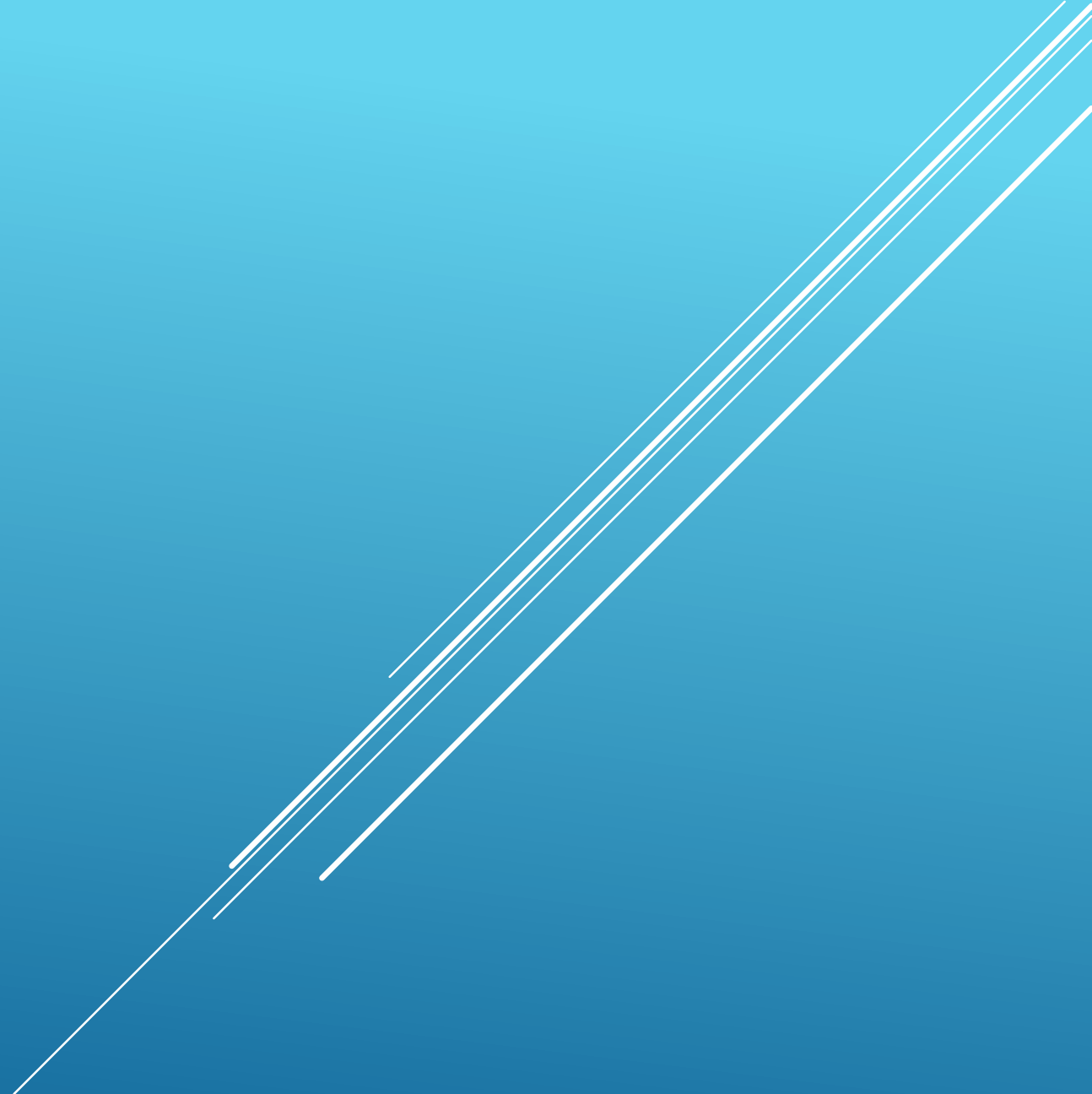


WATER SPIKE

By

Tod Jones





OXYGEN IN FISH CULTURE

Basic Metabolism

Disease Prevention

Compensates for Stresses



PAST OPTIONS

Aerators

Air Stones

Spargers

U Tubes

Cones

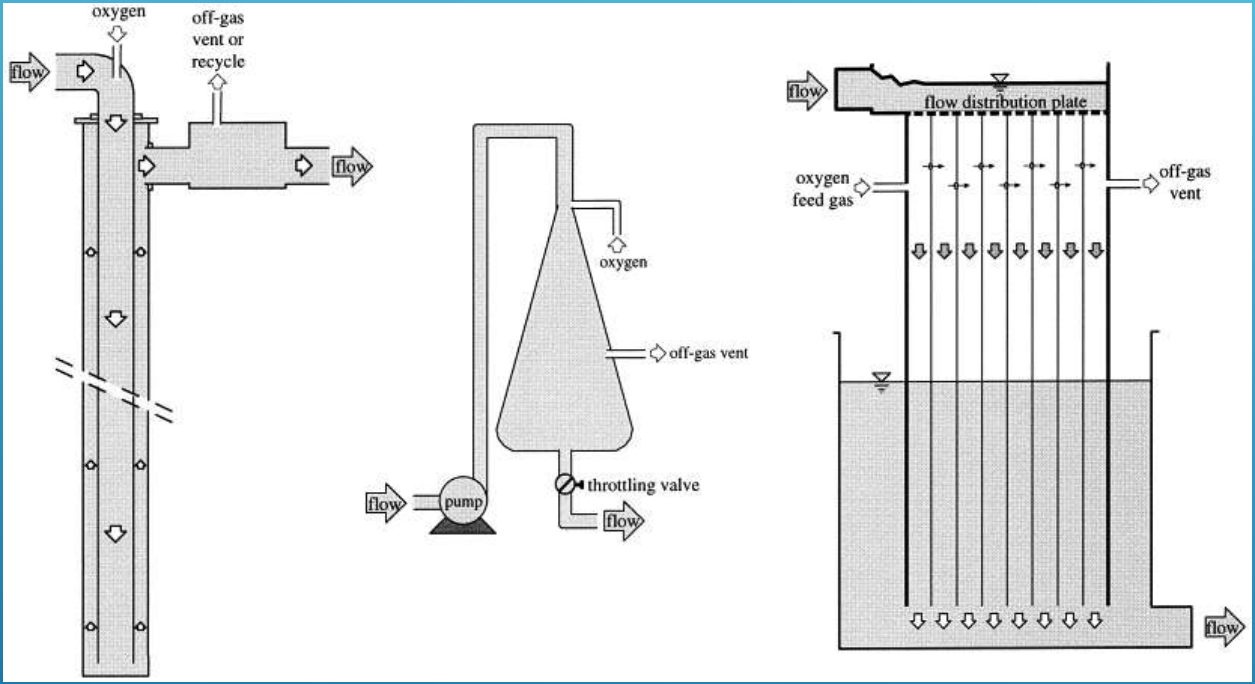
LHO's

CONES/U-TUBES/LHO

Adds O₂ and Nitrogen

