: plant tall grasses by the water and do not feed the geese

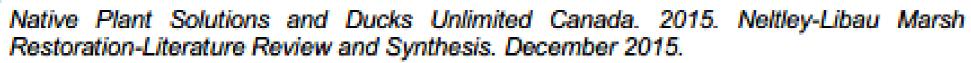
Protect the plants arounc the ponds

Xeroscape: native plants stabilize soils without watering or fertilizers

Options being considered by the RM....

- Expand riparian plantings around ponds
- Investigate ways to limit nutrient loading
- Remove nutrients from ponds
- Develop new ponds differently





Improve established ponds

Provide information to residents on best practices to limit algae growth

Look for ways to remove nutrients from ponds

Manage new ponds

Deter geese through plantings around pond

Require erosion control until riparian zone established

Larger designed

Clearer development requirements

Support oxygen levels

Improve riparian zones

Provide information to residents on best practices to limit algae growth

Monitor nutrients

Future Ponds

riparian zones

Nutrient management caveats on private lots

Deter geese through pond design

How can the RM best engage you and your neighbours regarding the ponds?





Facebook

Twitter

Community Newsletter

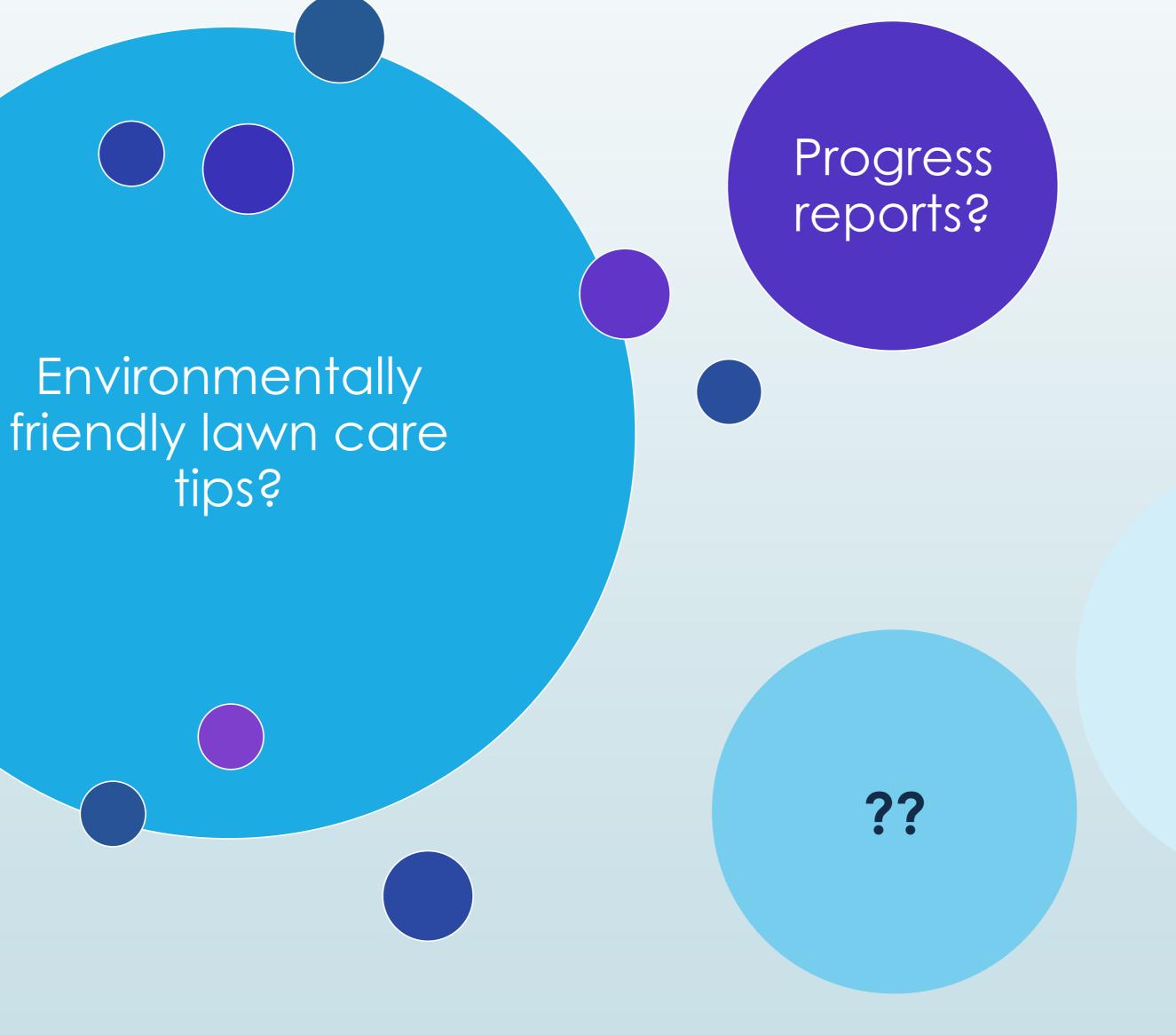
Surveys

Other (give us your ideas!)



What information would help you support pond health?





Other ideas?

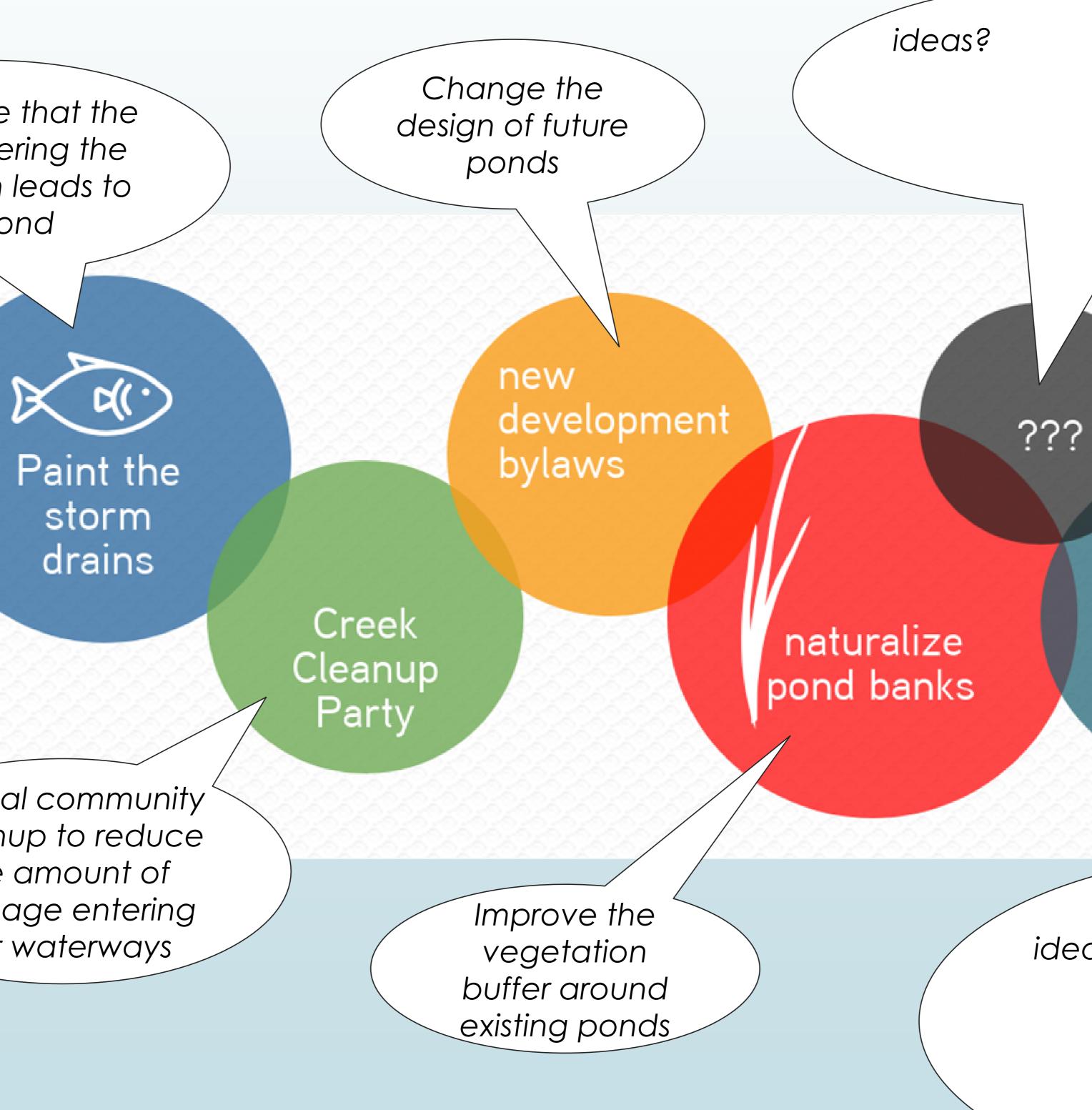
How to drain my pool in a way that protects the ponds?

