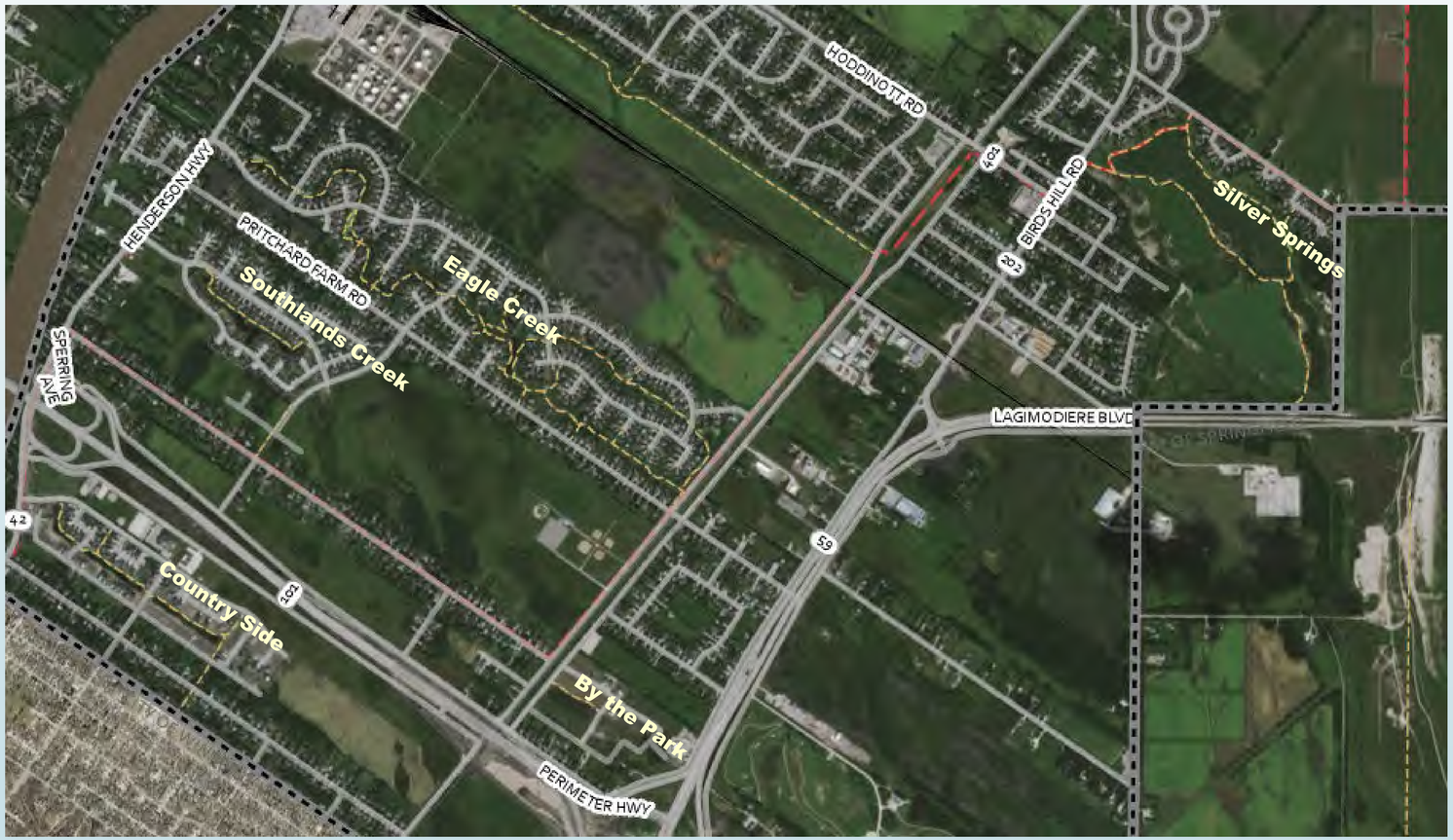
August 15, 2019 Boards

RM OF EAST ST. PAUL

# Healthy Ponds and Creeks



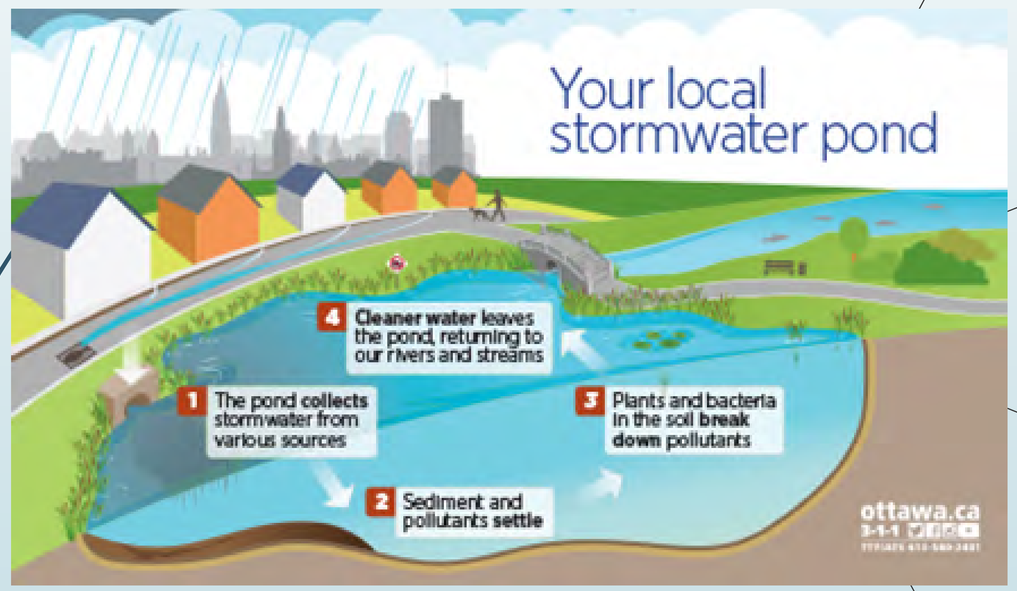

RM East St. Paul Information & Feedback Session

# 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?




**Provides drainage**

- Regulate and temporarily store runoff from spring melt water and rain

**Provides habitat**

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

**Aesthetic and recreation asset**

- Vistas
- Walking paths
- Winter ice rinks
- Catching frogs

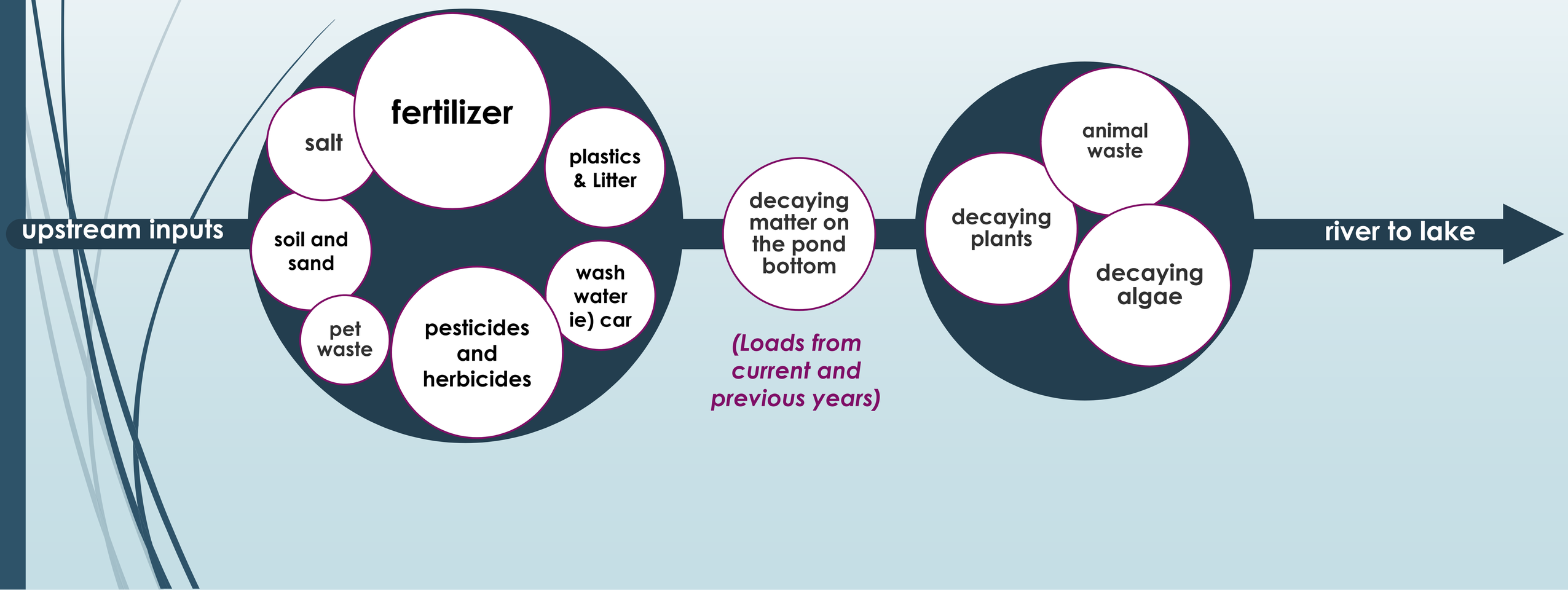
**Filters water**

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

# What influences pond health?

**Runoff loading from streets, yards and green spaces**

**Instream loading**



# Background - Water Quality in the Ponds: parameters of interest

- Dissolved Oxygen –
  - measure of oxygen available for fish and other organisms including the bacteria that decompose organic material.
  - Provincial guideline is above 6mg/L
- pH -
  - A measure of the alkalinity (acidic) or basic (caustic). Ideally levels remain between 6.5 and 9.5.
