

Part 2

HOW WASTEWATER GETS CLEAN AGAIN

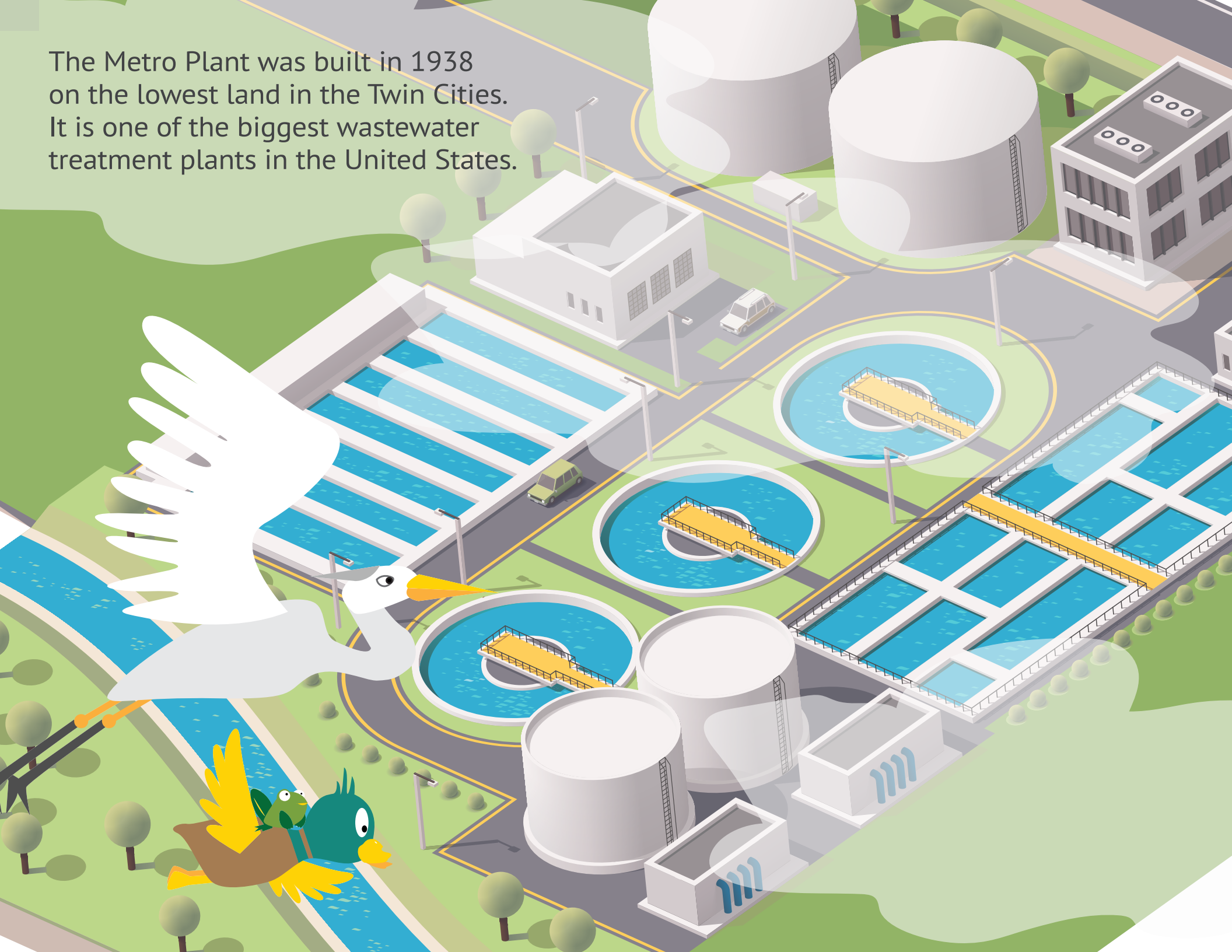




There it is!

METRO PLANT

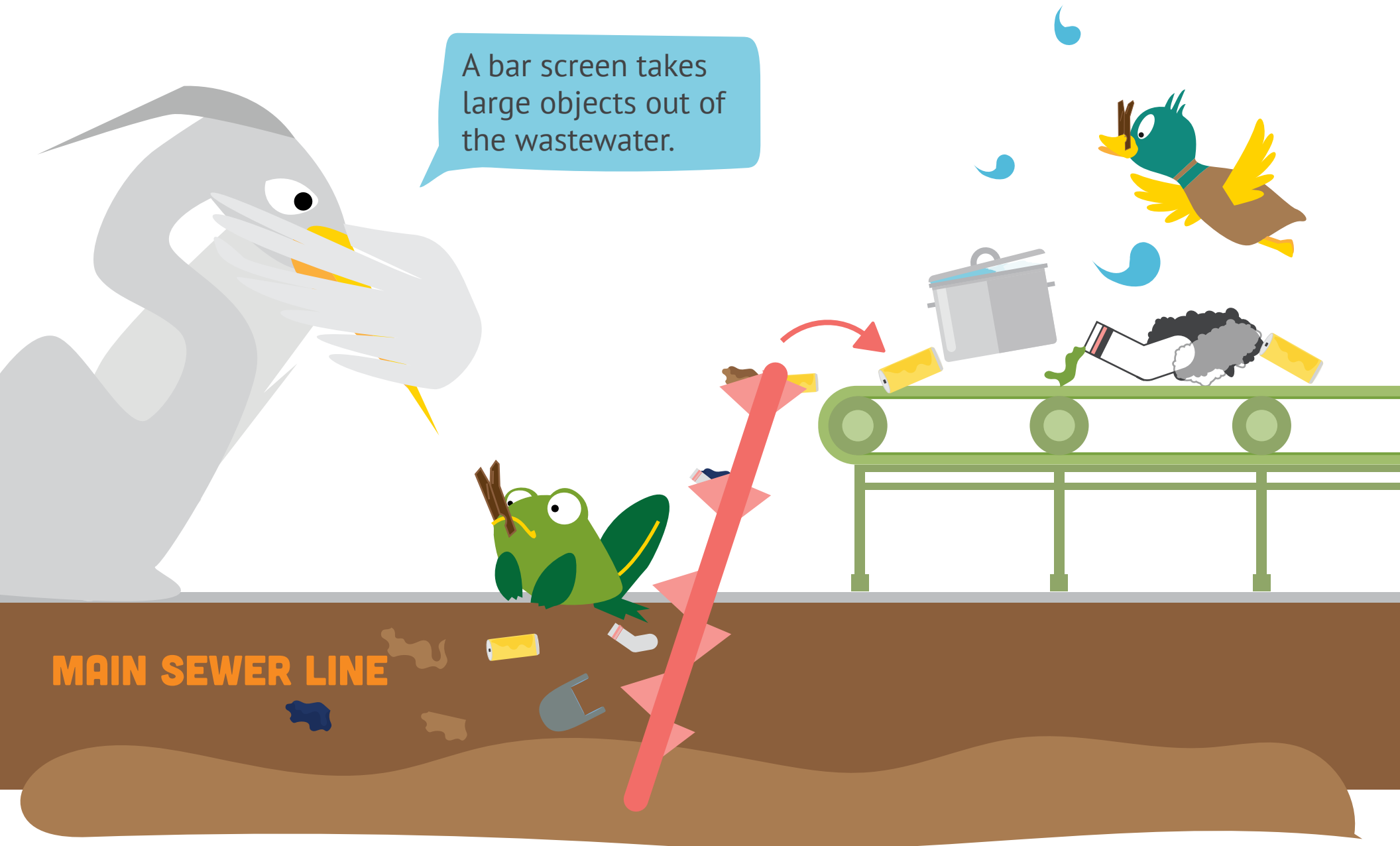
The Metro Plant was built in 1938 on the lowest land in the Twin Cities. It is one of the biggest wastewater treatment plants in the United States.



PRELIMINARY TREATMENT

Cleaning wastewater takes several steps.
We start with preliminary treatment.

