Human Impact

INVEST IN OUR PLANET

Essential Question

What impact do we have on our environment in Tucson Arizona?

Objectives: Students will analyze data to determine how Tucson's population has changed since 1910.
Students will evaluate textual evidence to describe a chain of reasoning that includes ideas that:

- Increase human population leads to greater consumption of natural resources.
- Scarcity of natural resources limits human activity.
- Strategies can help address the effects of population growth on the consumption of natural resources.

You can use this table of contents.

Tucson and the population.

Get thinking...

How many people do you think lives in Tucson?

Did you know?

- People have been in Tucson for 12,000 years. Making it the oldest settlement continuously inhabited in North America.
- The largest city on the continent that is solely reliant on groundwater.

And this is a timeline.

1910 Tucson is the largest city in AZ

1920 Tucson population is 14,000 people

1930 end of irrigation farming along the Santa Cruz and Rillito Rivers

1940 increased pumping from the groundwater due to the increase in population to 35,000

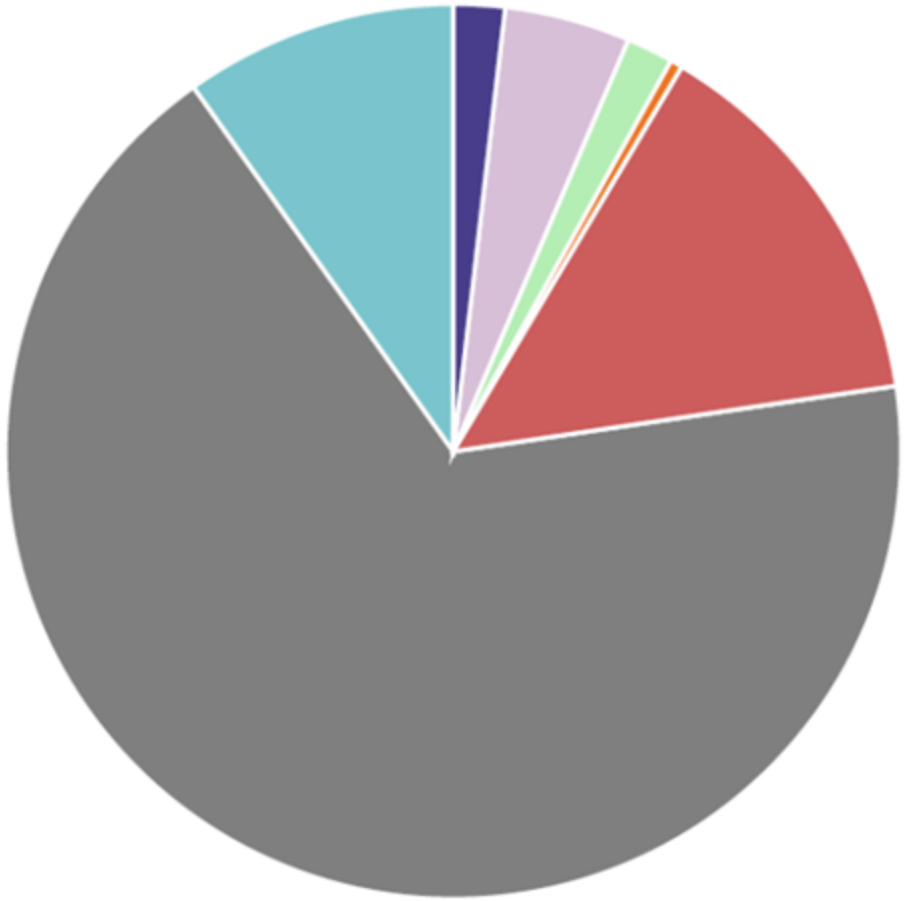
1950 Tremendous growth in population. Went from 55,000 to 213,000 people.

1960 Raytheon build their facility. Comfort in Tucson like air conditioning.

1980 groundwater decreased by 200 feet taking water from riparian areas.

