

Wastewater Treatment

The Fresno/Clovis Regional Wastewater Treatment Facility

Receives 68,000,000 gallons a day with a Capacity of 80,000,000 gallons of wastewater a day.

Primary Treatment – Part 1

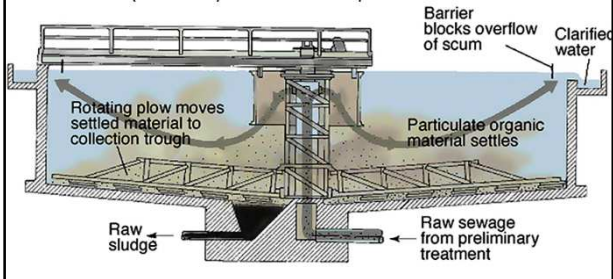
- Taking out solids (paper towels, feminine hygiene products, qtips, alligators, etc.)
 - Grates (removes debris)
 - Moving Screen: takes out small pieces

Drive roller Conveyor belt

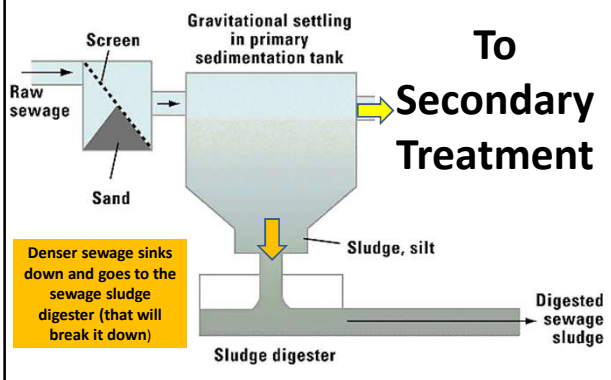
Primary Treatment Part 2 Sedimentation Tank



- Sludge settles to the bottom (it's more dense)
- Clarified (clearer) water on top moves on



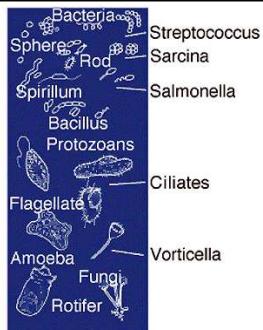
Primary sewage treatment



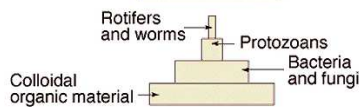
Secondary Sewage Treatment

We need something to eat the organic material (fats, sugars, carbon molecules)

Bacteria, Protozoa, Amoeba, Fungi eat up the organic wastes

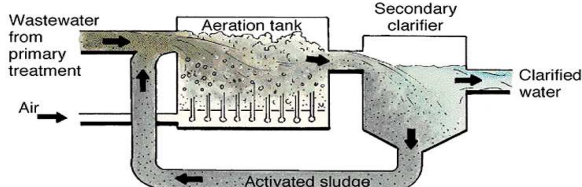


Trophic Pyramid for Secondary Treatment



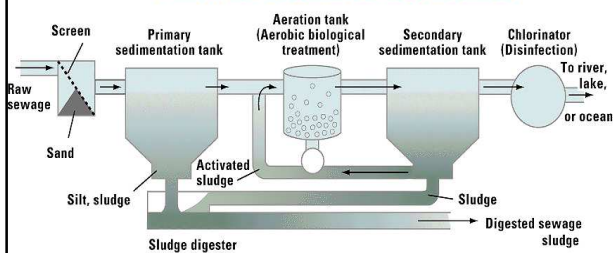
Secondary Treatment

- In An Aeration tank (lots of O₂)
- Bacteria and protozoa consume 80-90% of biodegradable soluble organic contaminants (e.g. sugars, fats, organic carbon molecules)



- After Secondary Treatment Water is usually chlorinated to kill bacteria.
- Water is non-potable (not drinkable). Can be released to river or ocean or used as industrial coolant water, golf courses, parks, etc.

Primary and secondary sewage treatment

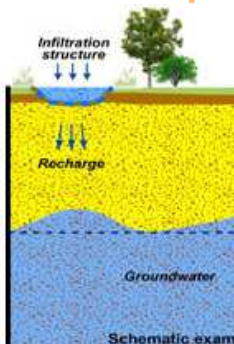


Fresno Wastewater Plant Ends at Secondary Treatment.