?

???

Dotmocracy! What future actions would you like to see?

A visual cue that the water entering the storm drain leads to the pond



Annual community cleanup to reduce the amount of garbage entering our waterways

Neighbours working together to find long term solutions

Neighbourhood Pond Associations

ideas?

???

Your input will help us make future decisions. Before you go please fill in our participation survey to help us improve.

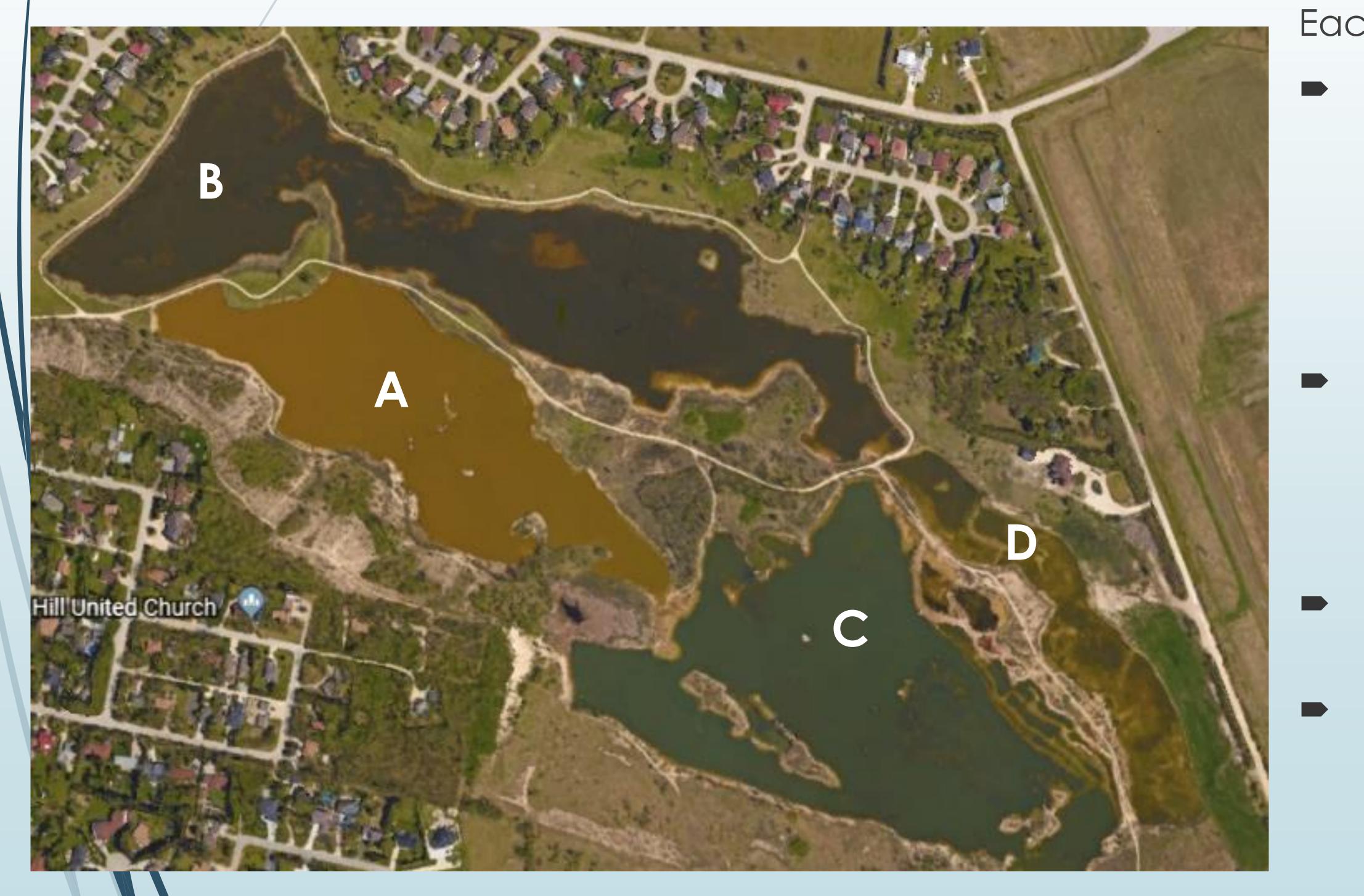
Thanks again for joining us today!