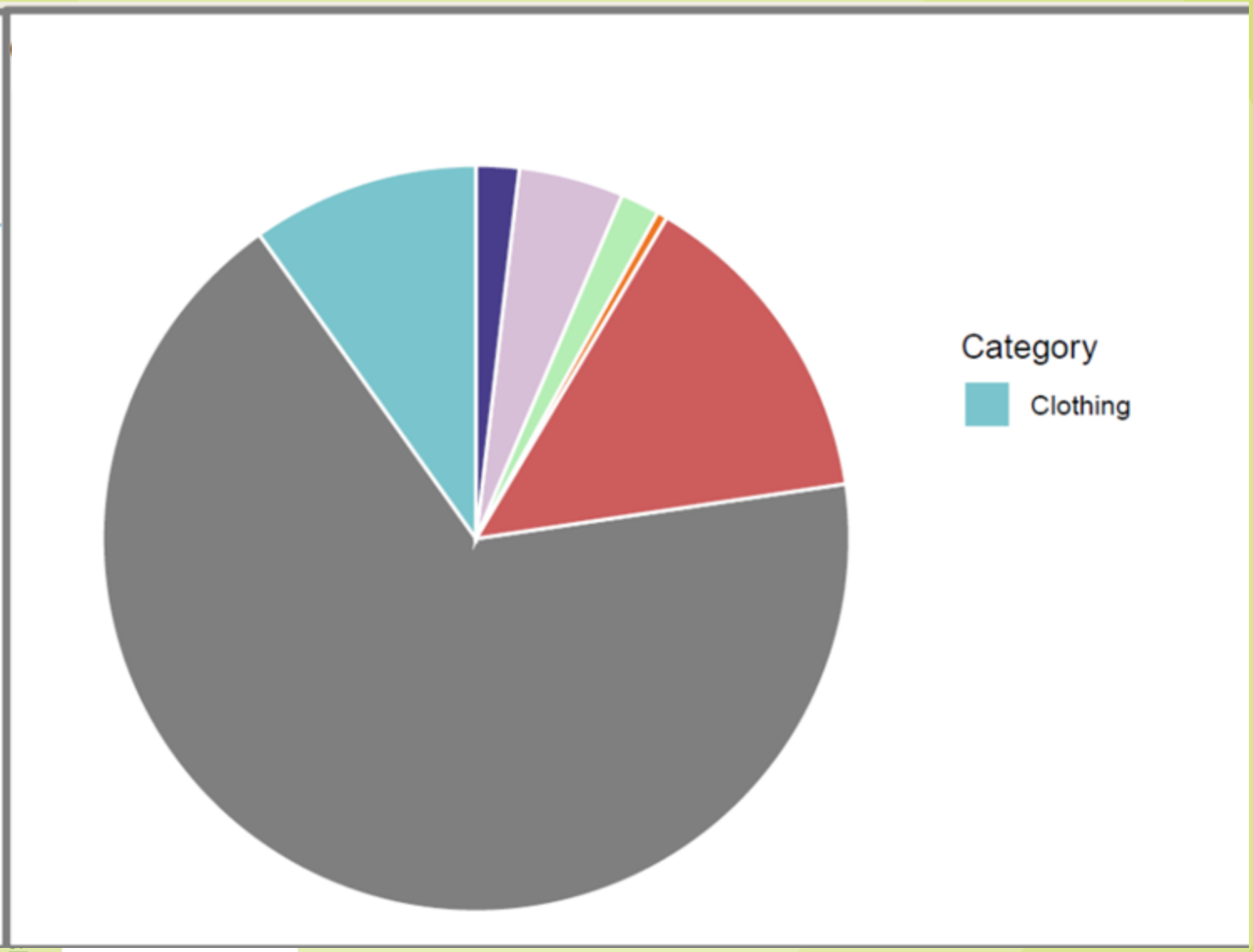
2010 population of 520,000 people

2023 Tucson population 1,080,300 with an average growth rate of 0.2% to 1.3%



What do you notice or wonder about this graph?

Write at least three things you notice and three things you wonder in your notebook.



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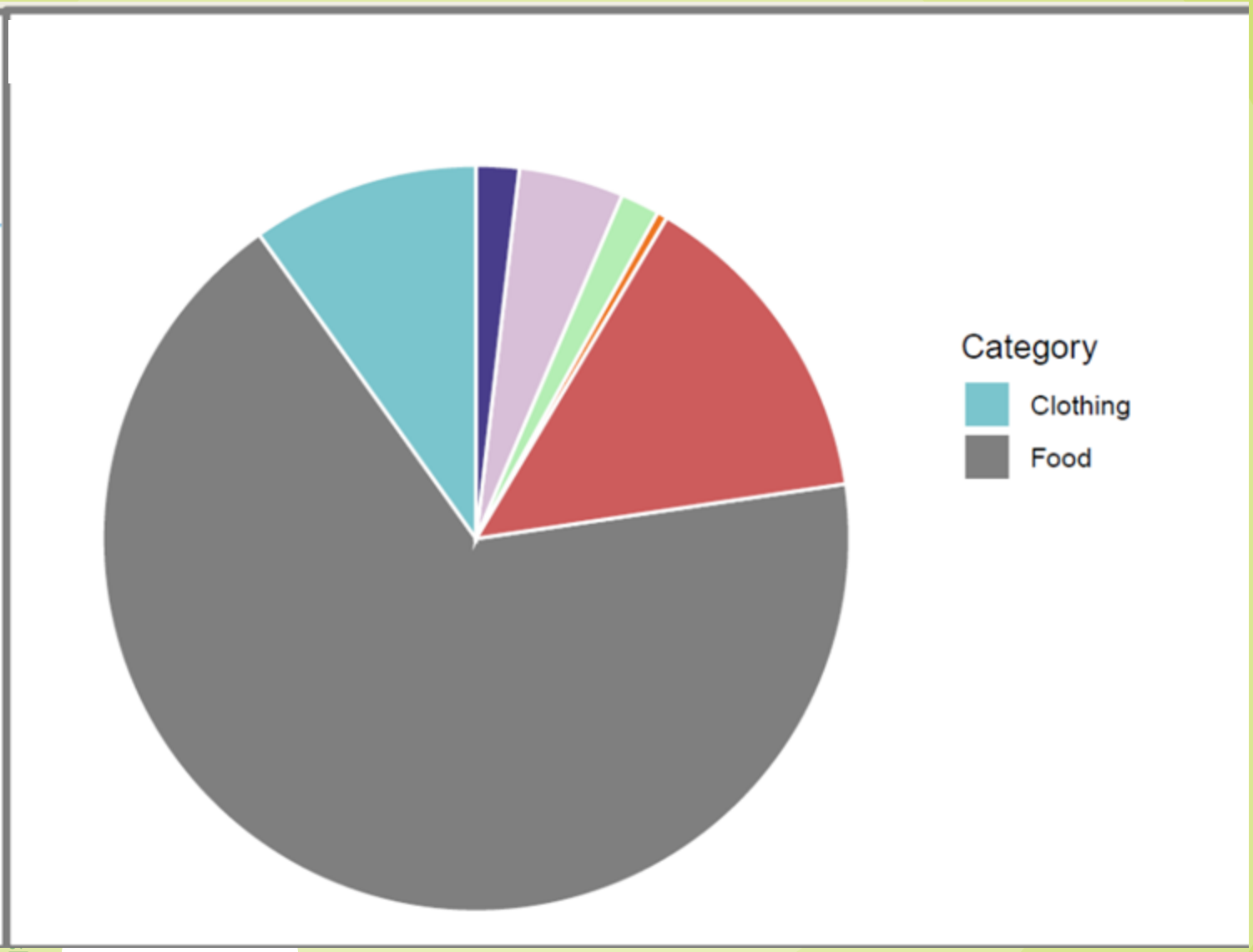