  - 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 non-shaded 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:**

- Key driver of excessive aquatic plant growth and algae blooms.
- It can accumulate in sediments and be suspended in the water column.

# New Ponds

## By the Park

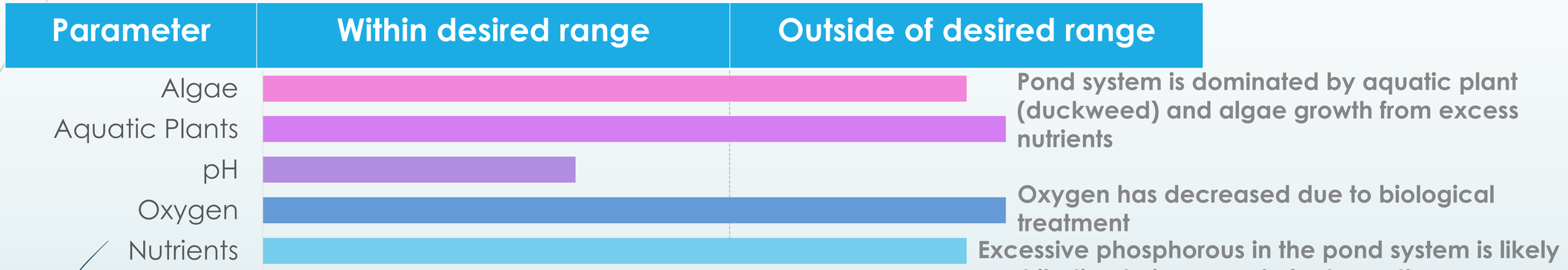
| Parameter | Within desired range | Outside desired range |
|---|---|---|
| Algae | | Prolific aquatic plant and algae growth is trending upwards and is likely to increase with further development |
| Aquatic Plants | | |
| pH | | |
| Oxygen | | |
| Nutrients | | Excessive phosphorous in the pond system is likely contributing to increased plant growth |

## Countryside Crossings

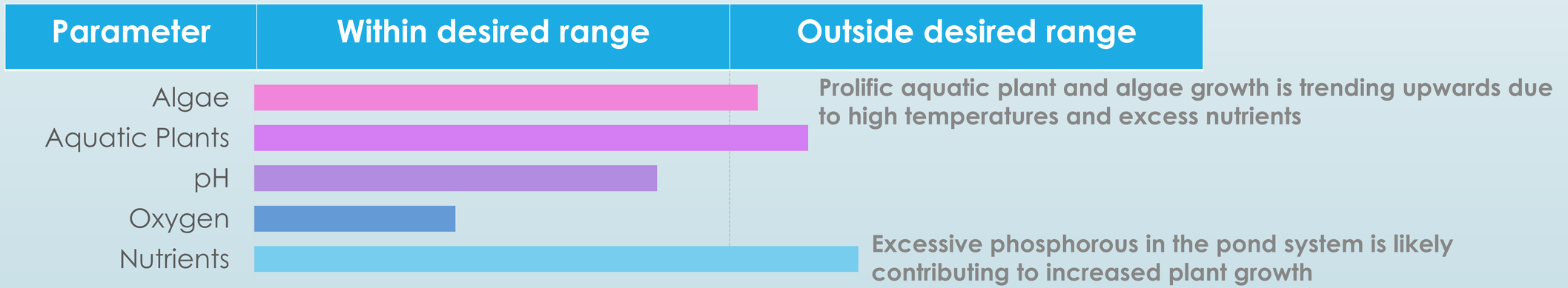
| Parameter | Within desired range | Outside desired range |
|---|---|---|
| Algae | | Prolific aquatic plant and algae growth is trending upwards and is likely to increase with further development |
| Aquatic Plants | | |
| pH | | |
| Oxygen | | |
| Nutrients | | Excessive phosphorous in the pond system is likely contributing to increased plant growth |

