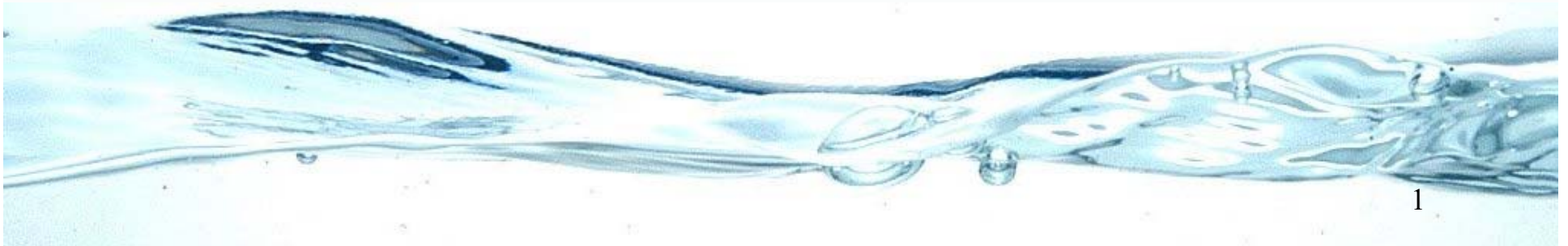


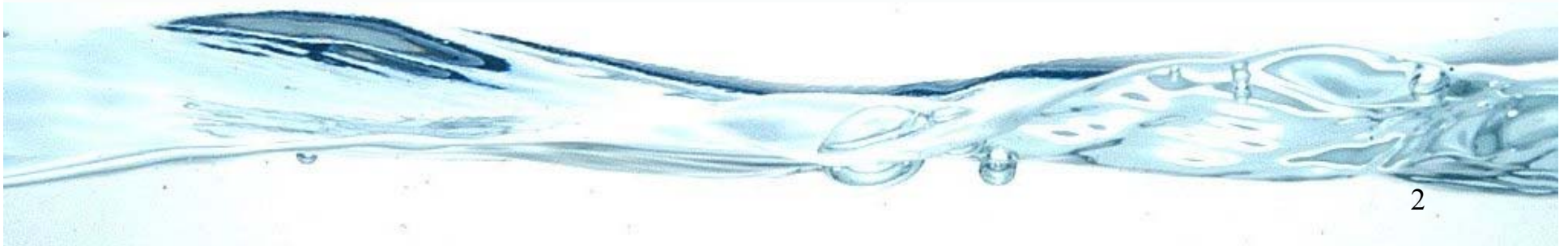
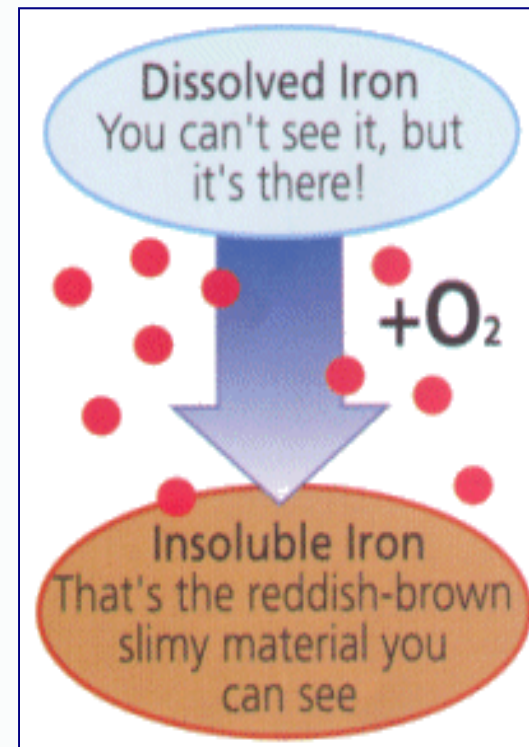


Iron Treatment

OVERVIEW OF IRON TREATMENT



- Iron (Fe) is a common naturally occurring element and can become dissolved in groundwater
- It occurs in one of two oxidation states:
 - Ferrous Iron (Fe^{2+} - dissolved)
 - Ferric Iron (Fe^{3+} - insoluble)