May or may not not ex-gas nitrogen

Contributes to thermal load





AERATORS

Adds Oxygen and Nitrogen

Effects Surface only

Increases thermal load



AIR STONES

Adds oxygen and nitrogen

Improves absorption below surface

Still low efficiency





SPARGER

Inserts either atmospheric air or O_2

Increased absorption

Does not purge surplus nitrogen



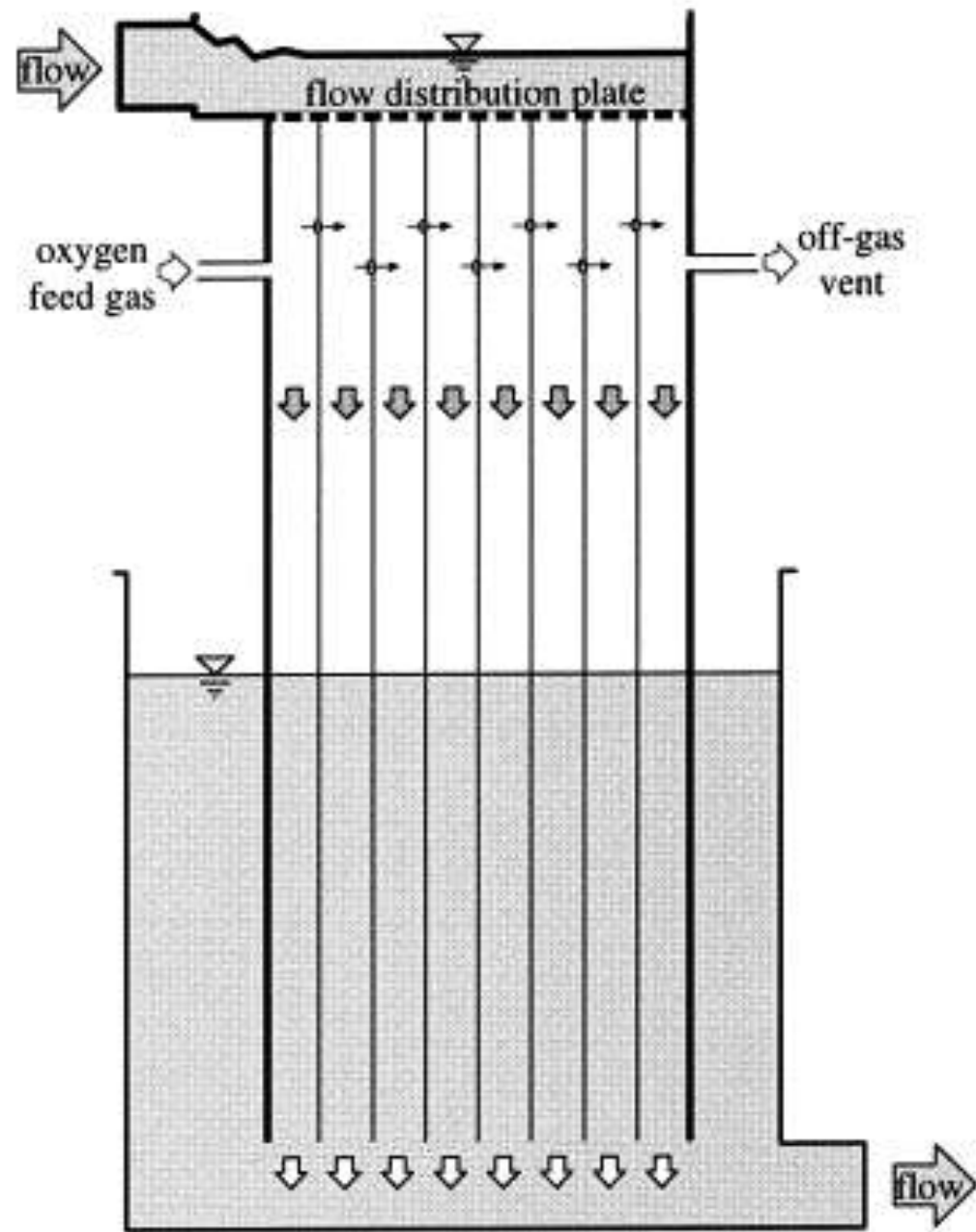
LOW HEAD OXYGEN (LHO)

Improves absorption of O_2 (150%)

Operates on minimal head pressure

Ex-gases nitrogen

Application Limitations







LIMITED ABILITY TO RETROFIT

Adequate Elevation (pressure)