# Established Ponds

## Eagle Creek




## Southlands



# How might climate change affect our ponds?

## Winter

- ↑ precipitation
- ↑ snow pack
- ↑ warm spells

**Ice Safety** ↓

## Spring

**water Level** ↑

- ↑ spring rains
- ↑ fall rains
- ↑ risk of floods
- ↑ nutrients & pollutants

## Summer

- ↑ extreme heat days
- ↑ water temperatures
- ↑ algae growth
- ↓ rainfall
- ↓ oxygen in the water

**Water Quality** ↓

## Fall

**Water Quality** ↑↓

- ↑ algae decay
- ↓ oxygen in the water
- ↑ heavy rains
- ↑ nutrient loading for next season

# RM Efforts

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.

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

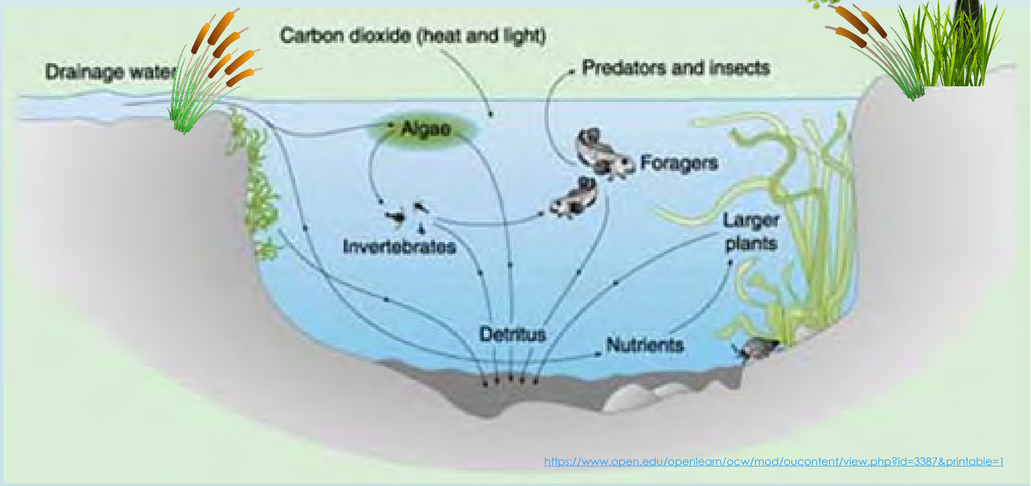
- Weekly sampling of pond water quality and visual inspections;
- Lab analysis of water quality every two weeks;
- Reviewing observations and data with aquatics specialists;
- Research into possible opportunities to improve conditions; and
- Targeted pilot tests with detailed monitoring to check effectiveness.

# What we have learned about our 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:
  - Native grasses draw nutrients, anchor the soils and protect the banks
  - Trees and shrubs draw nutrients, shade the water and keep it cooler
  - Cattails draw out nutrients
  - Filters out sediment