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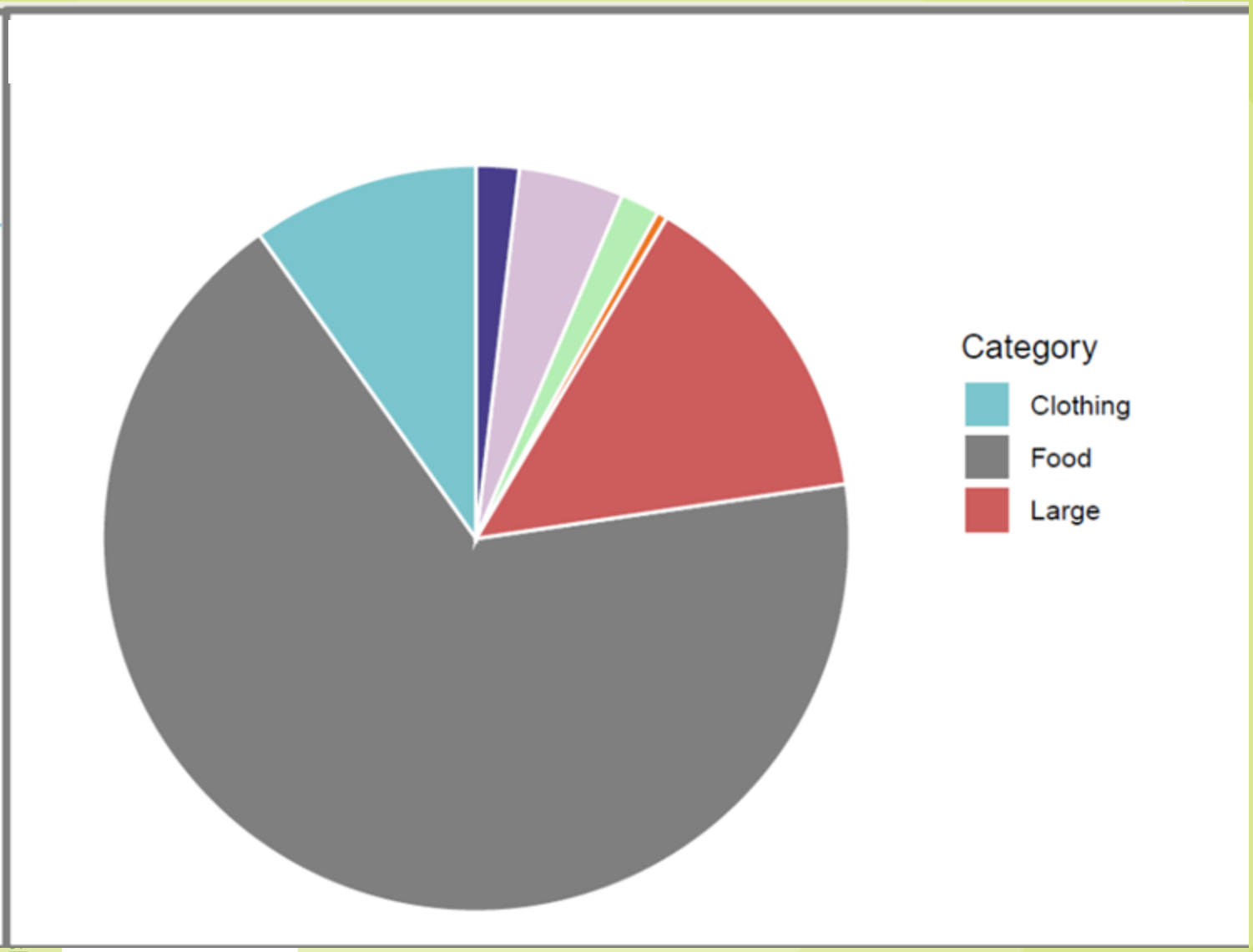

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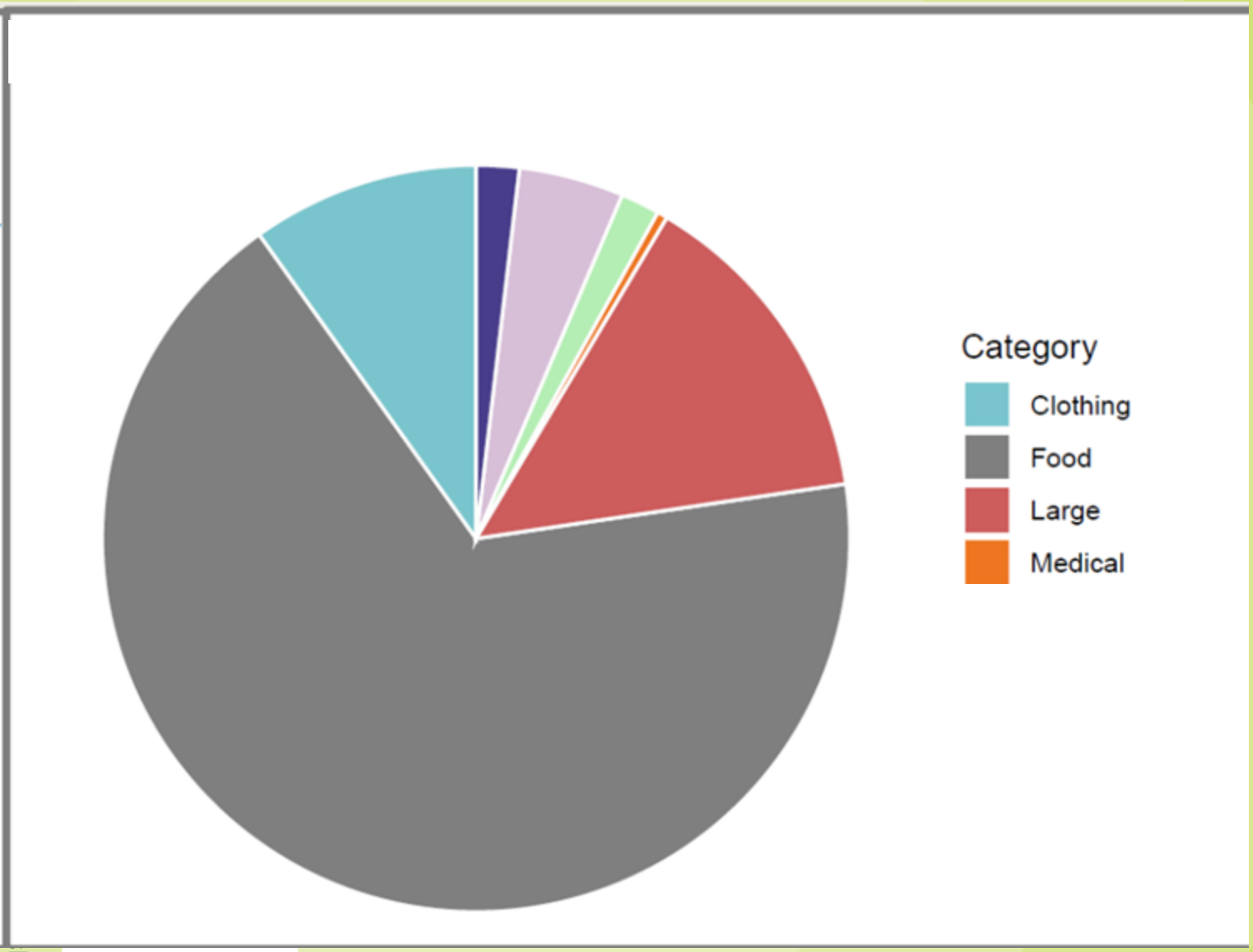