High head Turbulence



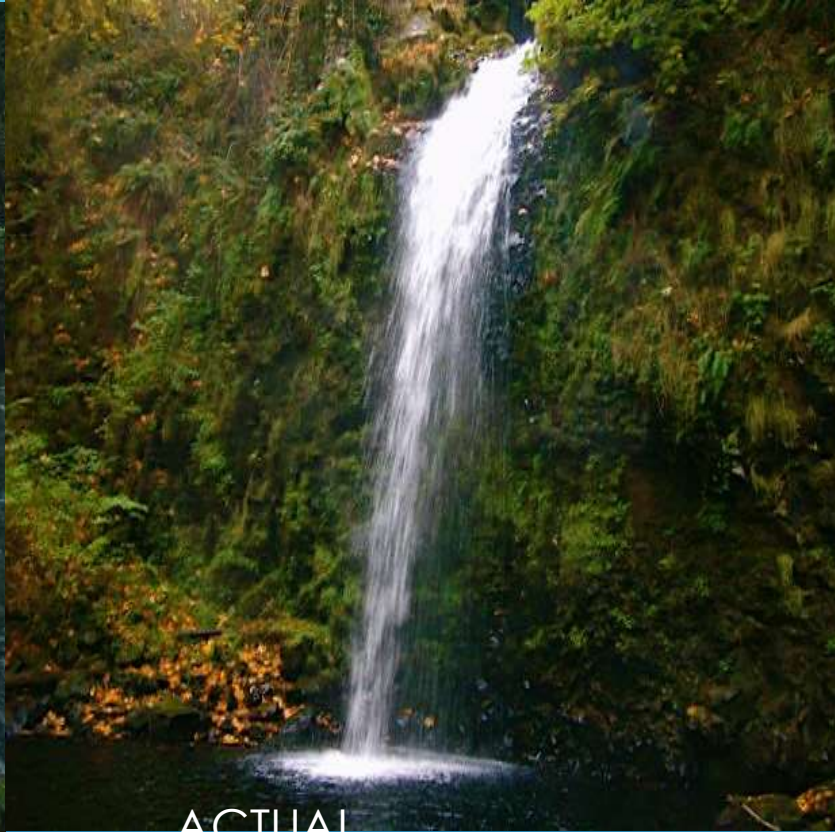
SUPPRESSION OF TURBULENCE



EELLS SPRINGS TROUT HATCHERY

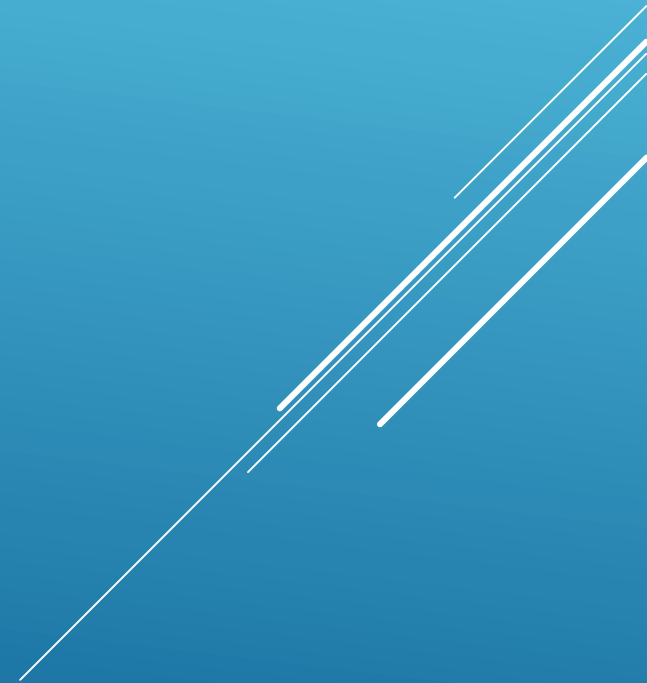


NORMAL



ACTUAL

MAJOR CHALLENGE





FIRST WATER SPIKE



WATER SPIKE INSTALLED



WATER SPIKE AT 250%

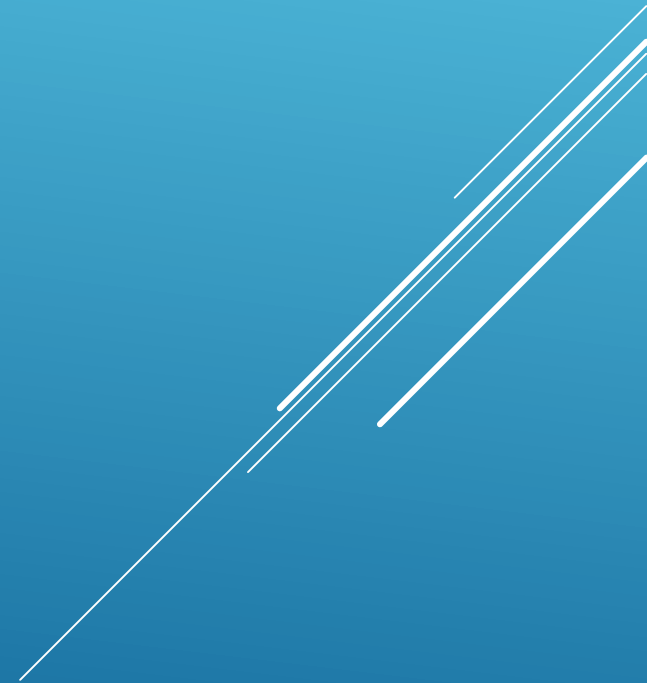
Use motive pressure



STURGEON TANKS



STURGEON POND





3 CFS WATER SPIKE

What we didn't know!!!



3 CFS Spikes Installed

5 mg/l to 18



OXYGEN SEPARATORS



LIQUID OXYGEN



60 GPM Water Spike Evaluation



MINI-SPIKE

300% O₂ Concentration

No thermal pollution

Variable flows

Dial up what you need

100% absorption

Sized to meet the need