Thank you for coming!

Silver Springs Ponds

The ponds in Silver Springs Park are four unique systems.



Each pond is behaving differently

- The water quality is different
 - pH levels are very high especially in B and D
 - Organic sediments may be helping to keep pH levels from getting higher
- Pond depths vary
 - The shallowest pond is D at approximately 30cm
 - The deepest is approximately 2m
- Nutrient loading is common between all ponds
- Each has different aquatic vegetation
 - Where aquatic plants dominate, algae levels are low.

Pond A

Parameter

Aquatic Plants pH Oxygen Nutrients

		VV

*Other

*Other

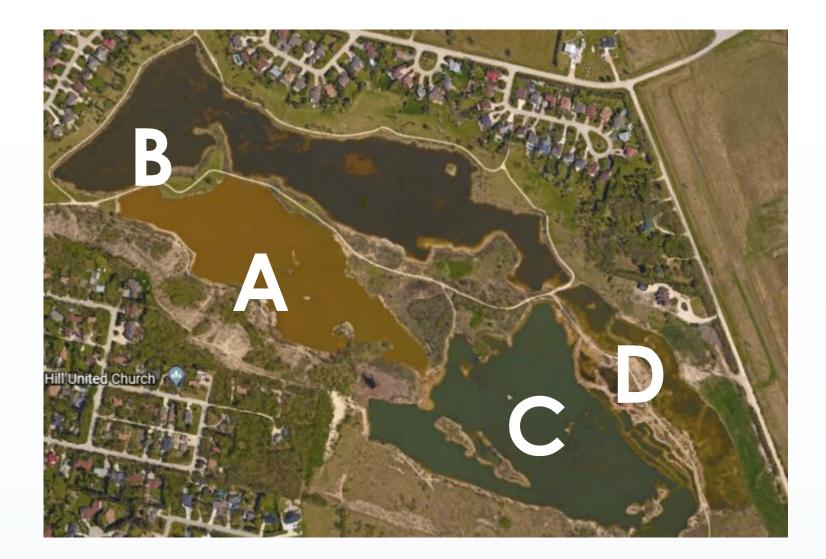
Pond B

Outside desired	Within desired range	Parameter
Aquat		Algae
aquat		Aquatic Plants
pH levels are t		рH
to limestone b		Oxygen
Excessive n likely contri		Nutrients

hin desired range	Outside desired
	Aquatic plo
	pH levels are trend limestone base
	Excessive are likely

Fecal levels are highest in this pond Suspended sediment levels are also high

Low levels of fecal matter Aquatic plant growth may be limiting the number of geese using this pond