***Vegetation along the bank is called the riparian zone***

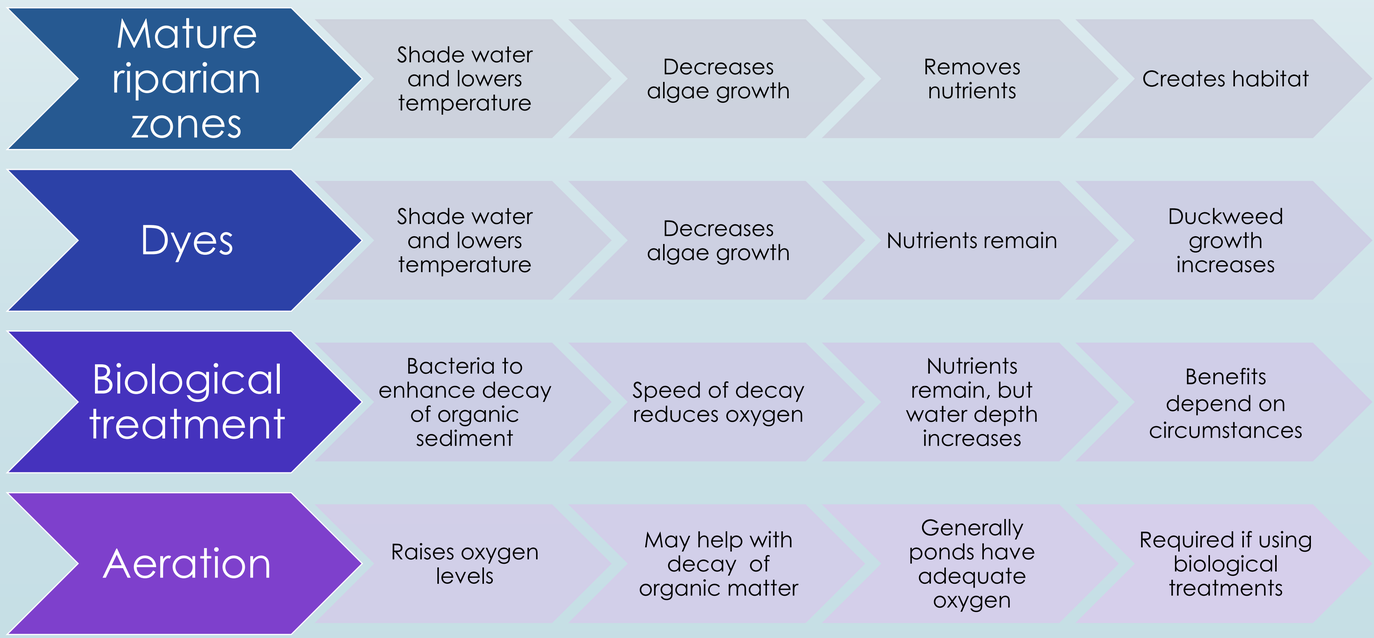



https://www.open.edu/openlearn/ocw/mod/oucontent/view.php?id=3387&printable=1

# 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



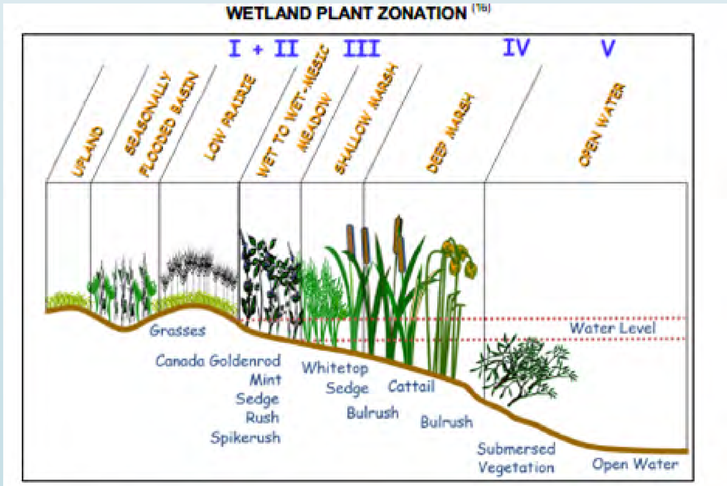
# How can residents protect our creeks and ponds?


Hamilton
nilton.ca/home-
velopment/water-
r-management-ponds

- Minimize use of fertilizers
- Time fertilizer application so that rain does not wash it into the ponds
- 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 around 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




*Native Plant Solutions and Ducks Unlimited Canada. 2015. Naltley-Libau Marsh Restoration-Literature Review and Synthesis. December 2015.*

## Improve established ponds

| | | | |
|---|---|---|---|
| Provide information to residents on best practices to limit algae growth | Look for ways to remove nutrients from ponds | Support oxygen levels | Improve riparian zones |

## Manage new ponds

| | | | |
|---|---|---|---|
| Deter geese through plantings around pond | Require erosion control until riparian zone established | Provide information to residents on best practices to limit algae growth | Monitor nutrients |

## Future Ponds

| | | | |
|---|---|---|---|
| Clearer development requirements | Larger designed 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?

- Website
- Email Blast
- Facebook
- Twitter
- Community Newsletter
- Surveys
- Other (give us your ideas!)

# What information would help you support pond health?

Planting tips?

Environmentally friendly lawn care tips?

Progress reports?

Other ideas?

?

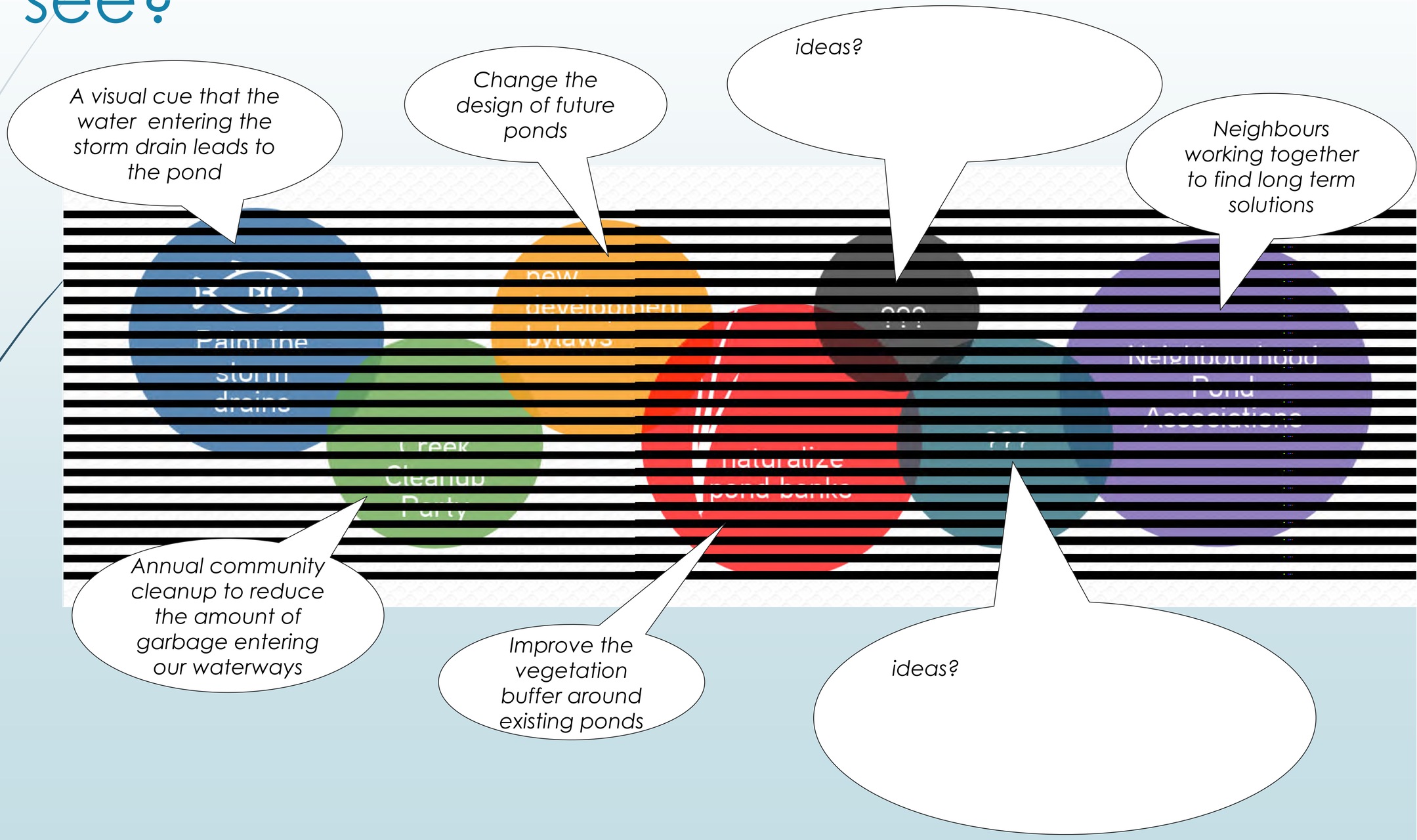
How to drain my pool in a way that protects the ponds?

???

??

?