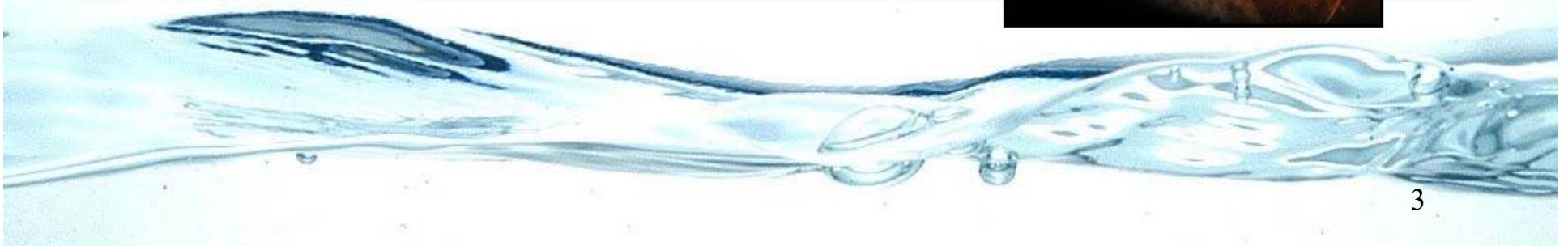
Reasons for Removing Iron

Surface and Storm sewer Discharge Requirements

- Dissolved iron consumes oxygen which strains aquatic life and is regulated by most environmental agencies.
- Regulations for iron discharge to surface and storm sewers can be much lower than the naturally occurring groundwater concentrations on some sites.

Iron Fouling of Remediation Systems

- Media vessels require backwashing and frequent media replacement.
- Bag filters require frequent replacement.
- Pumps, tanks and piping plug up with iron precipitate.
- Injection wells and sanitary sewer lines plug up with iron precipitate.



Iron Management

- Automatic Dosing of Iron Sequestering Compounds
- pH control
- Modifications to equipment to reduce or eliminate iron fouling

∕∕ Particulate Filtration (<1 ppm)

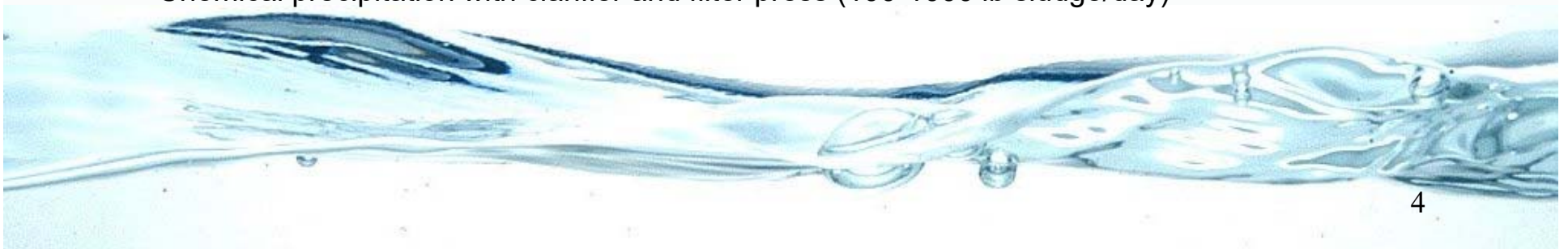
- Aquip[®] Enhanced Filtration, Bag Filtration, Cartridge Filtration

∕∕ Concentration and Back Systems (1 ppm to 100 ppm)

- Fil Iron Treatment System (2 ppm to 100 ppm)
- Carbon Backwash System (1 ppm to 5 ppm)
- Green Sand Treatment Systems (1 ppm to 3 ppm)

∕∕ Chemical Treatment: (100 ppm and up)

- Chemical precipitation with Bag Filters (0-10 lb sludge/day)
- Chemical precipitation with self indexing filters (10- 100 lb sludge/day)
- Chemical precipitation with clarifier and filter press (100-1000 lb sludge/day)