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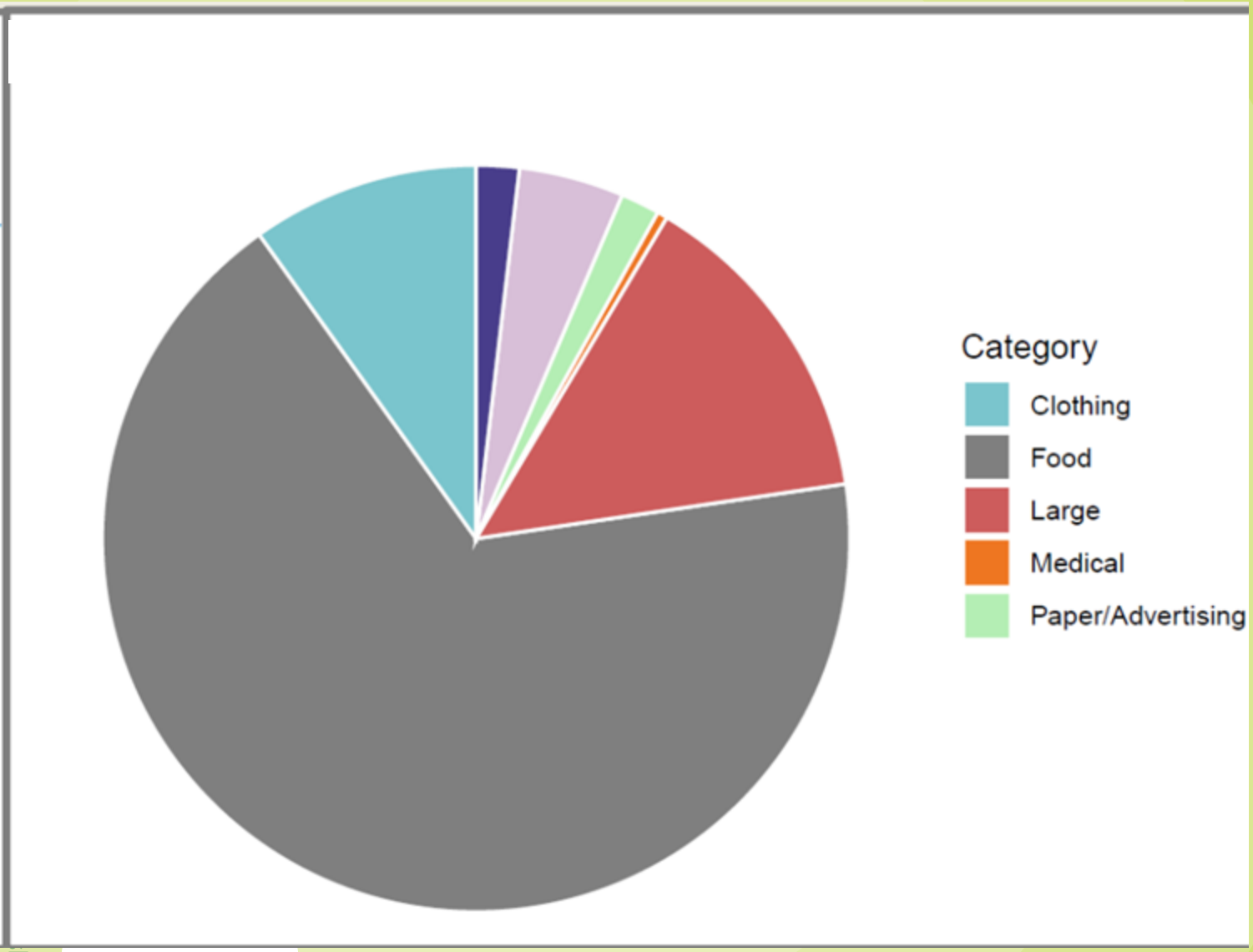

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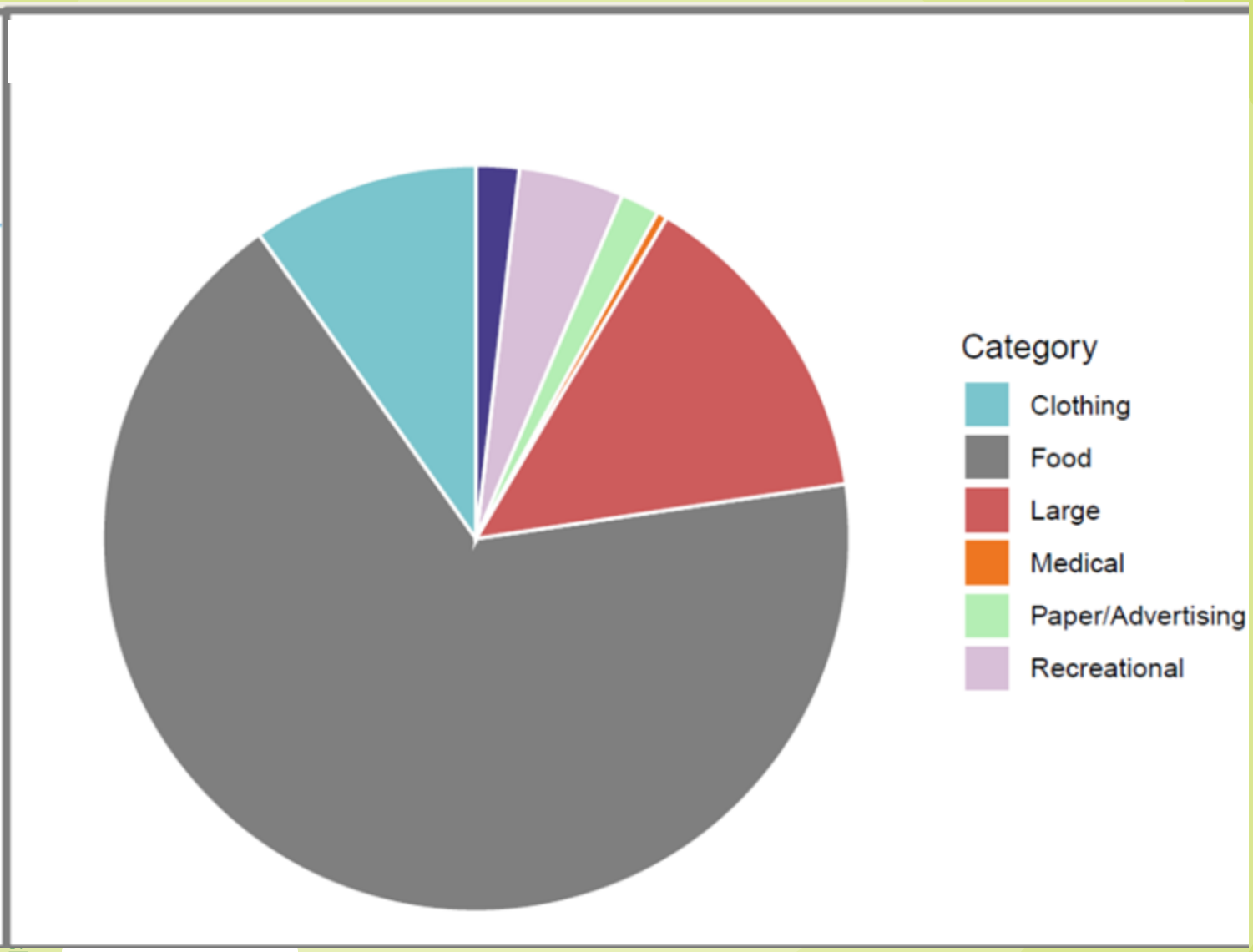