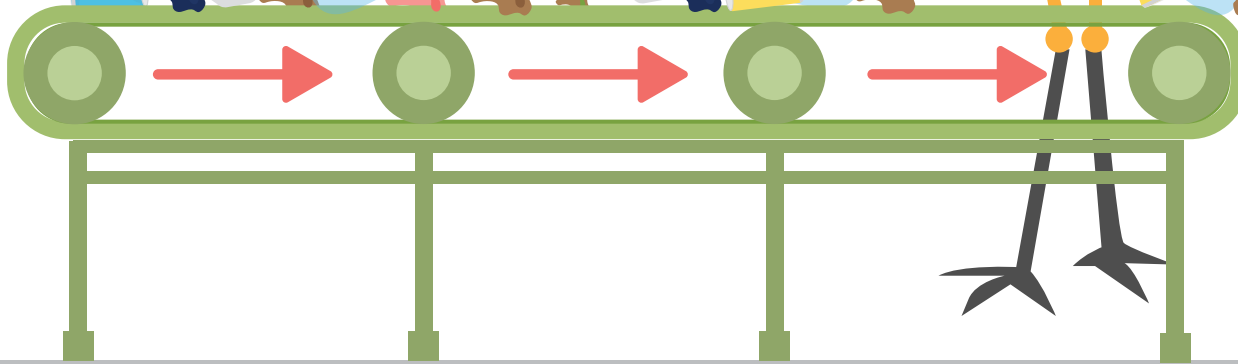
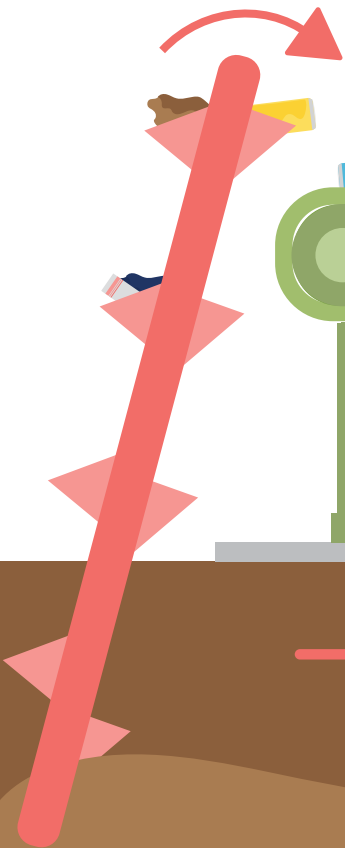
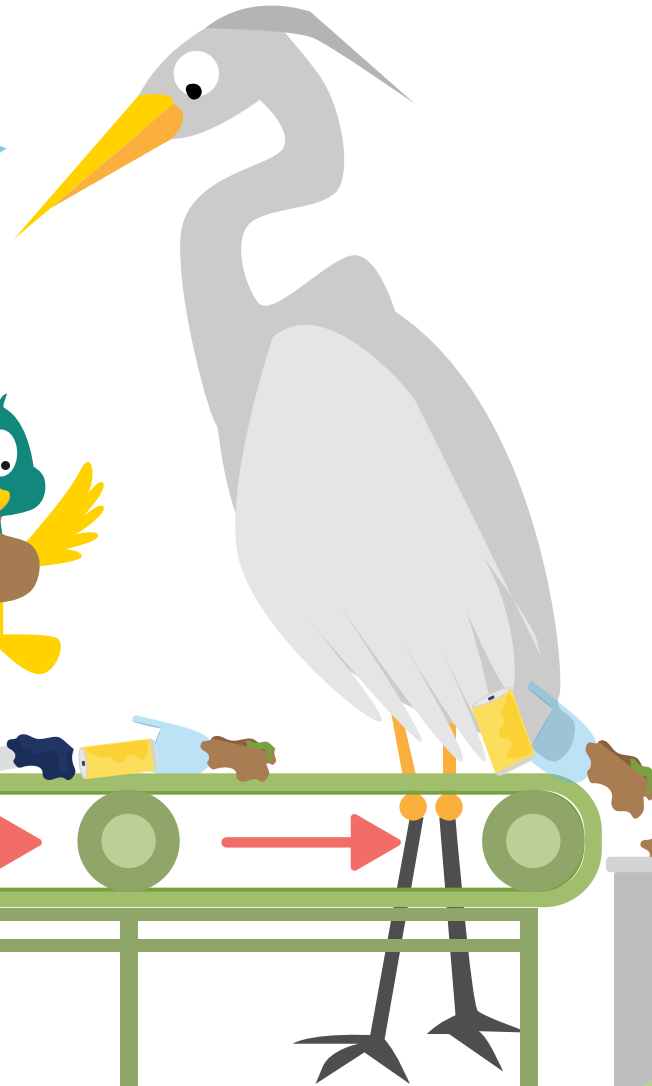
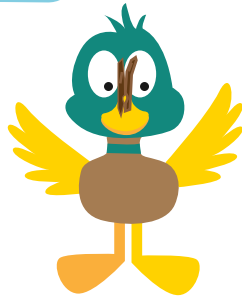
A bar screen takes large objects out of the wastewater.



MAIN SEWER LINE



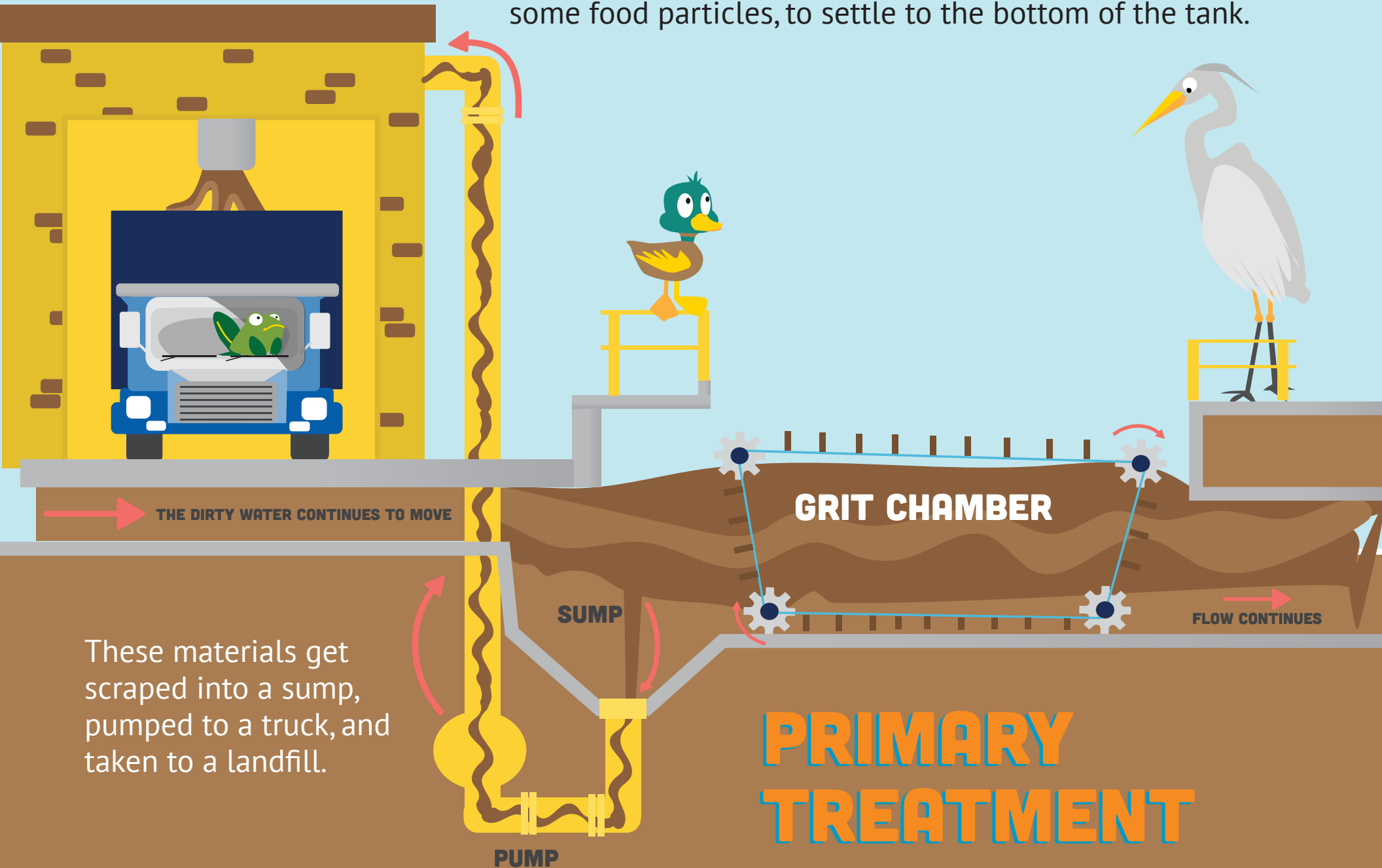
A conveyor belt moves the waste to a dumpster, which is dumped at a landfill. The dirty water continues to the next process.



