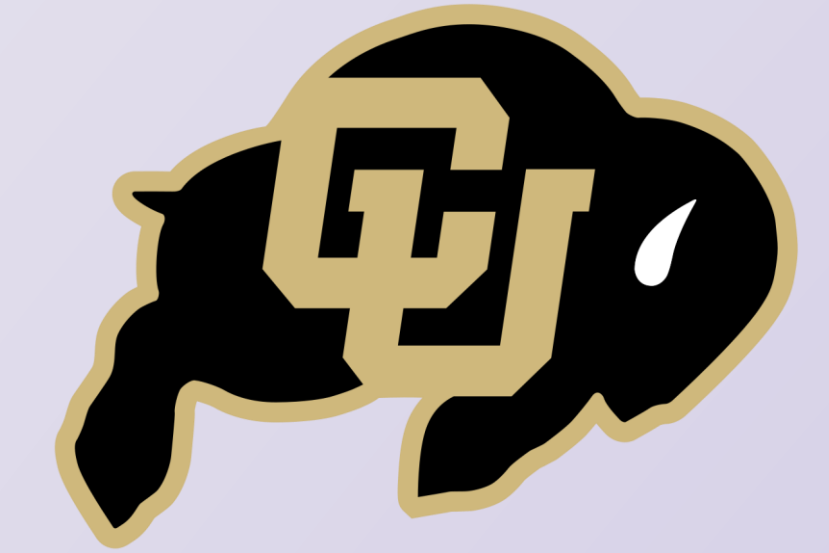




Underwater Sorting Collection Vacuum

Dorothea French - Heather Hunt - Justin Kirchner - Josh Ayers - Zach Sorscher - Jacob Lawrence



Senior Design Team 41 || University of Colorado Boulder || 2021 - 2022

Advisors: Tim Ruybal, Diana Manning, & Dan Riffell



Mechanical Engineering

Motivation



- 95% reduction in California kelp density, with other places to follow
- 10,000% increase in purple sea urchin populations
- Kelp sequesters 20x more CO₂ per acre than trees do
- Home to thousands of species