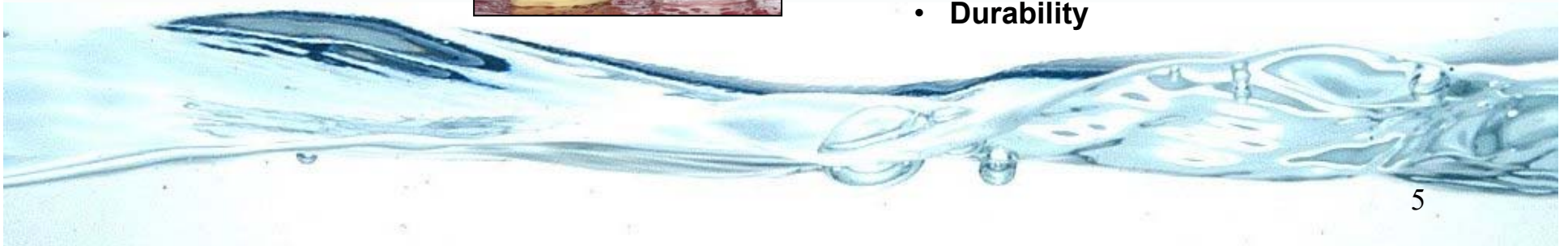
Iron Treatment System Process

- Pumped water enters an eductor which oxidizes dissolved iron, Fe^{2+} to Fe^{3+}
- Oxidized iron particles collect within a floating media bed and adhere to the media
- Backflushing (1 volume of water) removes the iron from the media in a concentrated waste stream
- The concentration of backflushed water is treated with chemicals and iron sludge is filtered
- With this system iron concentrations can be reduced to below 1 ppm in treated water



Benefits of the system include:

- High levels of Iron removal
- Eco-friendly
- Affordable
- Ease of operation
- Durability

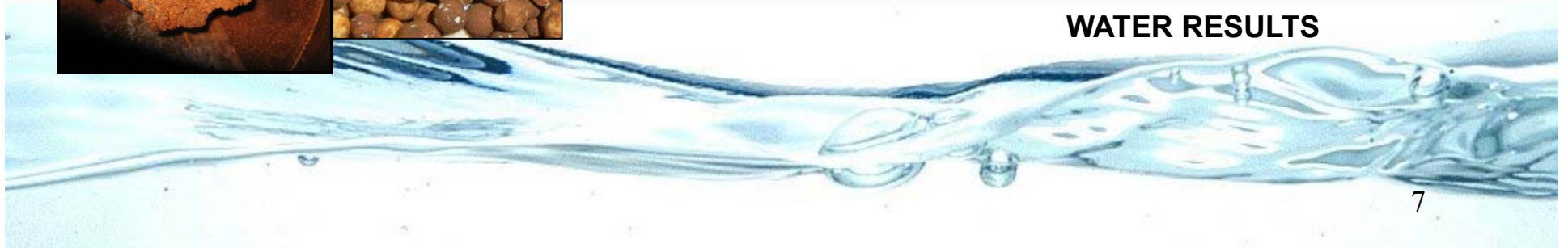


Advantages of the StormwaterRx Iron Treatment System

- The patented venturi eductor is a simple, low cost, chemical free solution to oxidizing the dissolved iron prior to filtration.
- The floating bead filter design requires much less backwash water than other concentrating technologies such as Green Sand.
- Backwash water iron concentration is much higher than other concentrating technologies.
- Lower maintenance and more cost effective than using a chemical treatment system to remove iron from the full process stream.
- Smaller footprint compared to other technologies.
- Low operating and maintenance costs.



Operation of a StormwaterRx Iron Treatment System



Results

Samples of water taken at various points during StormwaterRx Iron Removal Treatment process. Iron content [in ppm] shown.



Before
> 15 ppm

After
< 1 ppm

concentrate
> 1000 ppm

**Treated back-
flushed water to
be filtered**
<1 ppm