TO A SAND & GRIT REMOVAL TANK



In primary treatment, the wastewater flows to a large tank called a grit chamber. In the chamber we slow down the flow. This allows the heavier materials, such as sand and gravel and some food particles, to settle to the bottom of the tank.



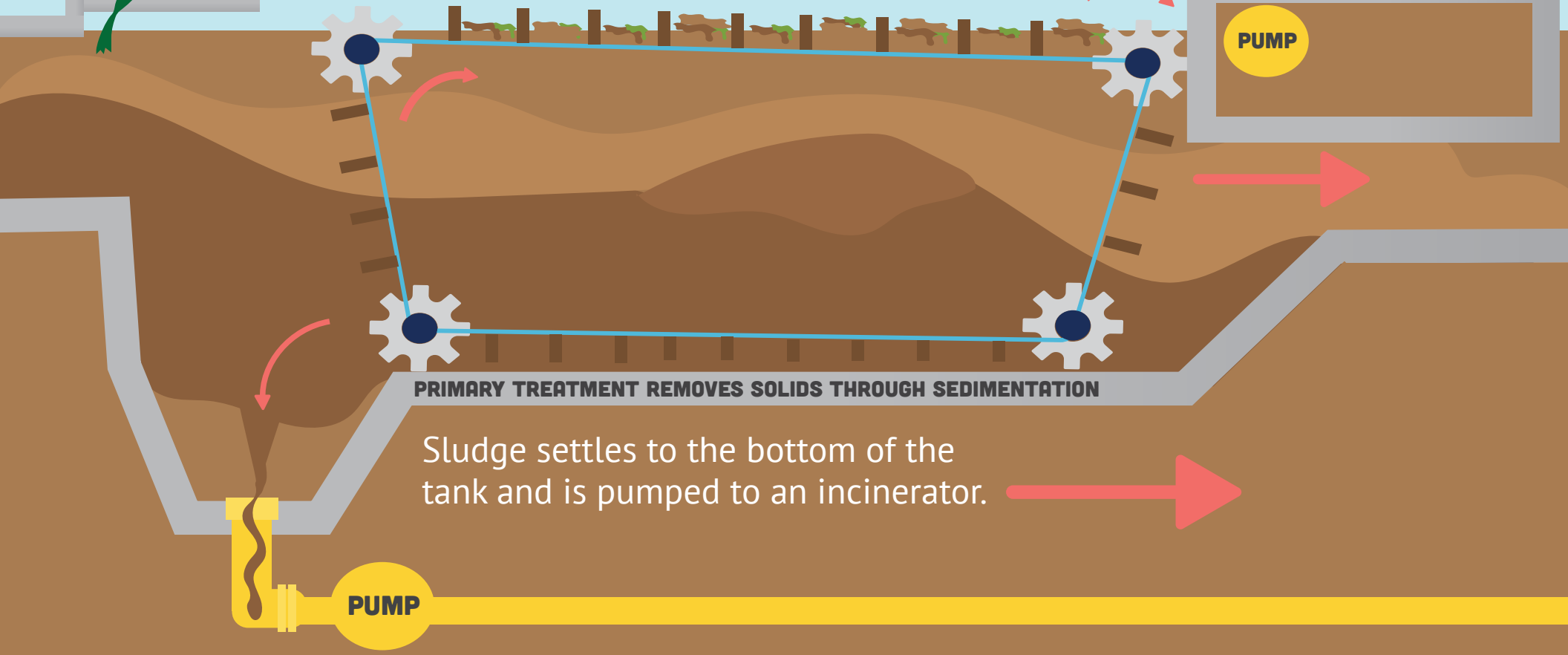
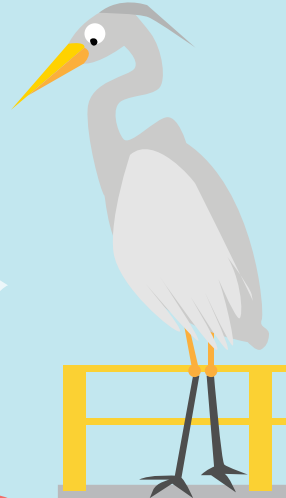
These materials get scraped into a sump, pumped to a truck, and taken to a landfill.

In the next tank, floatable solids such as grease and oil are skimmed from the top and pumped for disposal in a landfill.



Is the water clean now?

No, Anati, but about half the pollutants have been removed.



PRIMARY TREATMENT REMOVES SOLIDS THROUGH SEDIMENTATION

Sludge settles to the bottom of the tank and is pumped to an incinerator.

PUMP

PUMP

The sludge is pumped to a centrifuge, which removes water so we can burn the solids. The dried sludge is called “cake.”



Solids Management

The cake is burned in a huge incinerator, four stories high, at 1,375 degrees Fahrenheit. We landfill the remaining ash. We recover energy from steam produced in the process and clean the air emissions.