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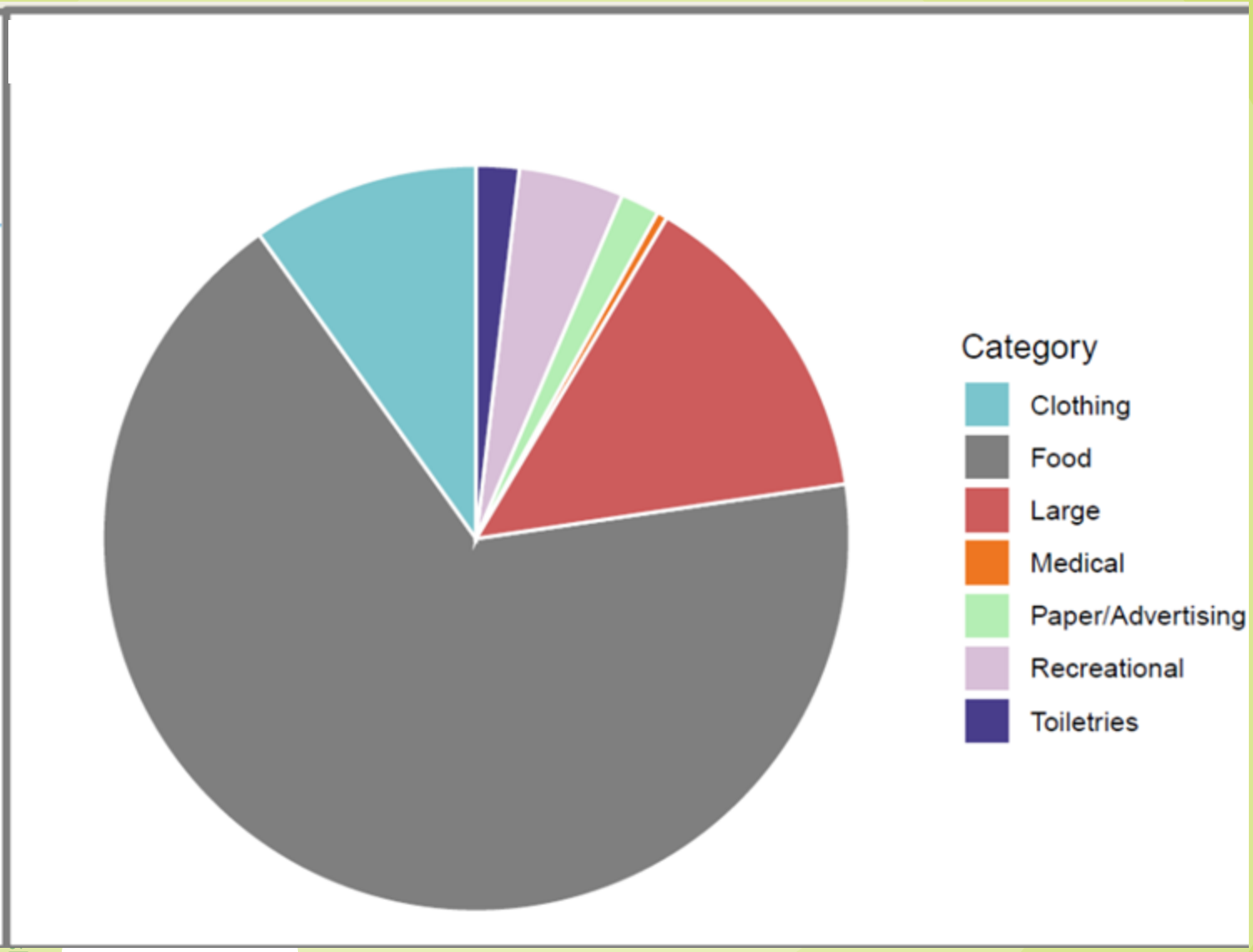

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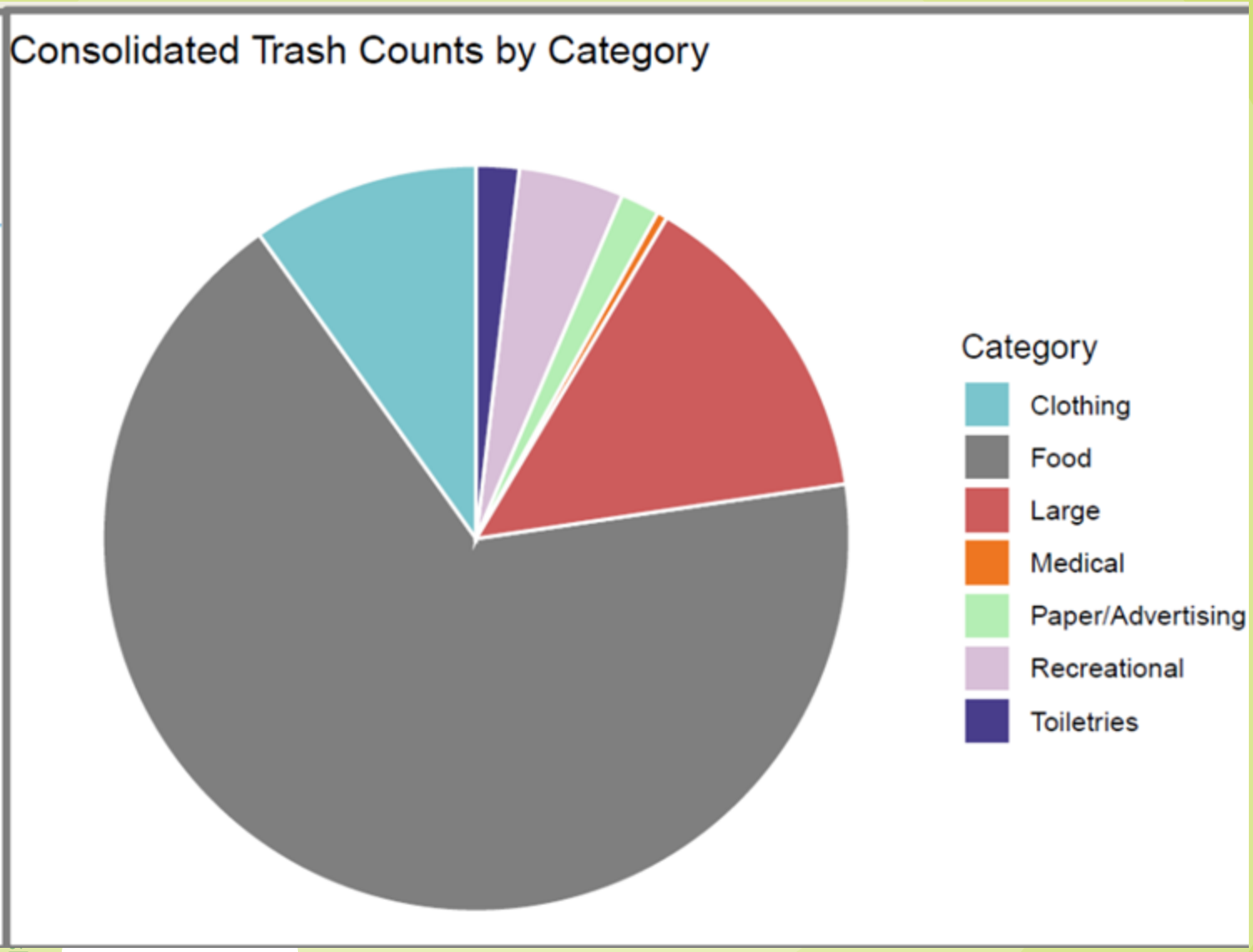