d range

lant growth is dominated by brown algae

ding upwards and are high due to

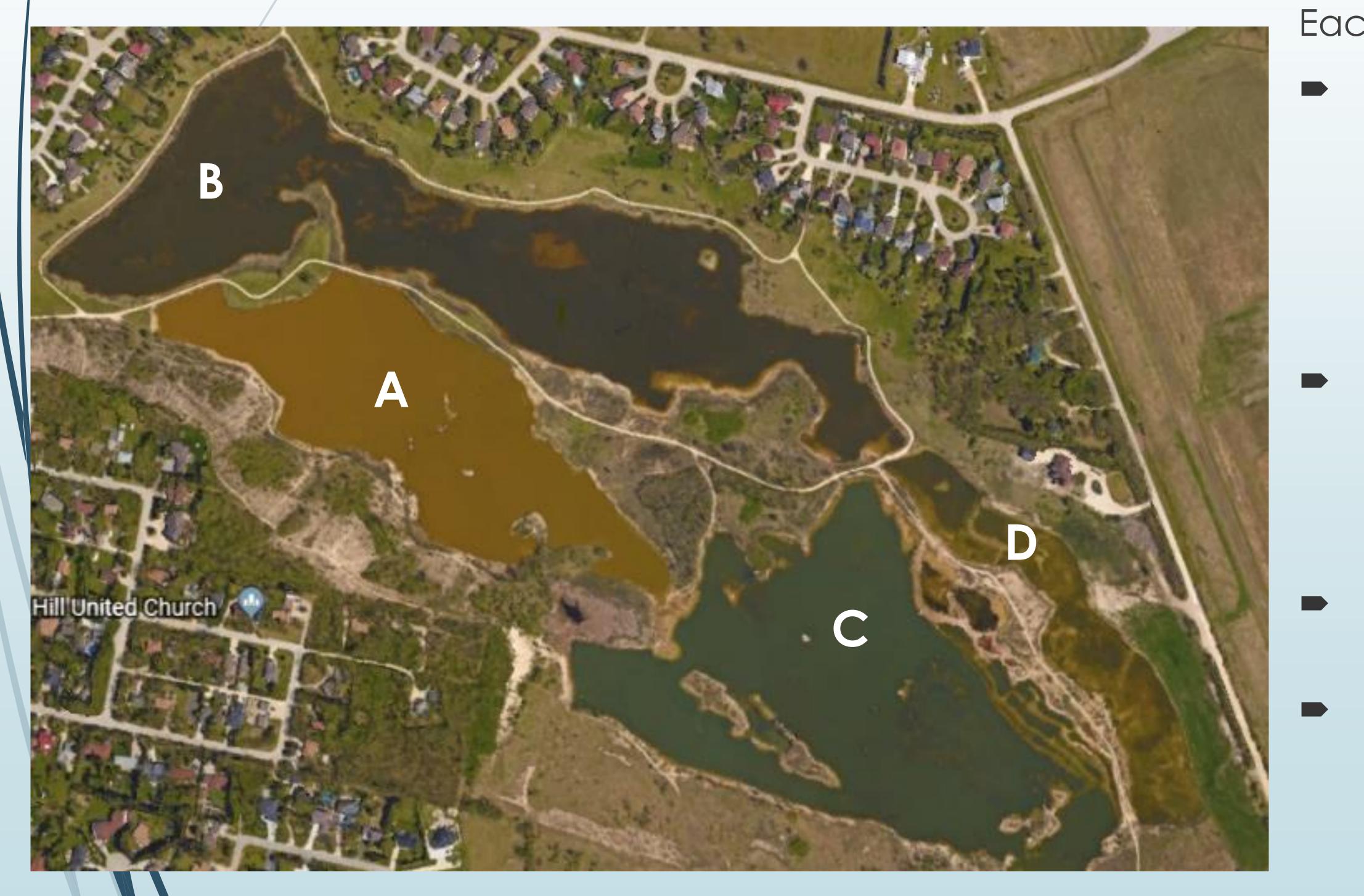
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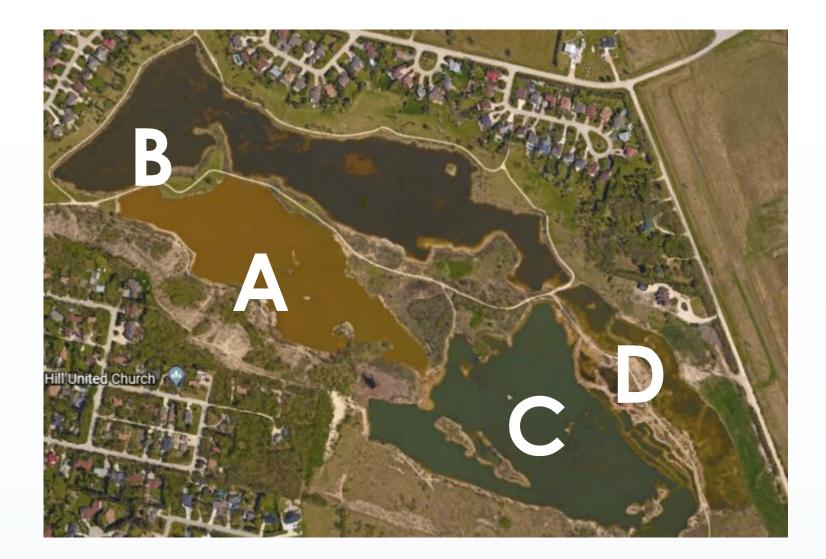
Pond B

Outside desired	Within desired range	Parameter
Aquat		Algae
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Pond C