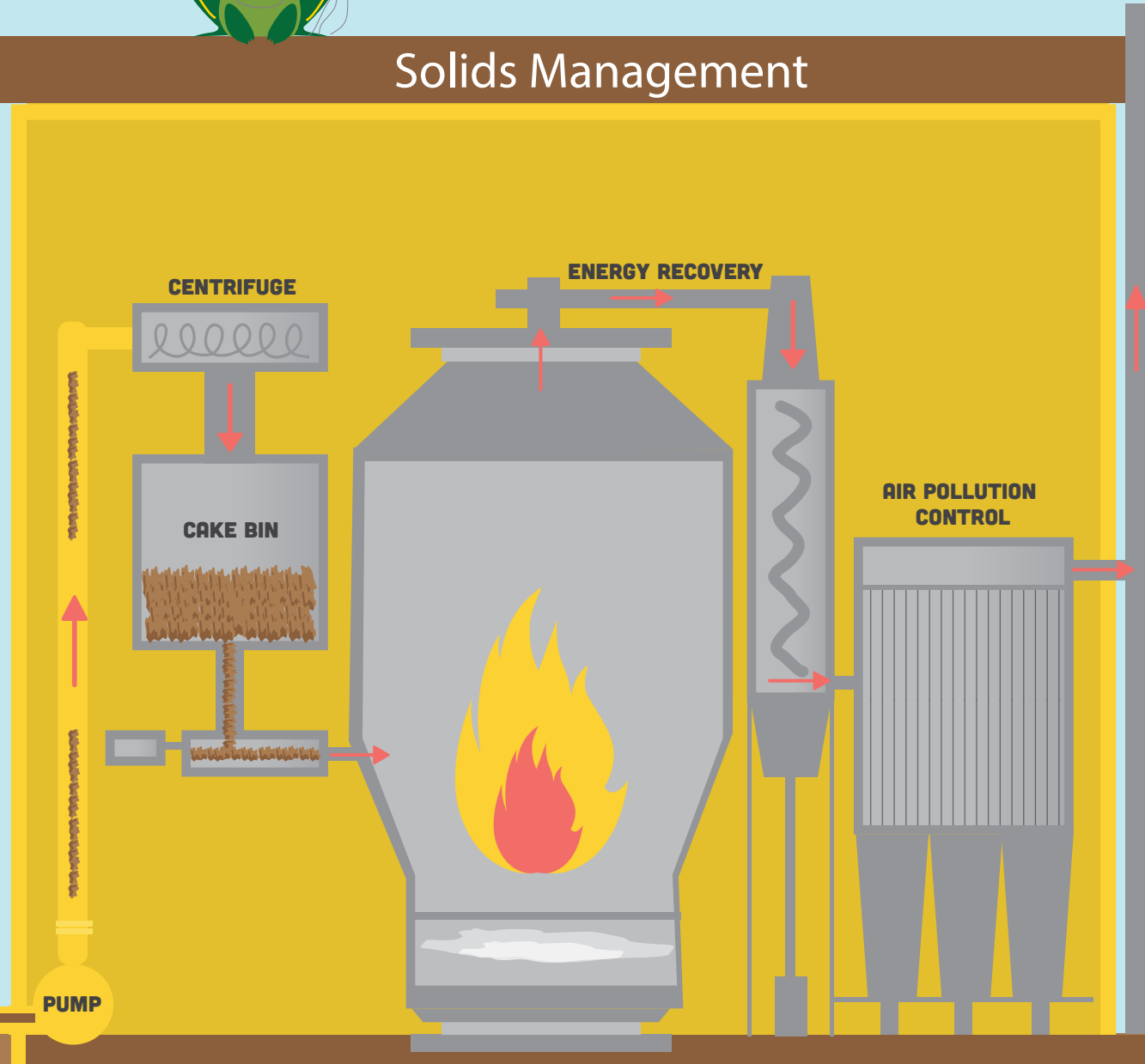


Don't give me any of that cake for my birthday!

SLUDGE

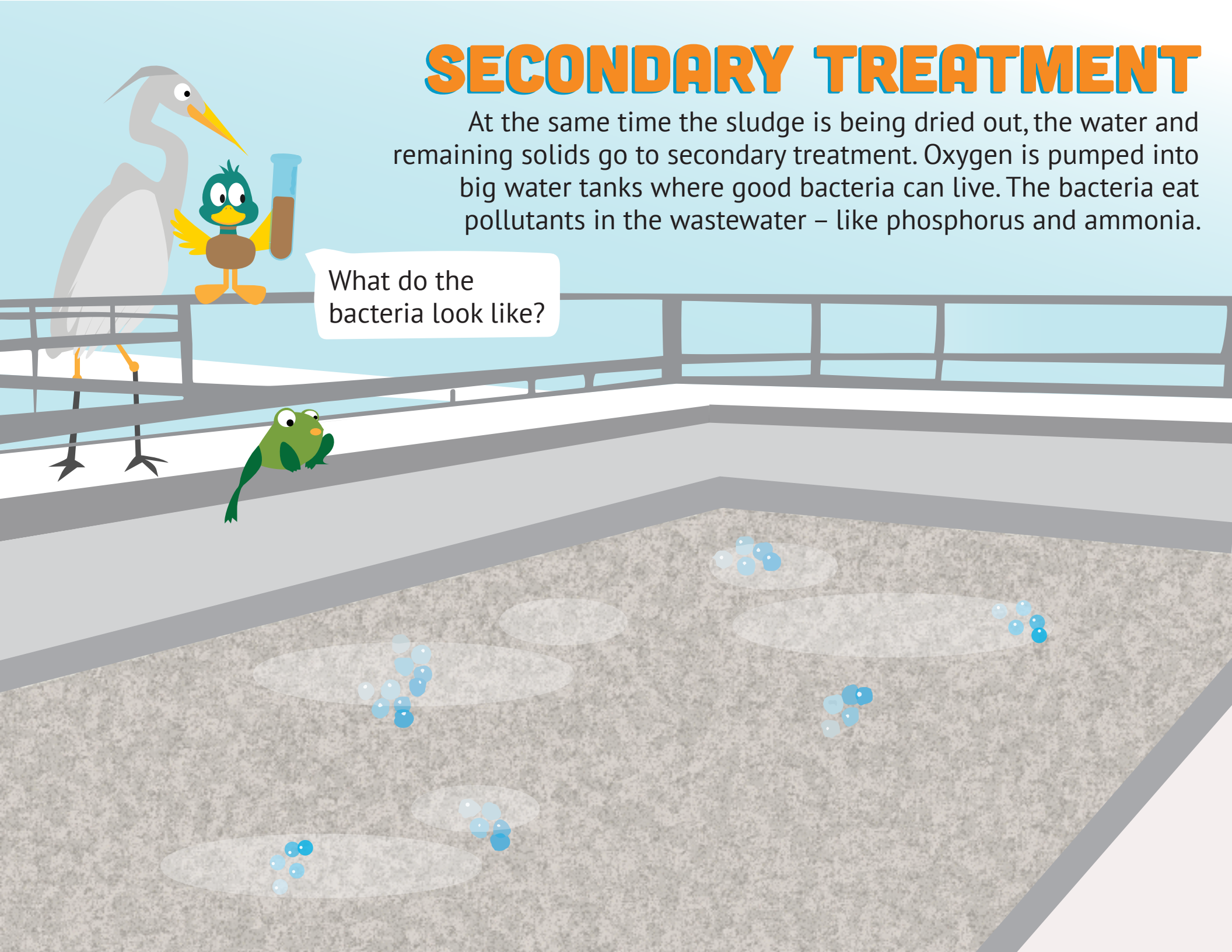


PUMP

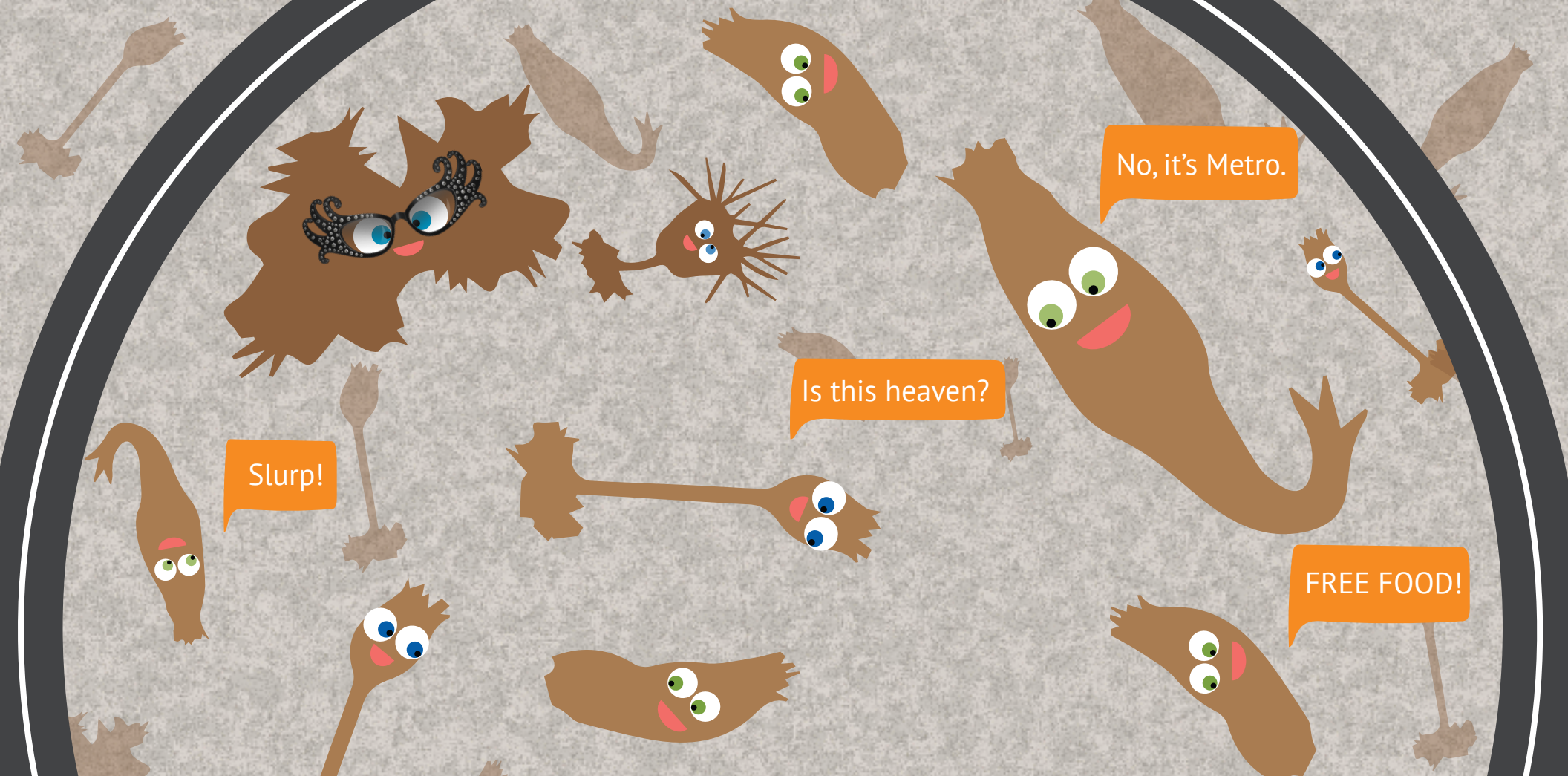


SECONDARY TREATMENT

At the same time the sludge is being dried out, the water and remaining solids go to secondary treatment. Oxygen is pumped into big water tanks where good bacteria can live. The bacteria eat pollutants in the wastewater – like phosphorus and ammonia.