# Dotmocracy!
# What future actions would you like to see?



RM OF EAST ST. PAUL

# Thank you for coming!

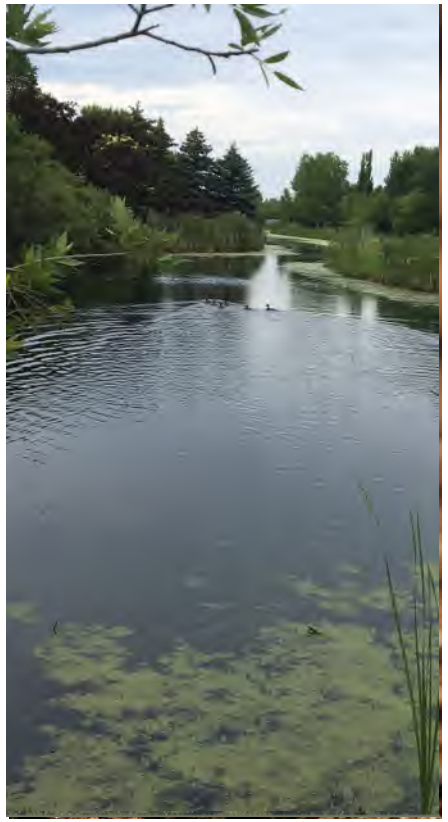
- Your input will help us make future decisions.
- Before you go please fill in our participation survey to help us improve.

Thanks again for joining us today!

August 15, 2019 presentation

# Managing the Ponds

And preventing future problems



# We recognize the challenges…

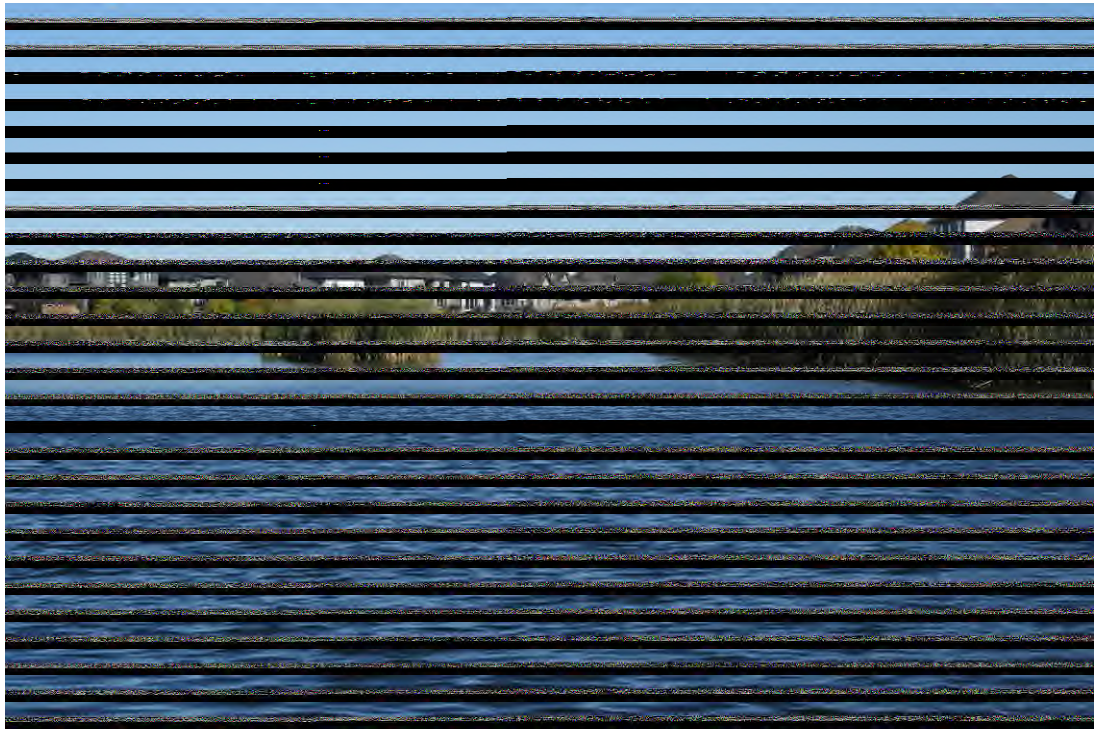
Some of our ponds are showing significant issues

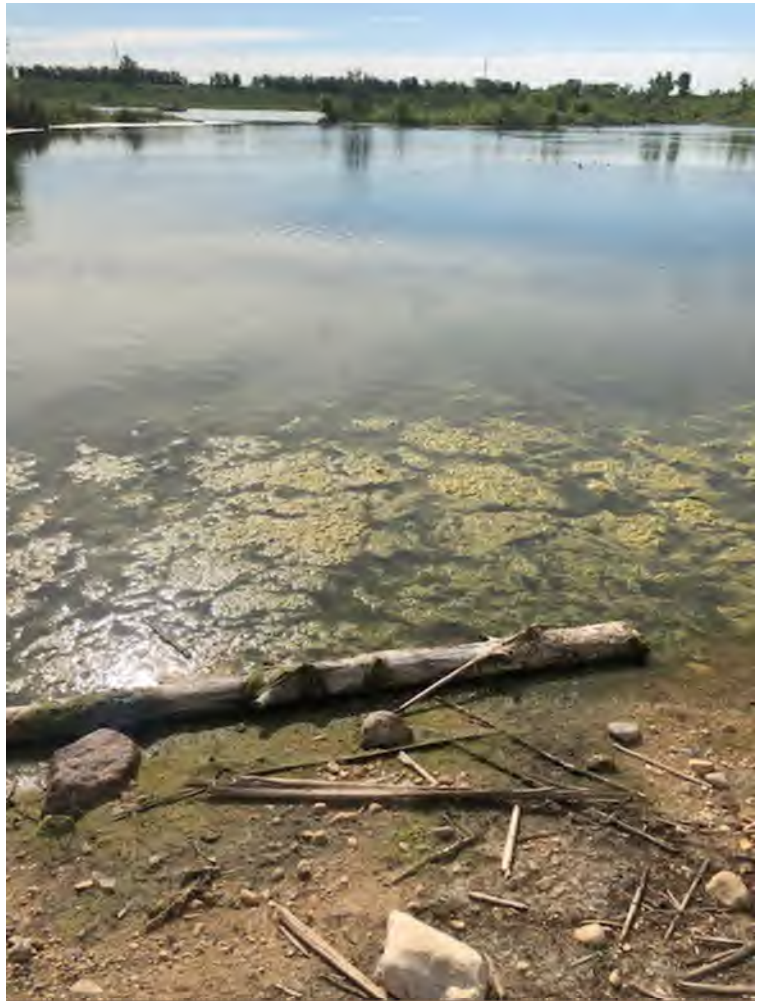
- The issues are:
  - multifaceted,
  - complex and
  - change with weather and the season