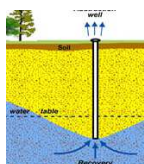
- Where do we send the wastewater?
- Ponding Basins - the water can recharge the aquifer.



What does Recharge the Aquifer mean?



- Provide water a place that it can Infiltrate (move down into) the groundwater below. Then we can pump it out later for use.



Where Does Wastewater Go? Las Vegas? Los Angeles?



After Secondary Treatment what is still left in the water?

- A paper being published in *Science* magazine finds that drugs for **anxiety drugs** — even at these very low levels — can affect the behavior of fish.

- **Antibiotics**
- **Pesticides/Herbicides**
- **Heavy Metals**
- **Nitrates**
- **Phosphates**



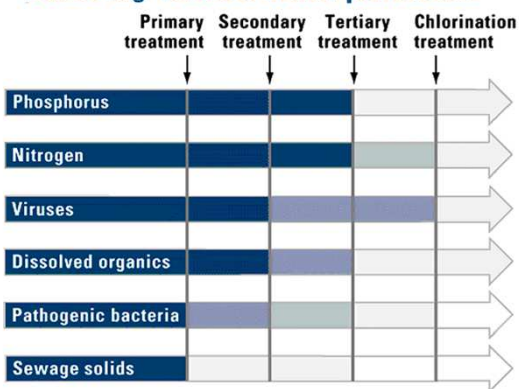
- **What can be done to remove these?**

Tertiary/Advanced Treatment

- Includes Reverse Osmosis, Microfiltration, Using UV and Ozone.
- Example: tertiary treatment has been provided for much of the treated effluent released into Lake Tahoe in California and Nevada to inhibit eutrophication.

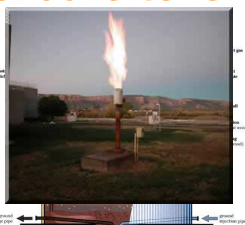


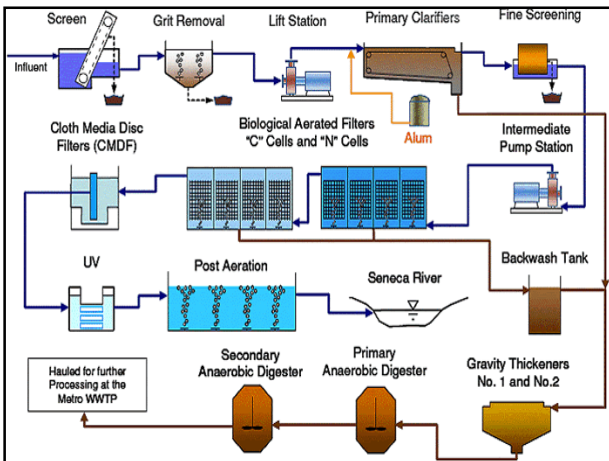
Effectiveness of sewage treatment in removing various water pollutants

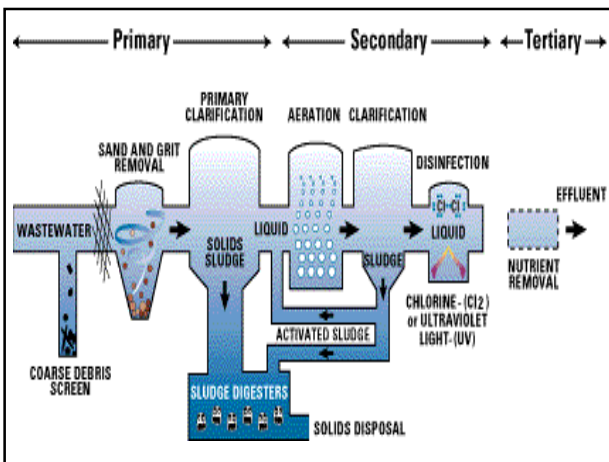


What about the solids leftover?

- “Sewage Sludge” refers to the solids that come in from primary and secondary it goes into an anaerobic digester.
- “Biosolids” refers to treated sewage sludge that meets the EPA pollutant and pathogen requirements for land application and surface disposal (aka Fertilizer for non food crops like cotton)







The Tijuana River Watershed
La Cuernera del Rio Tijuana

The End We Want

Processing Questions

- For each below answer
 - 1) How do they work
 - 2) What do they remove. :
 - Primary Treatment
 - Secondary Treatment
 - Tertiary Treatment
 - Anaerobic Digester