What do the bacteria look like?



Slurp!

Is this heaven?

No, it's Metro.

FREE FOOD!

These are some of the bugs used in secondary treatment.



Protozoa: Vorticella



Protozoa: Paramecium



Protozoa: Tokophrya



Activated Sludge Floc

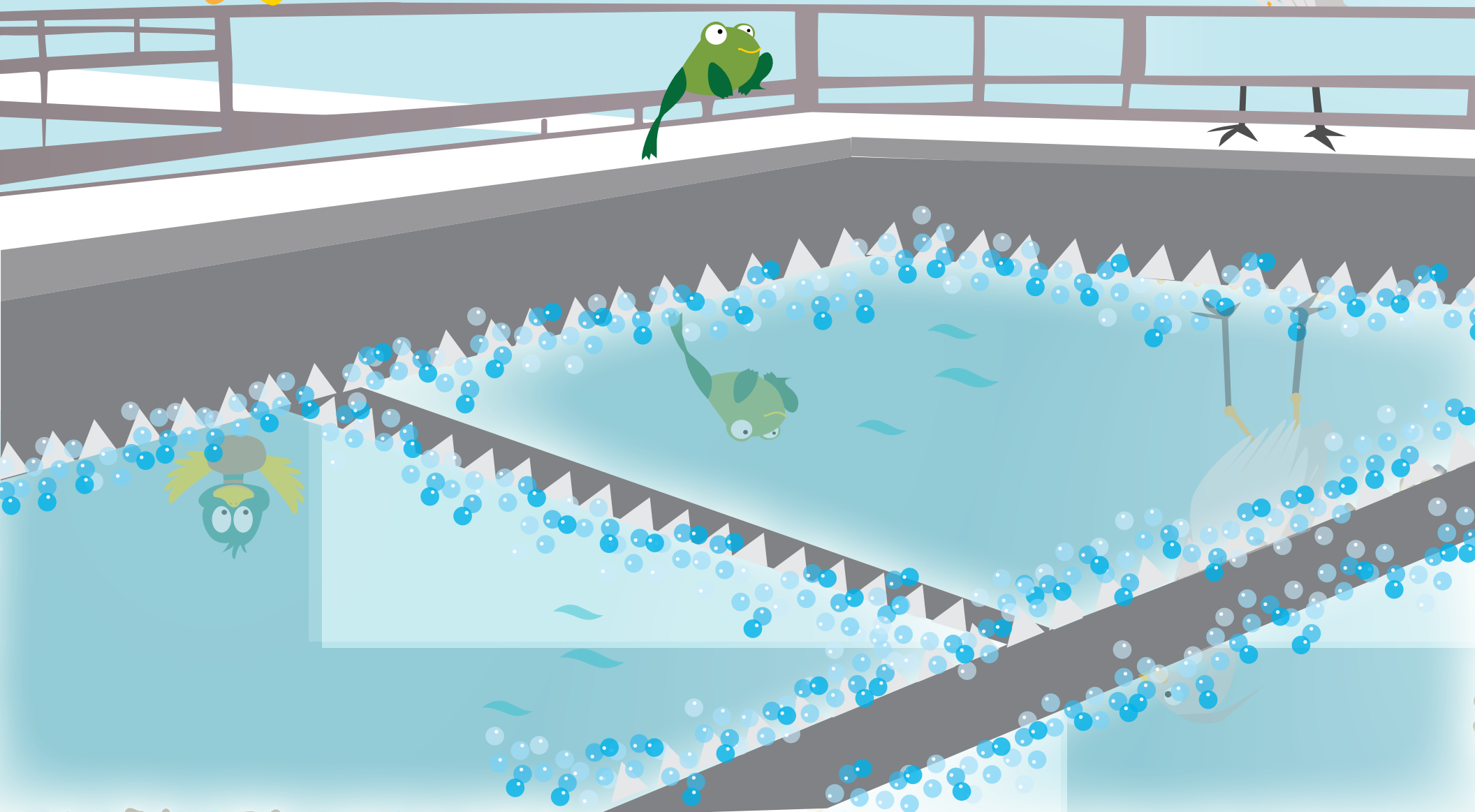
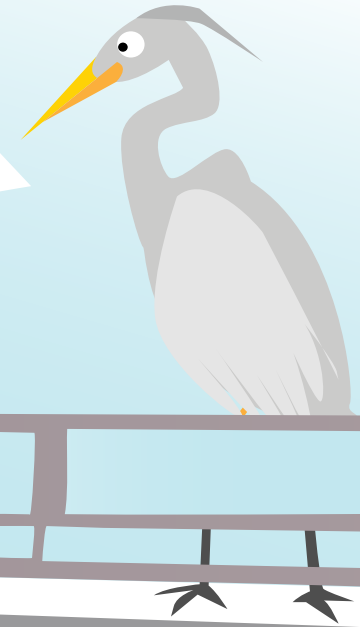


Rotifer: Philodina

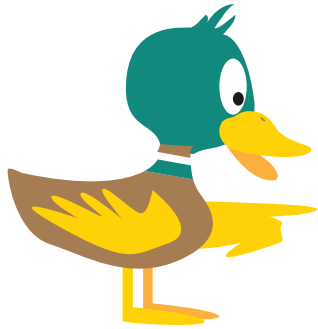
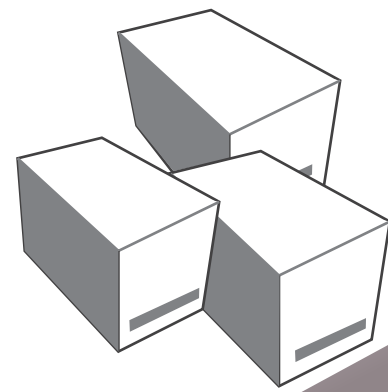
In final settling, any remaining solids sink to the bottom and are pumped to the incinerator. The water flows to the chlorine contact channel.

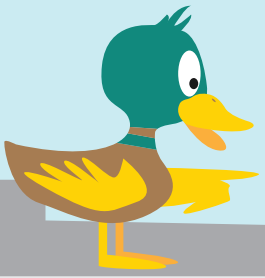


What's happening here?



Now we add chlorine to kill any remaining disease-causing organisms and to clarify the water.






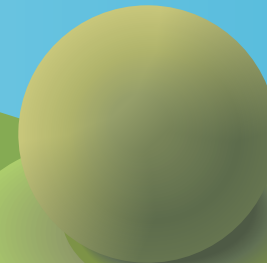
It looks beautiful!
Can I swim in it?