Parameter

Algae Aquatic Plants

рН

Oxygen

Nutrients

*Other

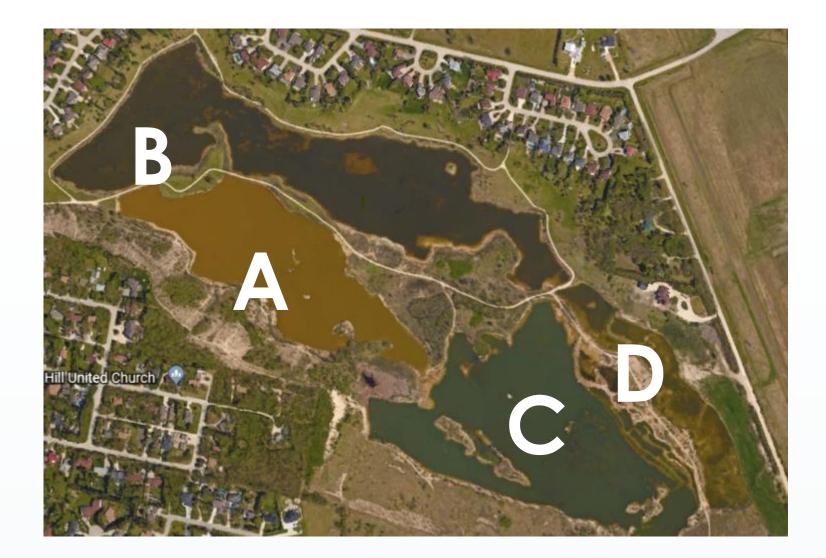
Pond D

Outside desired	Within desired range	Parameter
		Algae
Submerged a		Aquatic Plants
pH levels are tre		рН
limestone base		Oxygen
Excessive nutrients likely contributing		Nutrients
incery commoning	Other Low levels of fecal matter	

ithin desired range	Outside of desire
	Aqu
	pH levels are trending limestone base
	Exces are lik

Low levels of fecal matter, but high levels of ammonia suggesting use of pond by geese

Low levels of fecal matter Pond depth is approximately 30cm



ed range

vatic plant growth is dominated by green algae

g upwards and are high due to

ssive nutrients (phosphorous) in the pond system kely contributing to increased plant growth

range

aquatic perennial dominates this shallow pond

ending upwards and are high due to

nts (phosphorous) in the pond system are g to increased plant growth

Pond C

Parameter

Algae Aquatic Plants

рН

Oxygen

Nutrients

*Other

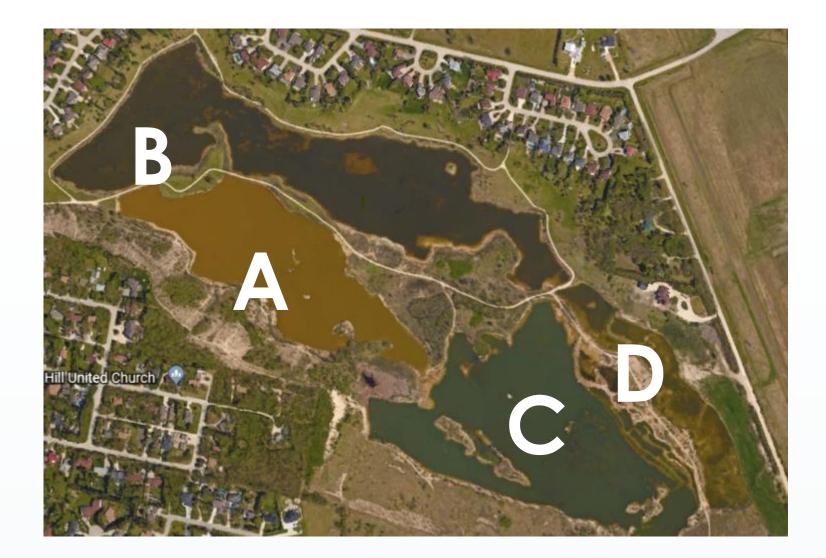
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Outside desired	Within desired range	Parameter
		Algae
Submerged a		Aquatic Plants
pH levels are tre		рH
limestone base		Oxygen
Excessive nutrients likely contributing		Nutrients
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What changes have YOU seen?

Vegetation -

- Shoreline vegetation?
 - Pond vegetation (algae, submerged aquatic plants)?

the pond systems?

Other?

How has the vegetation changed?



Have you noticed any other changes in