Now what are your thoughts about this graph?

Write in your notebook what your thoughts are about this graph.

The impact of the population boom in Tucson.

Get thinking... Write down as many things that impact Tucson when our population increases.

Get thinking...

How much trash do you think you produce in one day?

Write down on your sticky note and place it on the chart paper.

Did you know?

Each person produces 4.9 lbs of trash per day. 1,216 lbs per year.

Less than a fifth of the trash is recyclable and most of it floats.

The majority of trash thrown away is compostable.

So what is Tucson doing about this?

The Santa Cruz River

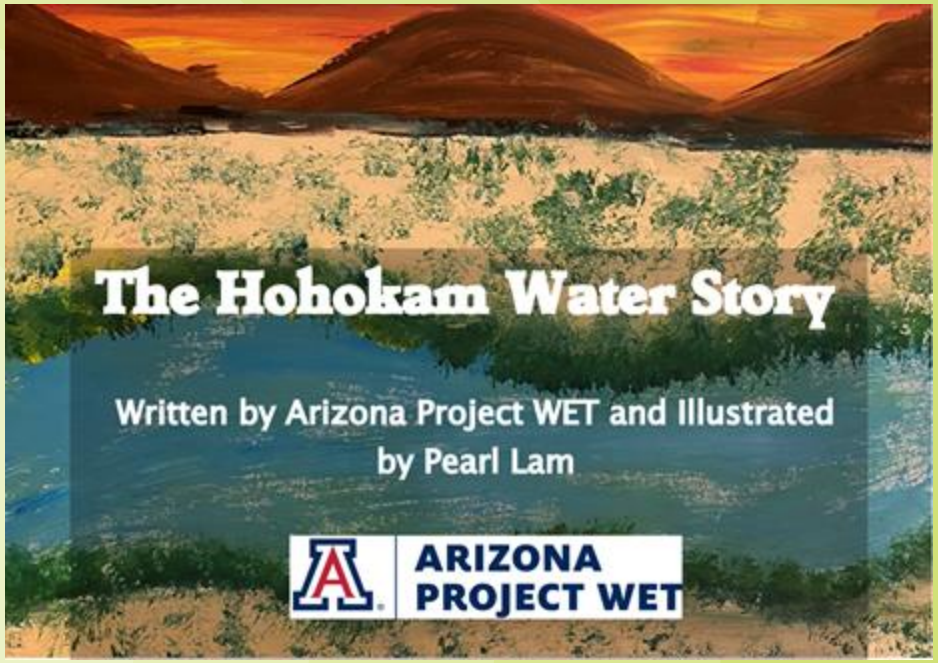
Get thinking... What do you think is the number one impact on Tucson from our population?

Did you know?

We have an amazing area with water, plants, and animals that is only about 5 miles away?

Santa Cruz River was named one of America's endangered rivers in 2024.

The history of the Santa Cruz River is very important.

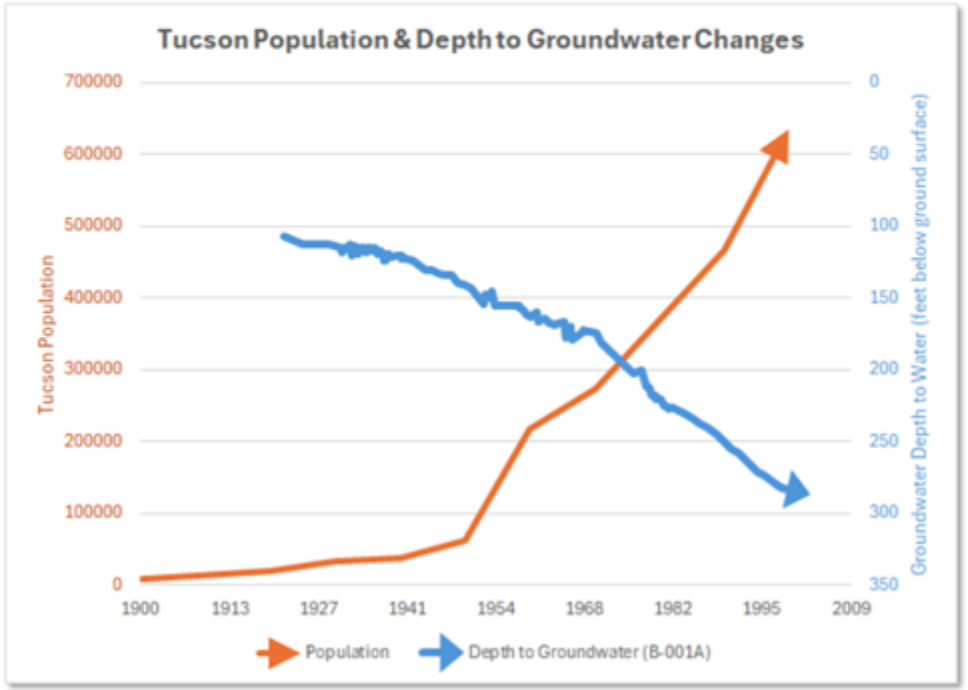


Tucson passed an act to help with our groundwater.

1980 Ground Water Management Act

Established laws that allowed the State to manage and protect groundwater for the benefit of all Arizona residents.

- Created ADWR
- Established Active Management Areas
- Initiated Assured Water Supply Program
- Mandated Reductions in Water Use



Our two wastewater plants.

We have two plants that are sending reclaimed water to the Santa Cruz River.

But wait we do have a third plant...

This plant is focused on removing harmful chemicals that could potentially seep into our groundwater from the military base.