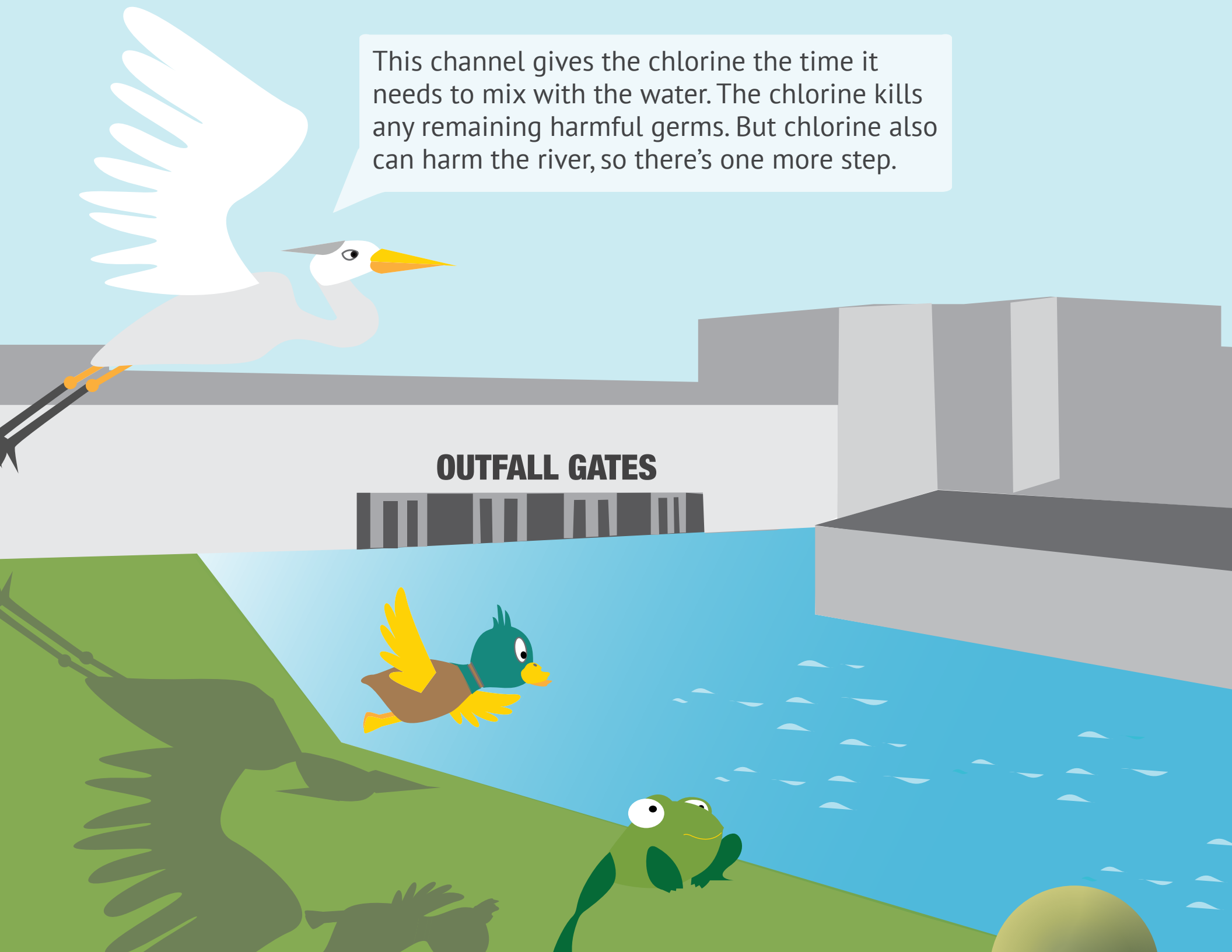
OUTFALL GATES



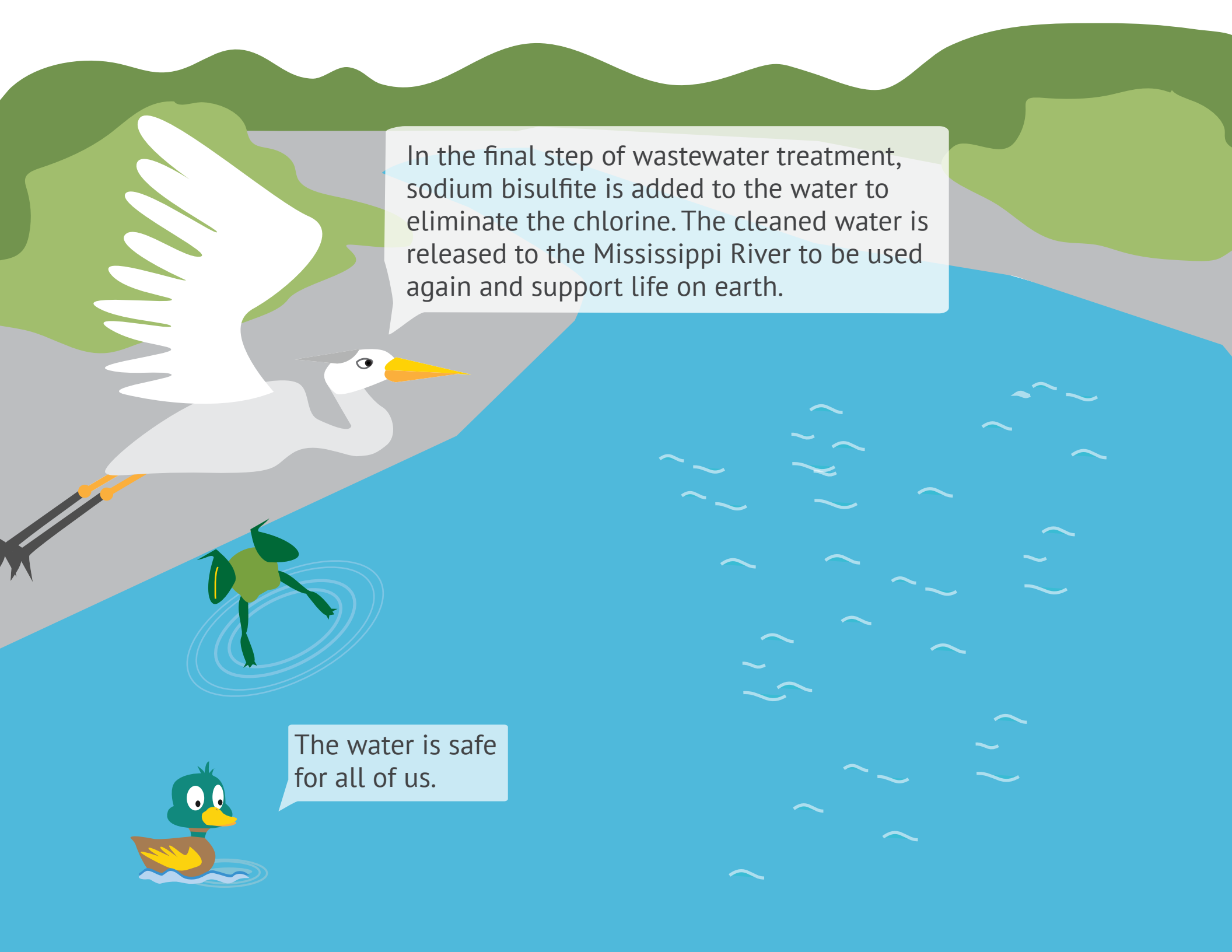
Not yet, Anati. These are the gates that control the flow of the cleaned water being channeled to the Mississippi River.



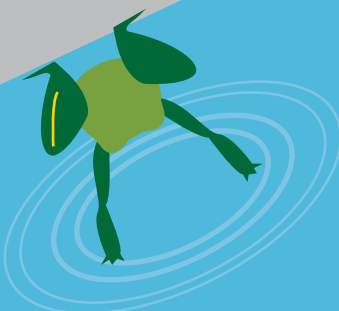
This channel gives the chlorine the time it needs to mix with the water. The chlorine kills any remaining harmful germs. But chlorine also can harm the river, so there's one more step.




