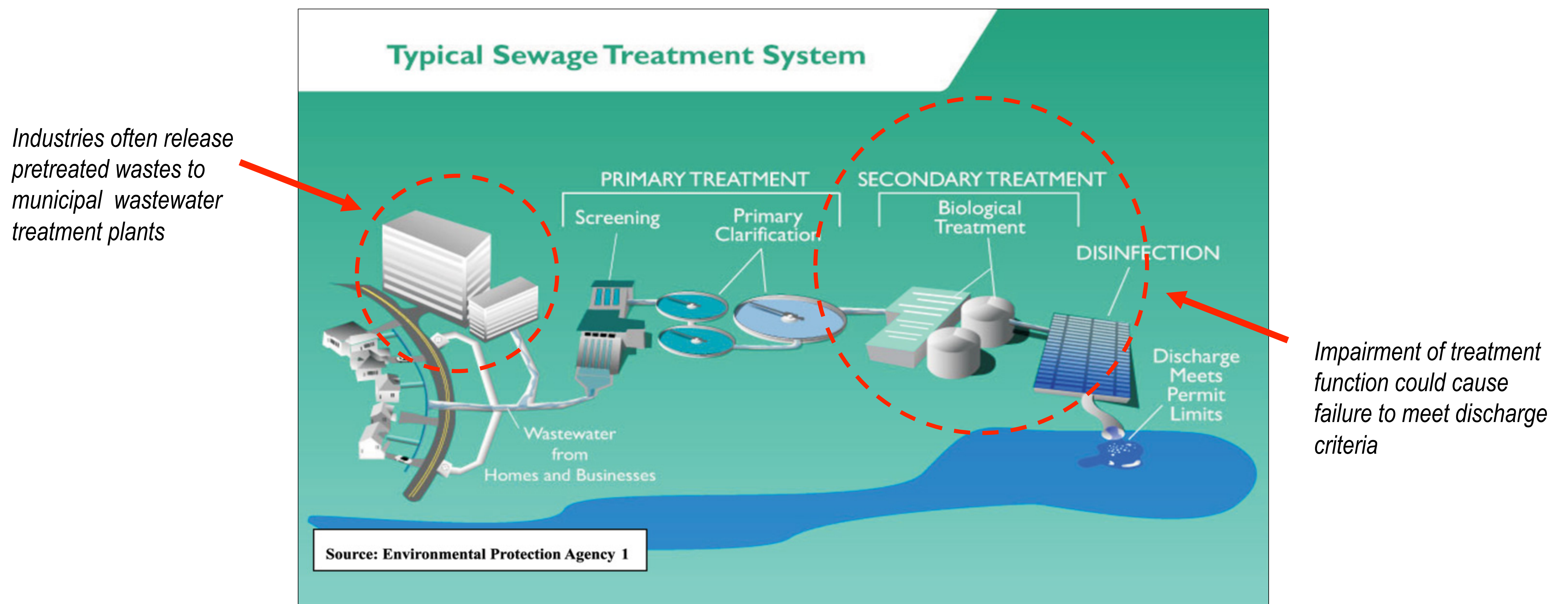


## Rare Earth Effects on Biological Wastewater Treatment (WWT) Systems



- Local, State and Federal regulations drive the type and extent of required wastewater pretreatment.
- EPA has not yet established pretreatment guidelines for rare earth elements (REEs).

### Objective:

Evaluate the impact of potential REE wastewaters on the growth and function of WWT microbes.

### Results to date:

- Exposed synthetic Eu and Y containing wastes (mimicking fluorescent lamp phosphor recycling) as well as complexant tributyl phosphate (TBP) to model nitrifying organisms:



- Found that >10 ppm Y and Eu inhibits growth and activity of *N. europaea*; TBP increases inhibition.
- N. winogradskyi* even more sensitive to these REE and TBP.
- The REEs appear to exert toxic effects even when most of the metals are insoluble.

### Current and future work:

- Conducting exposure studies with activated sludge consortia from Idaho Falls WWT Plant.
- Assessing effects on anaerobic treatment.