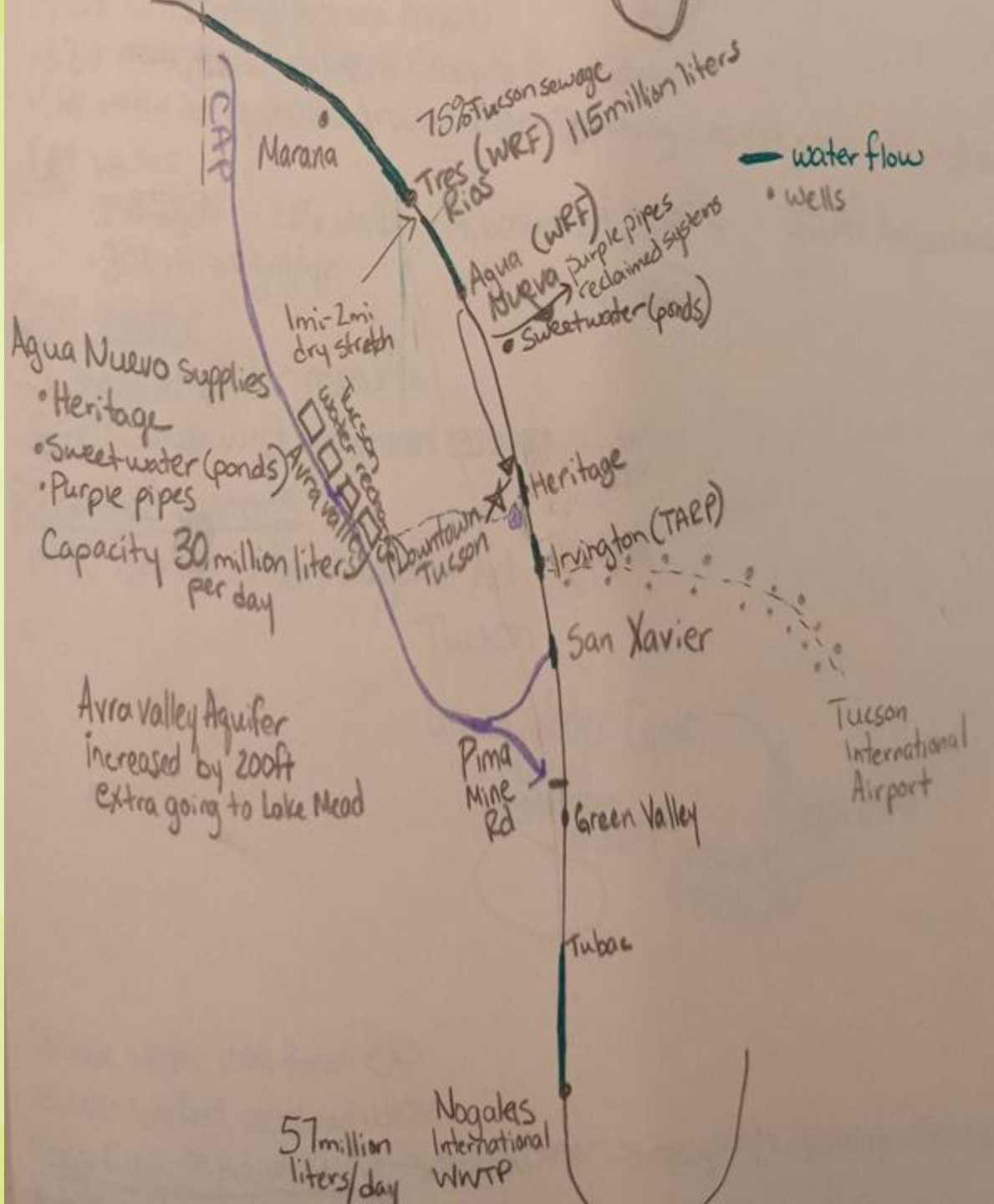
Tucson Airport Remediation Project (TARP)

Advanced Oxidation Process (AOP) Ultraviolet (UV) light with injected hydrogen peroxide create a strong oxidant that removes 1,4-dioxane and trichloroethene from water.

Granular Activated carbon (GAC) removes PFAS and any remaining hydrogen peroxide.

Here is a quick sketch that I made of the three plants and the Santa Cruz River.

Let’s look into one of these wastewater plants. Let’s get a closer look at the Tres Rios wastewater plant.



Virtual Field Trip

Now let’s go on a field trip to the Tres Rios wastewater treatment plant.

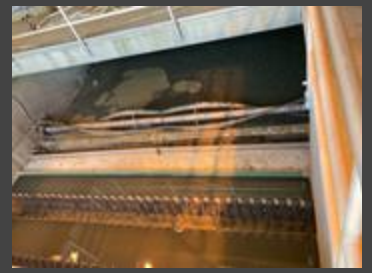
Tres Rios Wastewater Treatment Facility

Let's Go Inside...

but first...

A Poll

What kinds of solids might be moving through the sewer that are not biodegradable and will break down the system?



It’s POLL time!