- Finding solutions has not been easy – frankly frustrating

# The frustration….

**This is not one of our ponds**
**(healthy levels of algae and aquatic plants)**





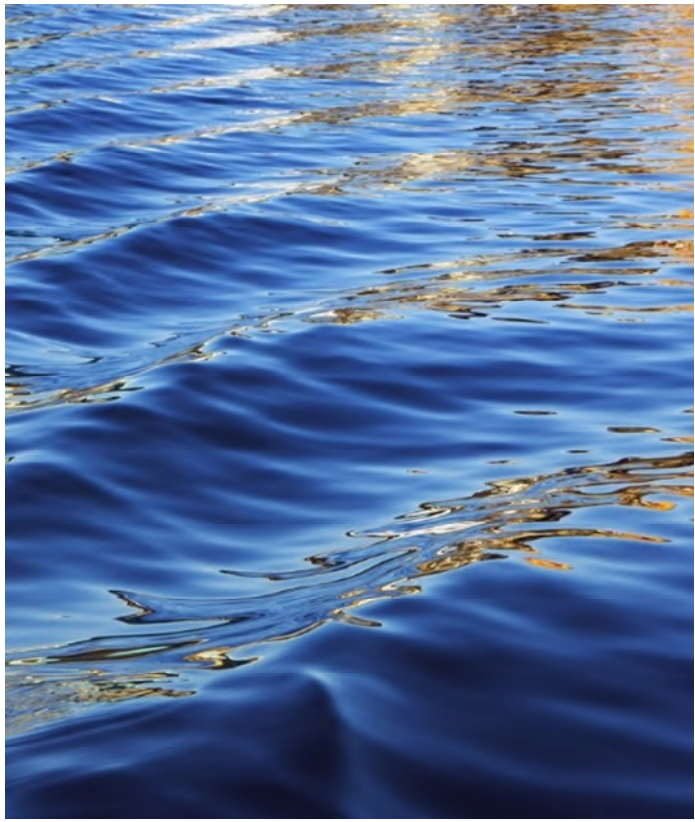
**Many of our ponds look like this**

# Here is what we are facing…

- Its taken years for the problems to get this state
- We all contribute to the problem
- The easy solutions have already been tried and many ponds still have significant issues with water quality
- Mother nature is changing and that makes it harder to find solutions
- It is going to take time and testing out options for improvements to happen
- This will take more than one summer

# The problems, the good news and the challenges

This is what we know….

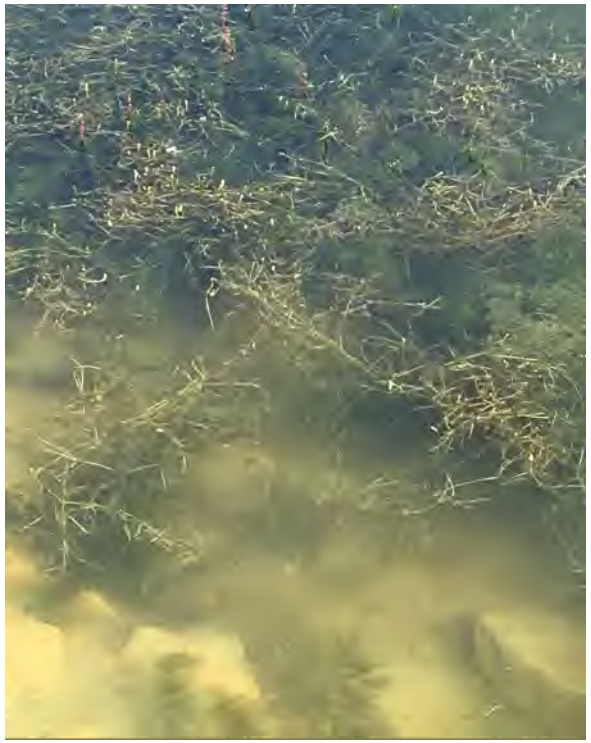


# When excess nutrients enter the water and one of these 3 things WILL happen!

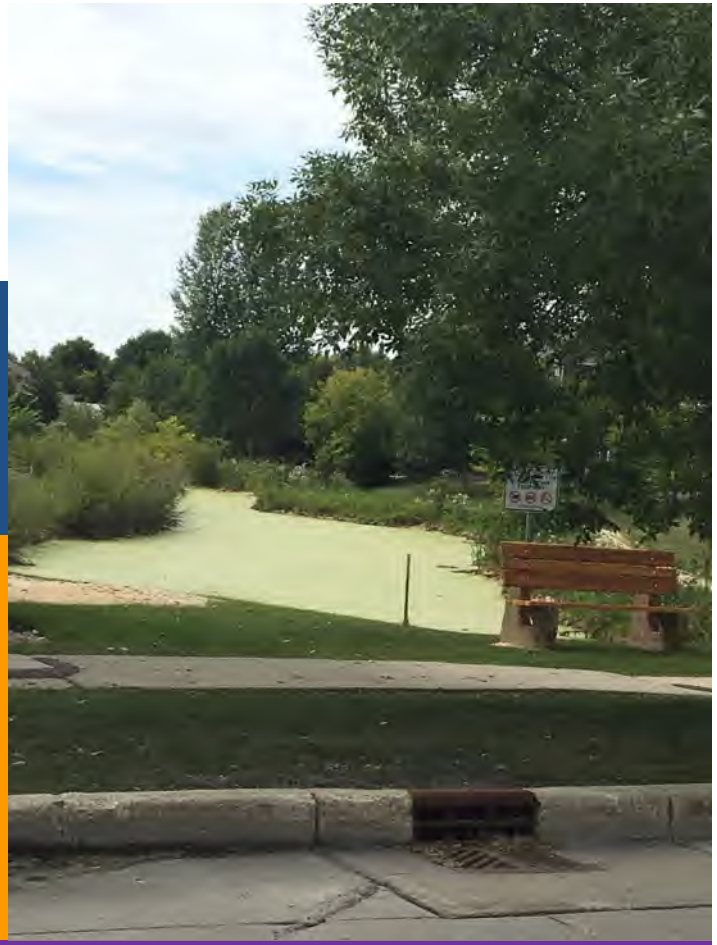
**1** Algae blooms

**2** Duckweed proliferation

**3** Thick aquatic plants



# Duckweed… (Eagle Creek)



## The problem:

- Too much of it

## The good news:

- It is easier to deal with than algae
- It can be harvested - removes nutrients from the pond permanently