OUTFALL GATES

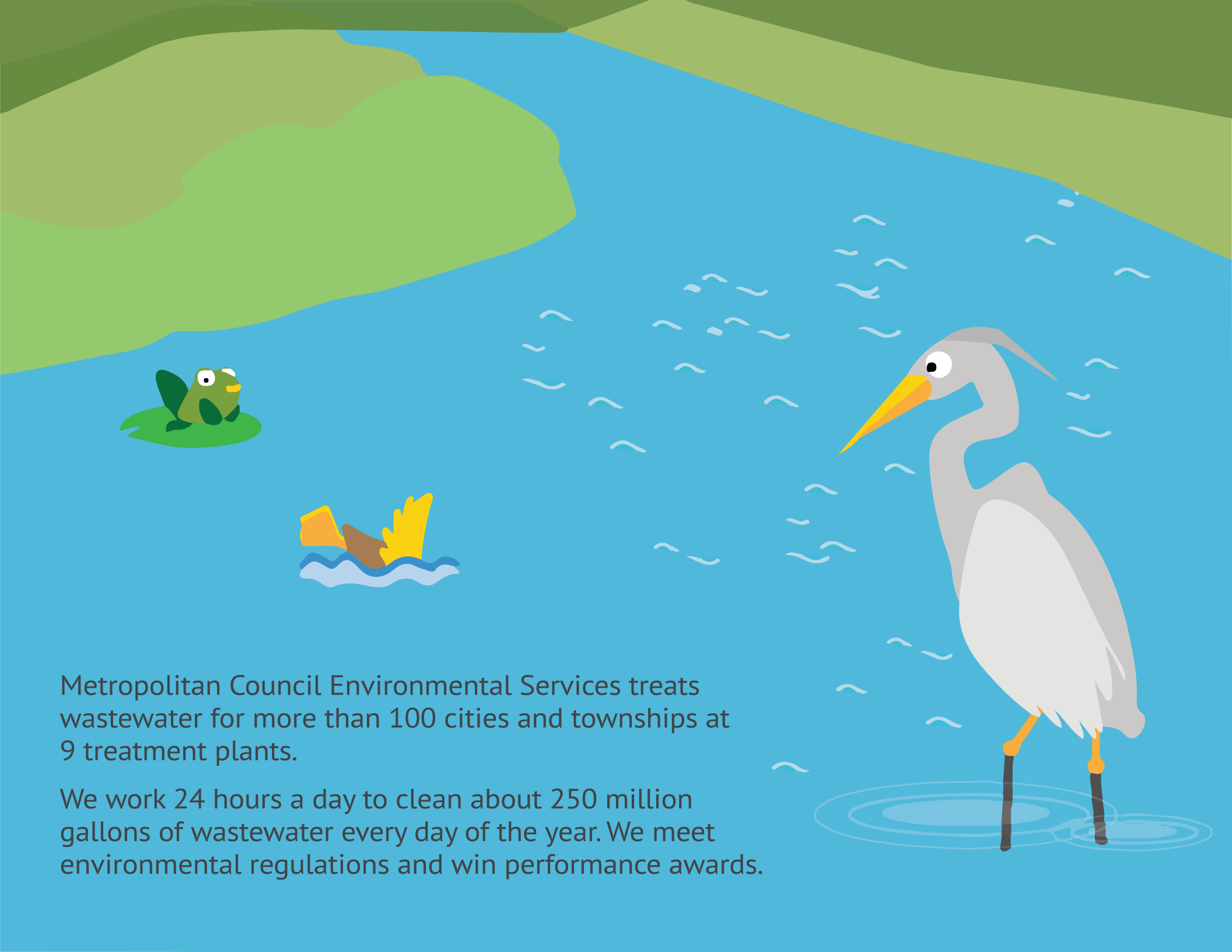


In the final step of wastewater treatment, sodium bisulfite is added to the water to eliminate the chlorine. The cleaned water is released to the Mississippi River to be used again and support life on earth.



The water is safe for all of us.





Metropolitan Council Environmental Services treats wastewater for more than 100 cities and townships at 9 treatment plants.

We work 24 hours a day to clean about 250 million gallons of wastewater every day of the year. We meet environmental regulations and win performance awards.

That's the end of our tour. Help keep treatment plants and pipes working by not putting things in the toilet that don't belong there. A wipe may be called "flushable," but it's not. DON'T put wipes, dental floss, paper towels, cat litter, and other materials in the toilet. If it CAN go in the garbage, it SHOULD go in the garbage.

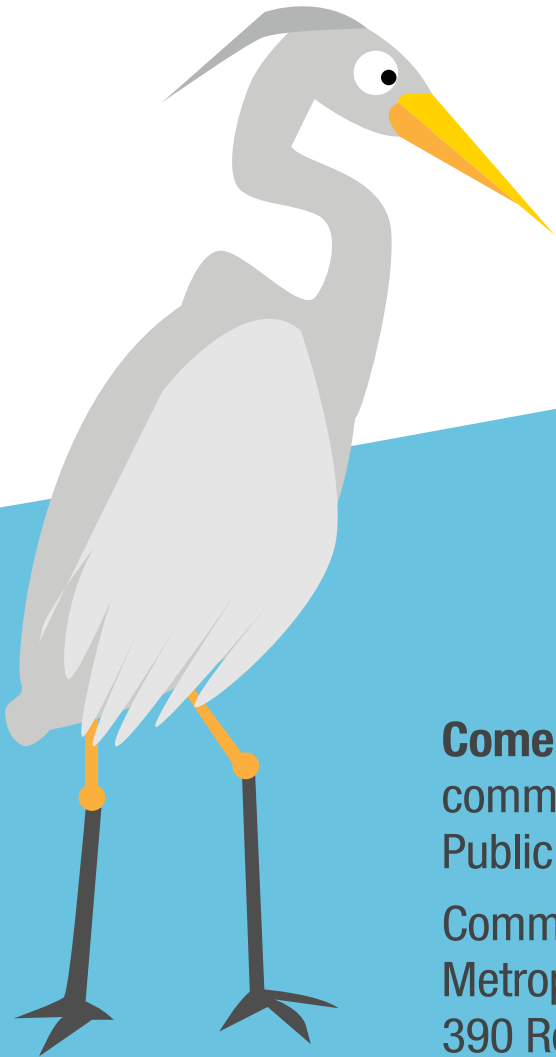


To learn more about water

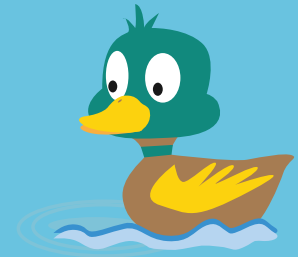
Visit <https://metro council.org/Wastewater-Water.aspx>

THANK YOU!

Bye! Thanks to all the people who work to protect public health and the environment.



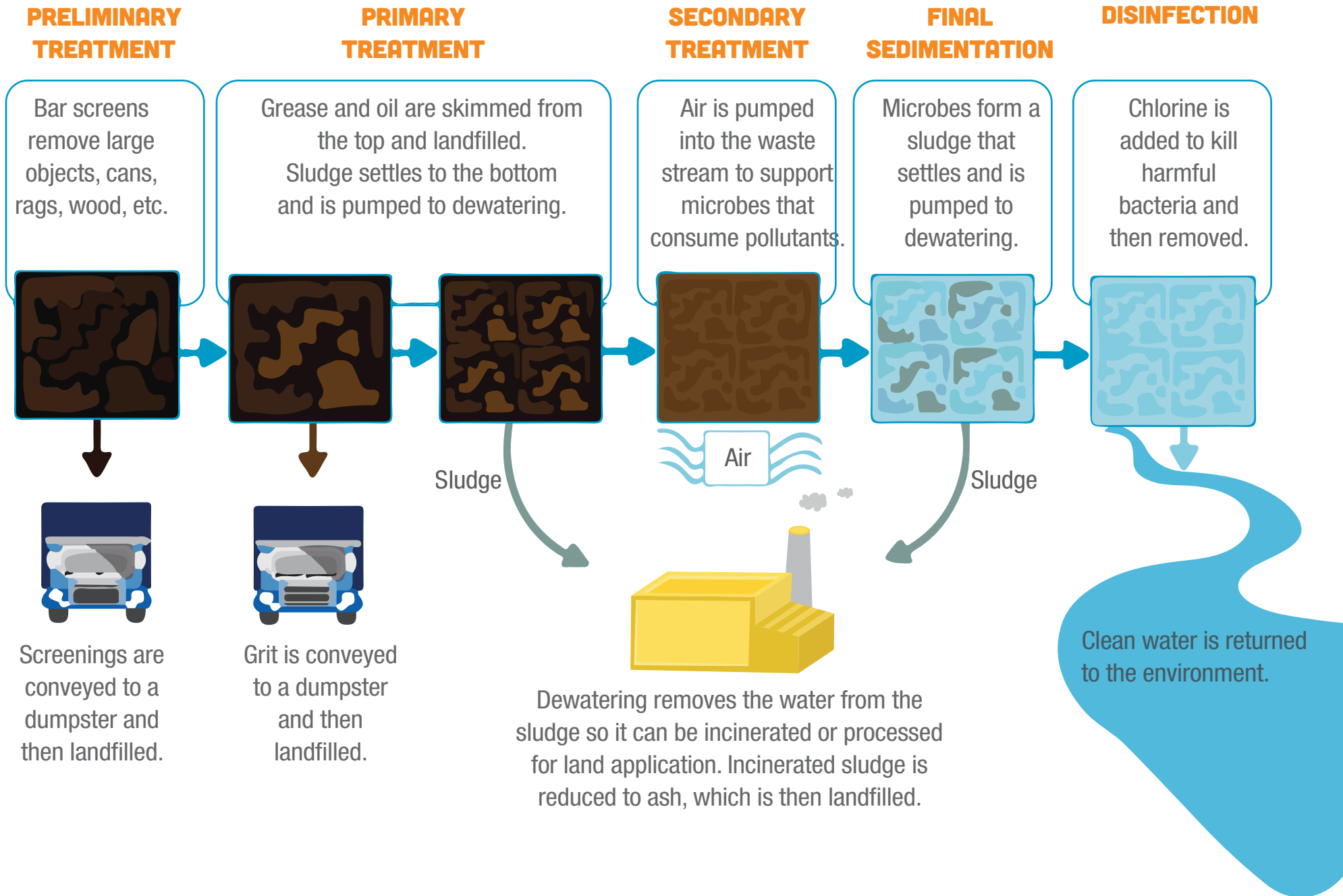
You are our heroes!