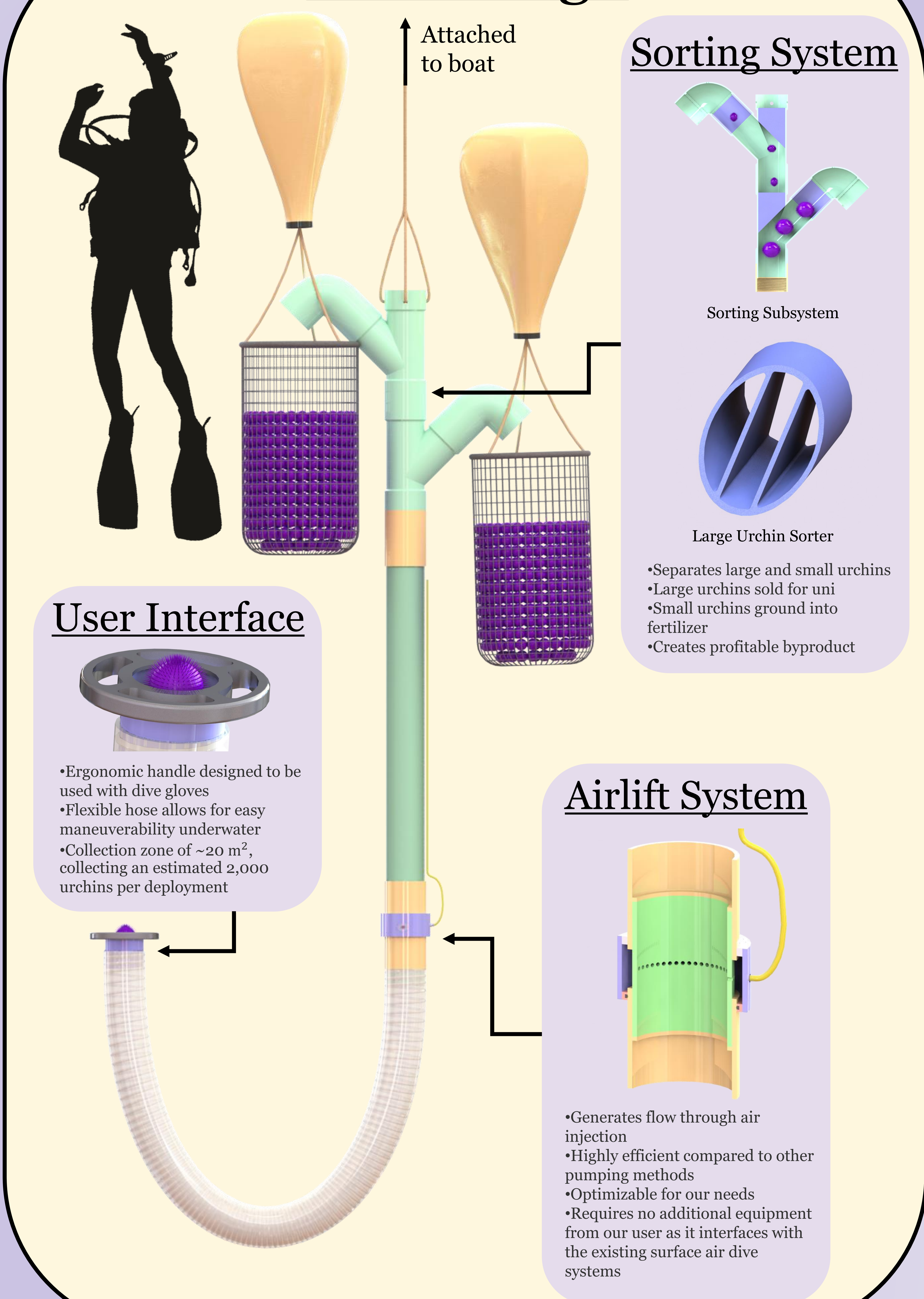
Design Goals

- User friendly -- intuitive, ergonomic, transportable
- Non damaging to the ecosystem
- Durable and doesn't corrode in salt water
- Modular and modifiable
- Sorts urchins into multiple sizes

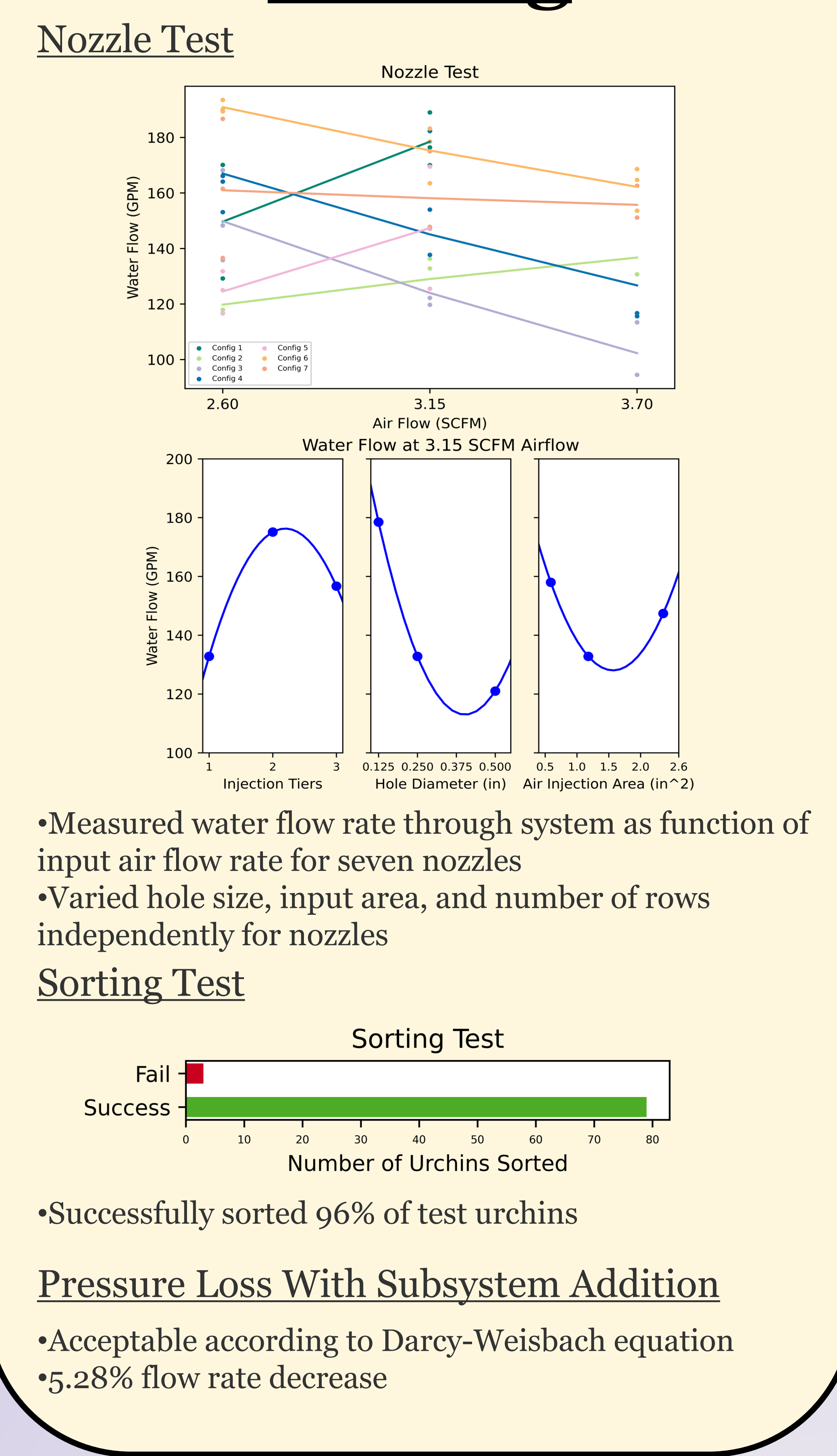
Manufacturing

- Majority of components made from PVC to be easy to acquire and not degrade in high salinity conditions
- Designed remaining components such as the sorting inserts, handle, and nozzle seal rings for plastic injection molding configurations
- Solvent welded PVC components

Our Design



Testing



Results

- Fully functioning prototype, met or exceeded all design goals
 - Won 4th place in NVC climate competition, featured on PHYS ORG and Department Website
 - Interest from The Bay Foundation and Oregon Kelp Alliance
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