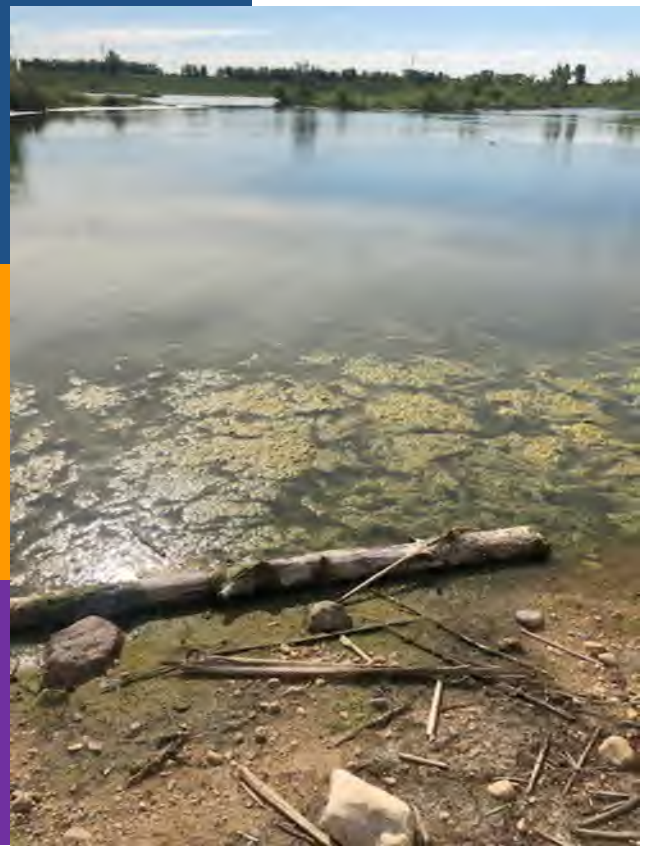
## The challenge:

- Finding a mechanical system to work in shallow ponds

# Newer Ponds…

## The problem

- Signs of nutrient loading
- Lots of garbage is getting in the ponds
- Geese use of the ponds is high – additional nutrient loading



## The good news

- Nutrients are not already in the sediment in bottom of the ponds
- Changing lawn fertilizing practices now will reduce future algae growth

## The Challenge:

- Enforcing landscape requirements
- Finding ways to deter geese

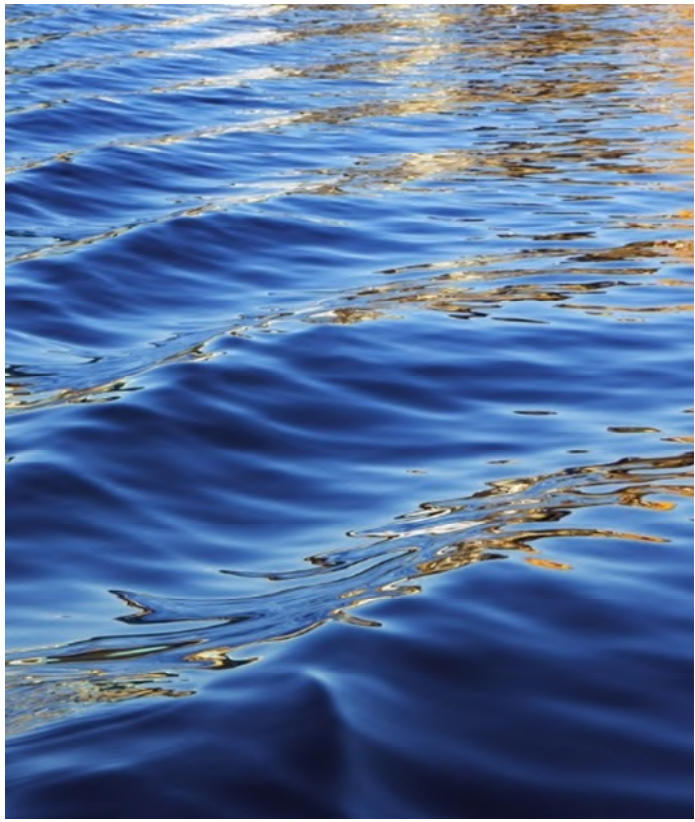
# What about aeration?
## (adding oxygen)

Oxygen keep decomposition process from going anoxic (odours)

- Only helpful if there is not enough oxygen already
- Existing ponds – electricity to power aeration systems not readily available
- If the water level is low - aeration systems struggle to be effective
- Future ponds - electricity mandatory beside the ponds