Come back anytime! We'd love to hear from you. Send us your comments or questions, or request a treatment plant tour, at PublicInfo@metc.state.mn.us or by snail mail:

Communications
Metropolitan Council
390 Robert Street N., Saint Paul, MN 55101

WASTEWATER TREATMENT MADE EASY



GLOSSARY

- ATMOSPHERE:** The envelope of gases surrounding the Earth; air.
- BAR SCREEN:** A mechanical device used for separating objects from the wastewater stream.
- CONVEYOR:** A mechanical device used for carrying objects away from a source.
- DEWATERING:** The removal of water from a particular substance.
- DUMPSTER:** A large container that holds trash.
- EFFLUENT:** The outflow or discharge of clean water from a wastewater treatment plant.
- EVAPORATION:** The process of turning from liquid into vapor (suspended in air).
- FILTRATION:** A process used for the removal of one substance from another, as in solid material from water.
- GRAVITY FLOW:** A process which uses the Earth's gravitational pull to move material (wastewater).
- INCINERATION:** To consume by burning up.
- INFLUENT:** Something that flows in or into.
- LANDFILL:** An area of land where trash and waste material is dumped and buried.
- POLLUTANT:** A waste material that dirties air, soil, or water.
- PRECIOUS:** Of great worth, valuable.
- PRECIPITATION:** Rain, snow, sleet, or hail that falls to the ground.
- SEDIMENTATION:** The process where solid materials settle to the bottom of a liquid.
- TWIN CITIES AREA:** The seven counties that include the cities of Saint Paul and Minneapolis, Minnesota, USA.
- WASTEWATER:** Water that has been used in a home, a business, or as part of an industrial process.

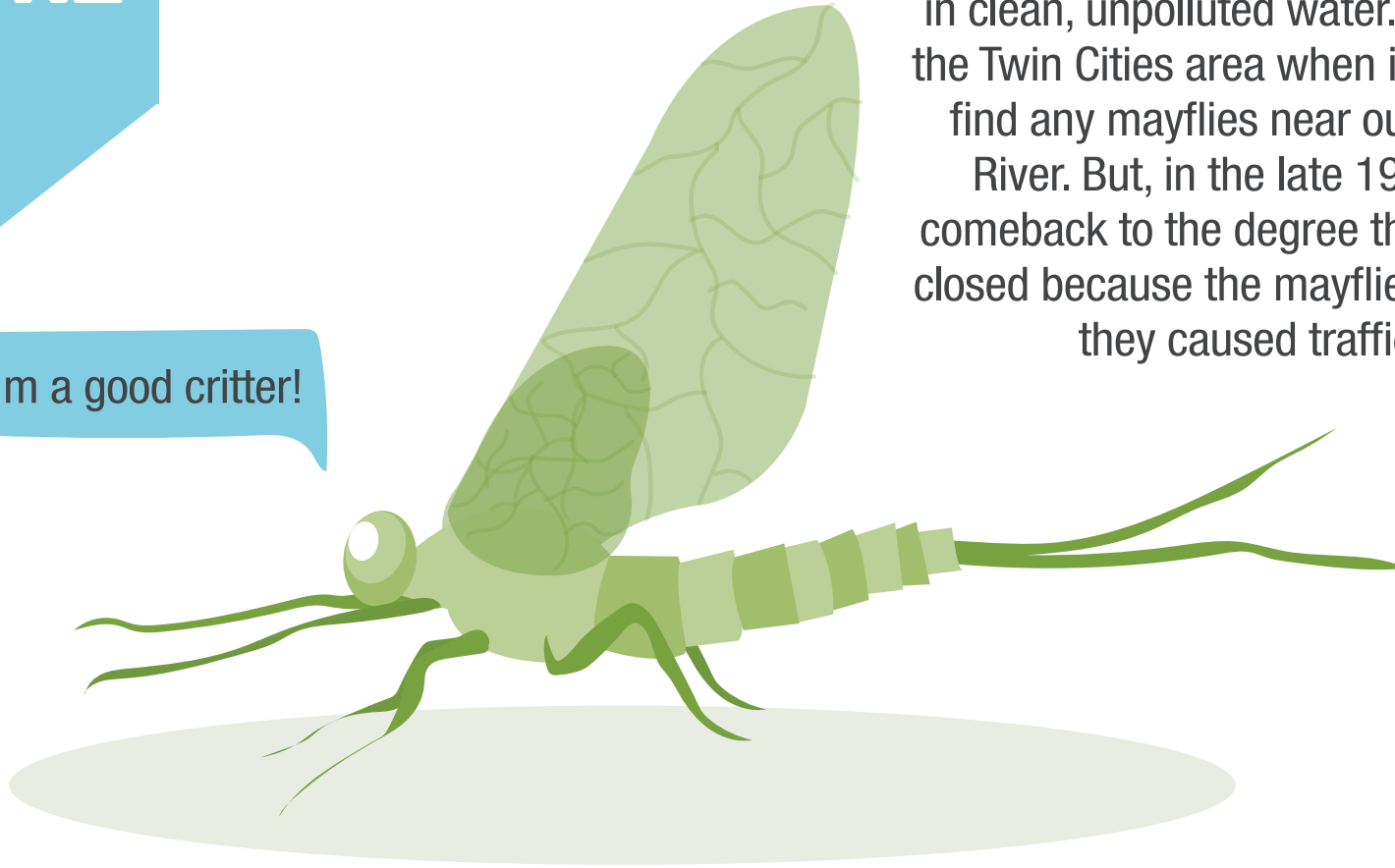


MORE

MAYFLY

Mayflies are short-lived insects that only hatch in clean, unpolluted water. There was a time in the Twin Cities area when it was very difficult to find any mayflies near our great Mississippi River. But, in the late 1980s, they made a comeback to the degree that bridges had to be closed because the mayflies were so numerous they caused traffic accidents.

I'm a good critter!



Water Quality Timeline:

1929 - Sewage mats float on Mississippi River; only three fish found in river survey.

1938 - Metropolitan Wastewater Treatment Plant opens.

1972 - Dozens of small wastewater treatment plants closed; regional system put into place.

1980s: Secondary wastewater treatment added to Metro Plant; mayflies return to river.

1990s: Biological phosphorus removal reduces phosphorus coming from plant by 92%.