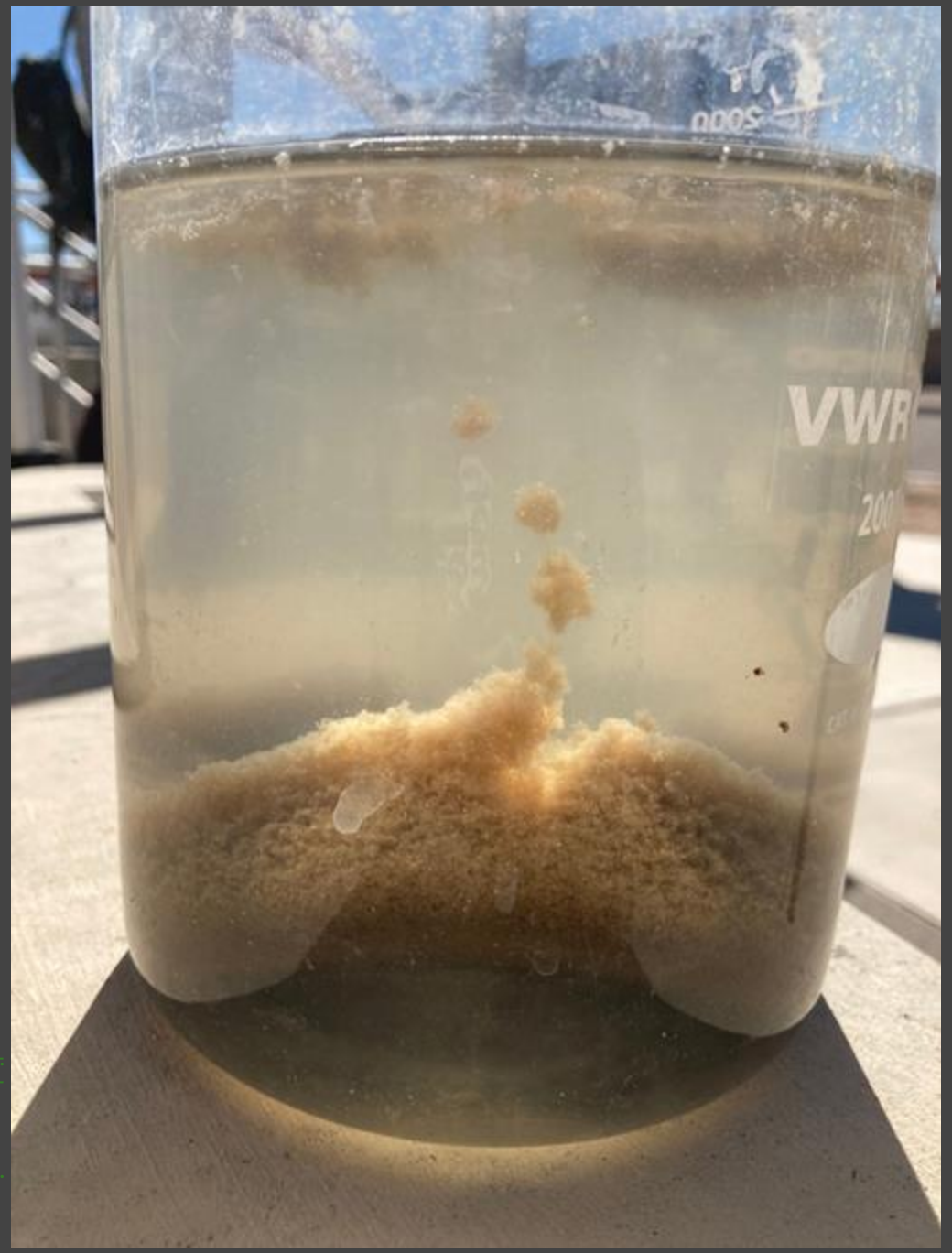
How many gallons of water flow through the separators?

A) 1 million gallons

B) 2 million gallons

C) 4 million gallons

D) 8 million gallons



What is added to the water in the secondary separators to further break down the solids?

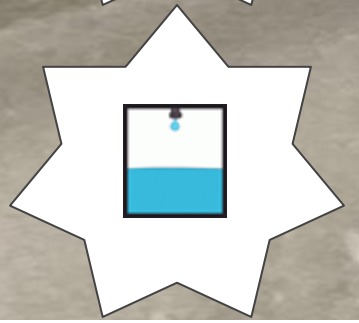
Through the Pipes

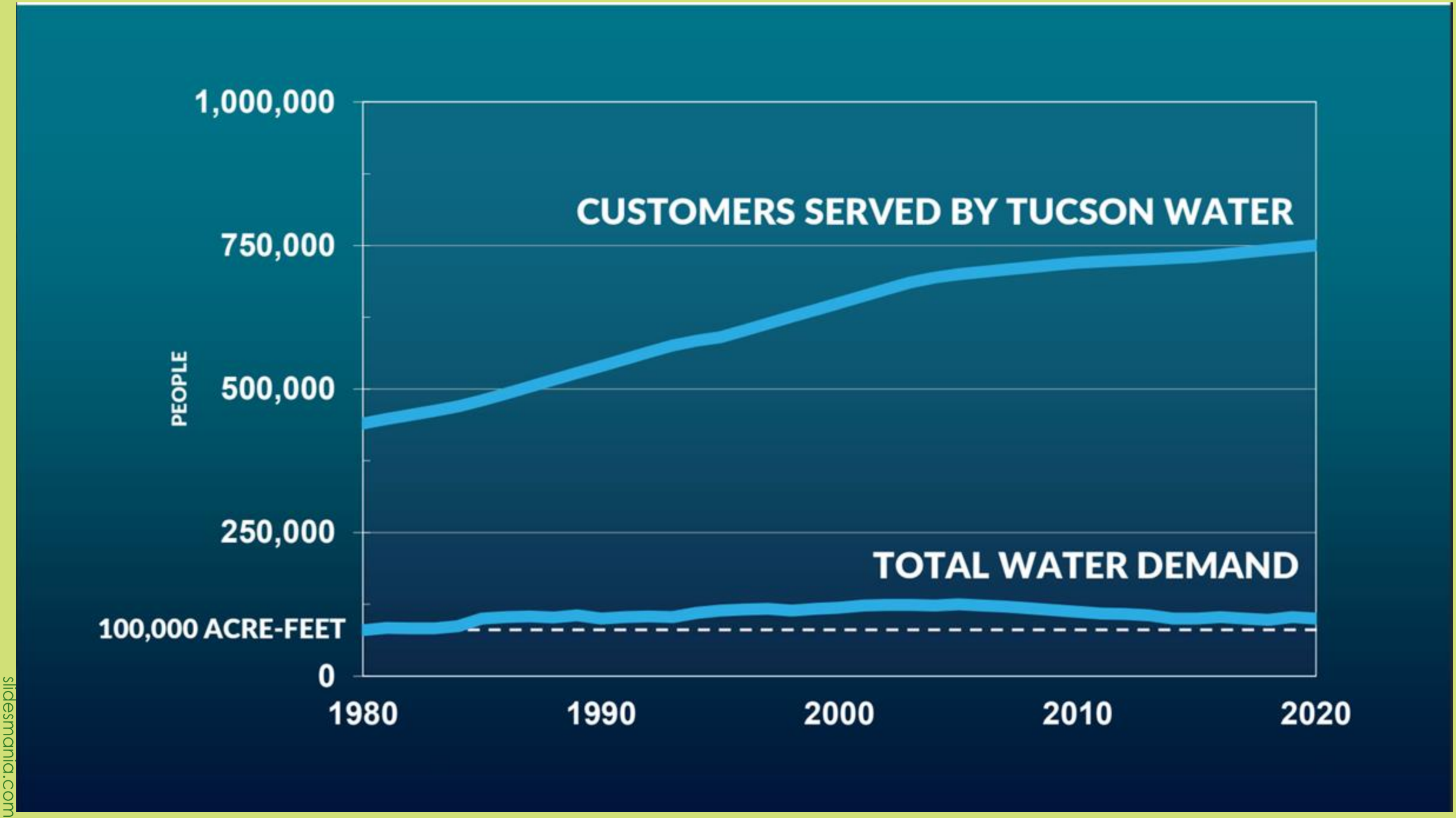
It’s POLL time!

What are the solids converted into?


PROCESS AIR
#3 Blower
48056
DANGER
WARNING

Through the Pipes





Closing...

What changes can you imagine doing that will impact the Santa Cruz River?