# What are the solutions?

answer = it depends



# New Ponds

## Better shoreline vegetation standards

Royalwood Ponds – SE Winnipeg

Bridgewater Estates Ponds– Vegetation Zone

# The difference shoreline vegetation makes ….

Public and private properties

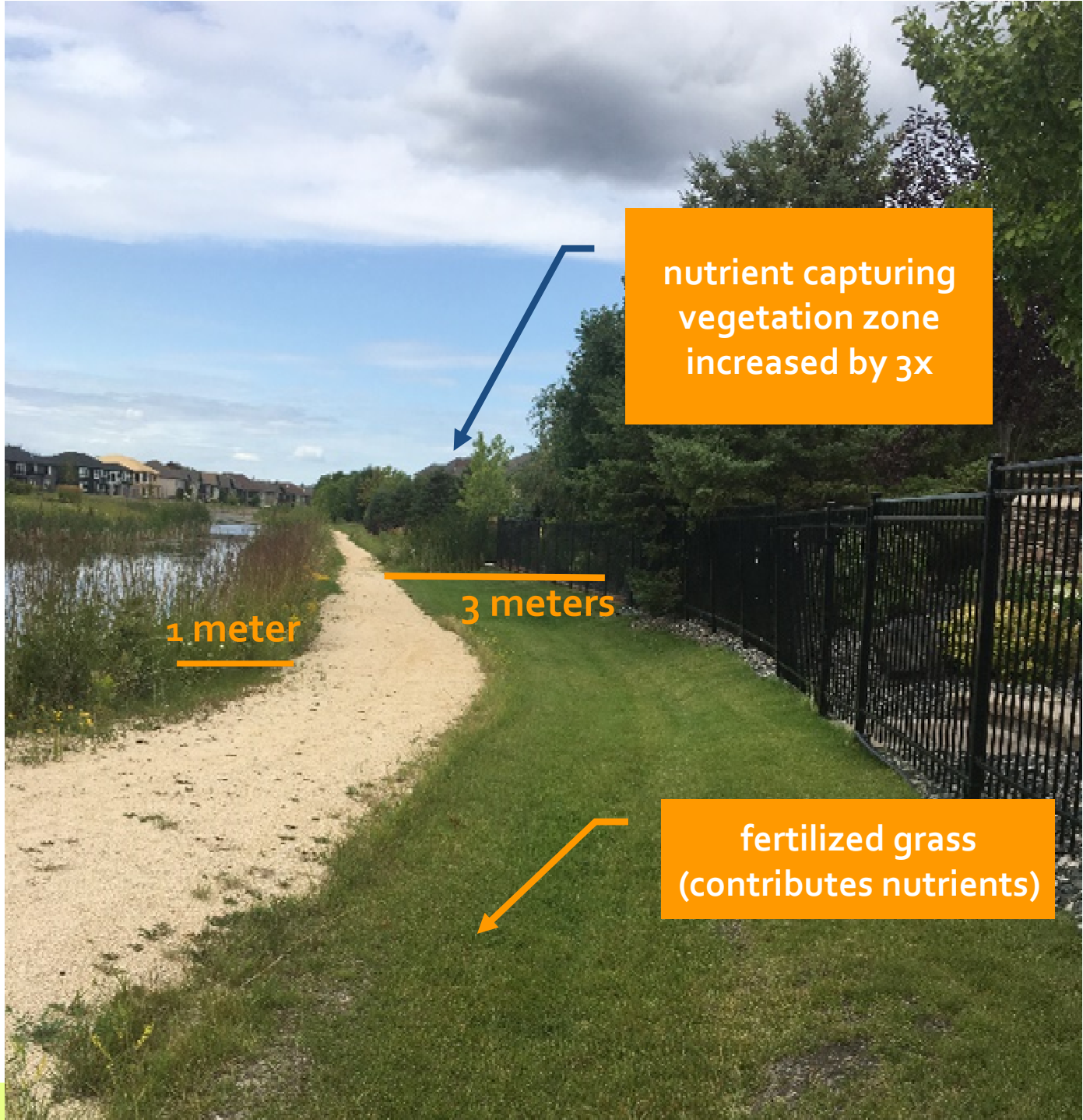
Upland grasses, cattails and other plants on the shoreline capture nutrients

# Existing Ponds

## Every meter matters….

Better choices:

- where we cut
- where we allow natural vegetation to prevail



# Existing Ponds

## Protect existing shoreline vegetation

### Water quality when nutrients not captured

Countryside East St. Paul July 2019

### Water quality when nutrients captured

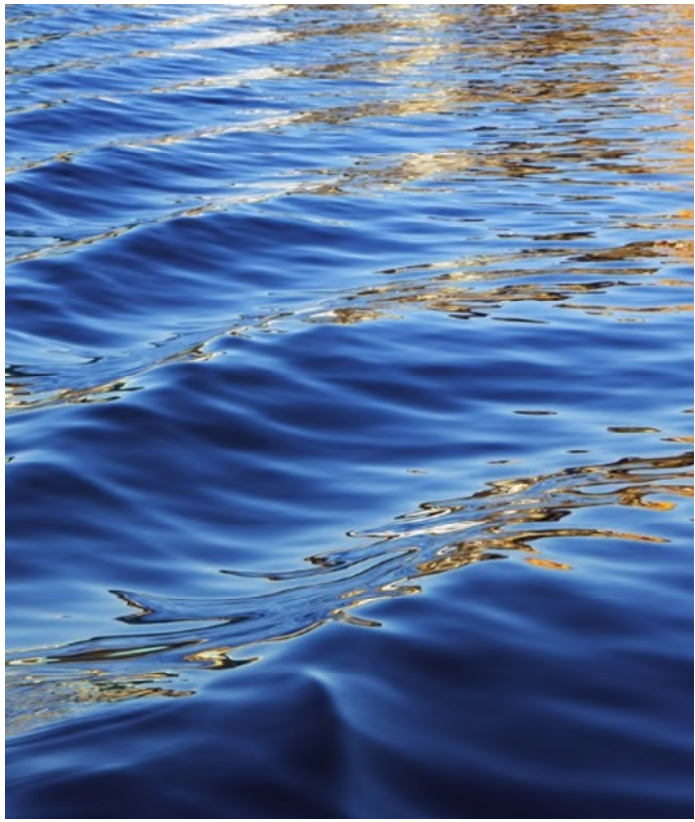
Royalwood South Winnipeg July 2019

# Fertilizers…. Are there better ways?


- Test your soil – you may already have enough.
  - Test kits are available at your local hardware store
- Use slower releasing fertilizers
  - blood meal
  - compost
- Don't fertilize to the edge of your lawn….
  - it just washes into the pond through the street drain or down the bank to the pond
- Plant native species – they don't need fertilizers

# 2019 Efforts

RM East St. Paul



# ….. 2019 efforts
# More Resources

The problems are complex and there are no simple answers:

- Hired staff to monitor and investigate
- Working with aquatic specialists
- 8 month university engineering study of Eagle Creek to start in September

# ….. 2019 efforts
# MONITORING

Understand conditions and triggers in each pond.

- Weekly testing
- Analysing results
- Monitoring trends
- Tracking pilot programs

# ….. 2019 efforts
# RESEARCH

Royalwood Ponds –Winnipeg

## Improve shoreline vegetation

- Reviewing success of other municipalities

## Mechanical removal of clump algae

- Identifying options
- Can mechanical equipment work in our shallow ponds?

## Duckweed removal study (International Institute of Sustainable Development)

- Awaiting results

## Nutrient loading from geese

- Options to make ponds less attractive to large numbers of geese

# ….. 2019 efforts
# TEST PILOTS

## Biological additives (Eagle Creek)

- natural dyes to shade the water have reduced algae growth
- results of bacteria additions unknown

- What we learned

  dye is a possible option for other ponds

  BUT Mother Nature will try to use the nutrients for something else (like duckweed)

- Future considerations

  Apply to other ponds if deemed to be beneficial

# ….. 2019 efforts
# TRIALS

## Removal of duckweed from Eagle Creek

- What we learned
  - Rate of duckweed growth outstrips ability to remove it manually
- What we are doing
  - Investigating mechanical equipment that can work in shallow ponds
- Future considerations
  - Possible harvesting of duckweed 3-5 times a year
  - Removes nutrients permanently from the pond

# The way forward

Actions by the RM will not be enough

Property owner will also need to think differently and change practices

**Together we <u>can</u> make improvements happen**