

Rivers in Crisis

- Industries released ~200 million pounds of chemicals into waterways in 2022
- Pollutants include toxins like **arsenic**, **nitrates**, and **heavy metals**

Project Overview

Current Challenges

- Manual Sampling
- Time consuming
- Labour intensive

Previous Teams

- Inaccurate
- Inconsistent functionality

Mission Statement

Improve upon existing methods of collecting and storing river water samples for **testing and analysis**.

Design Criteria



Water Collection

≥5mL per sample every 24 hours



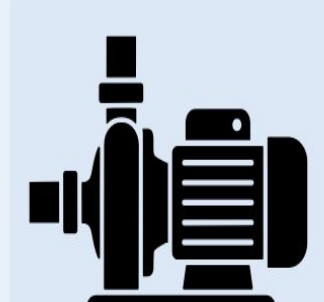
Water Resistance

IPx4 water resistant rating



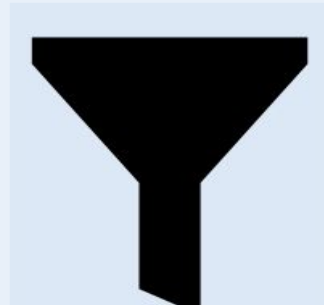
Heat Resistance

Withstand temperatures ≥125°F



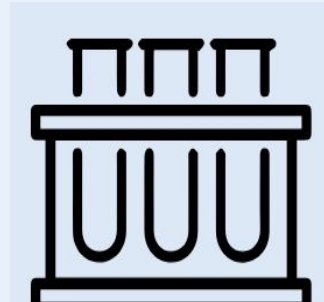
Pump Strength

Sample fill time ≤60 seconds



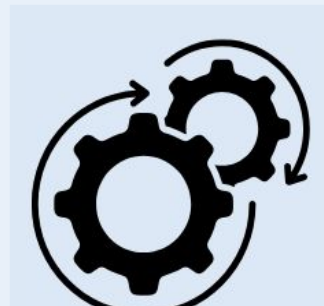
Filtration

Must filter particles ≥0.45 microns



Storage Capacity

Device must hold ≥31 tubes



Continuous Operation

Fully and complete operate for ≥31 days



User Interface

Score ≥3: Easier interaction with device

Bayou Water Sampler Device

Tubing Holder

3D Printed, ABS Filament

12V Water Pump

Tubing

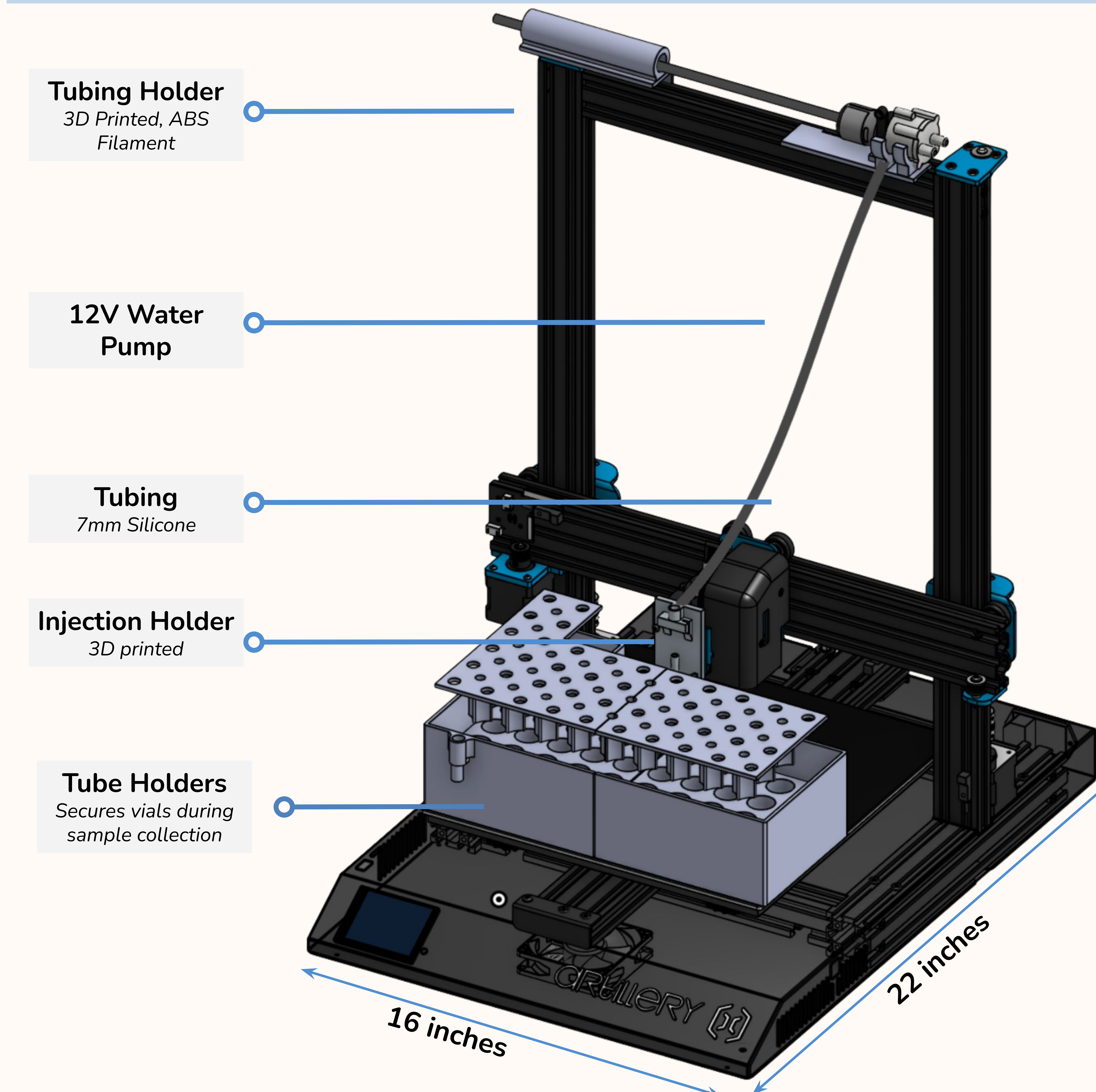
7mm Silicone

Injection Holder

3D printed

Tube Holders

Secures vials during sample collection



Raspberry Pi 3+ B



Notecard Cellular



Swan Microcontroller



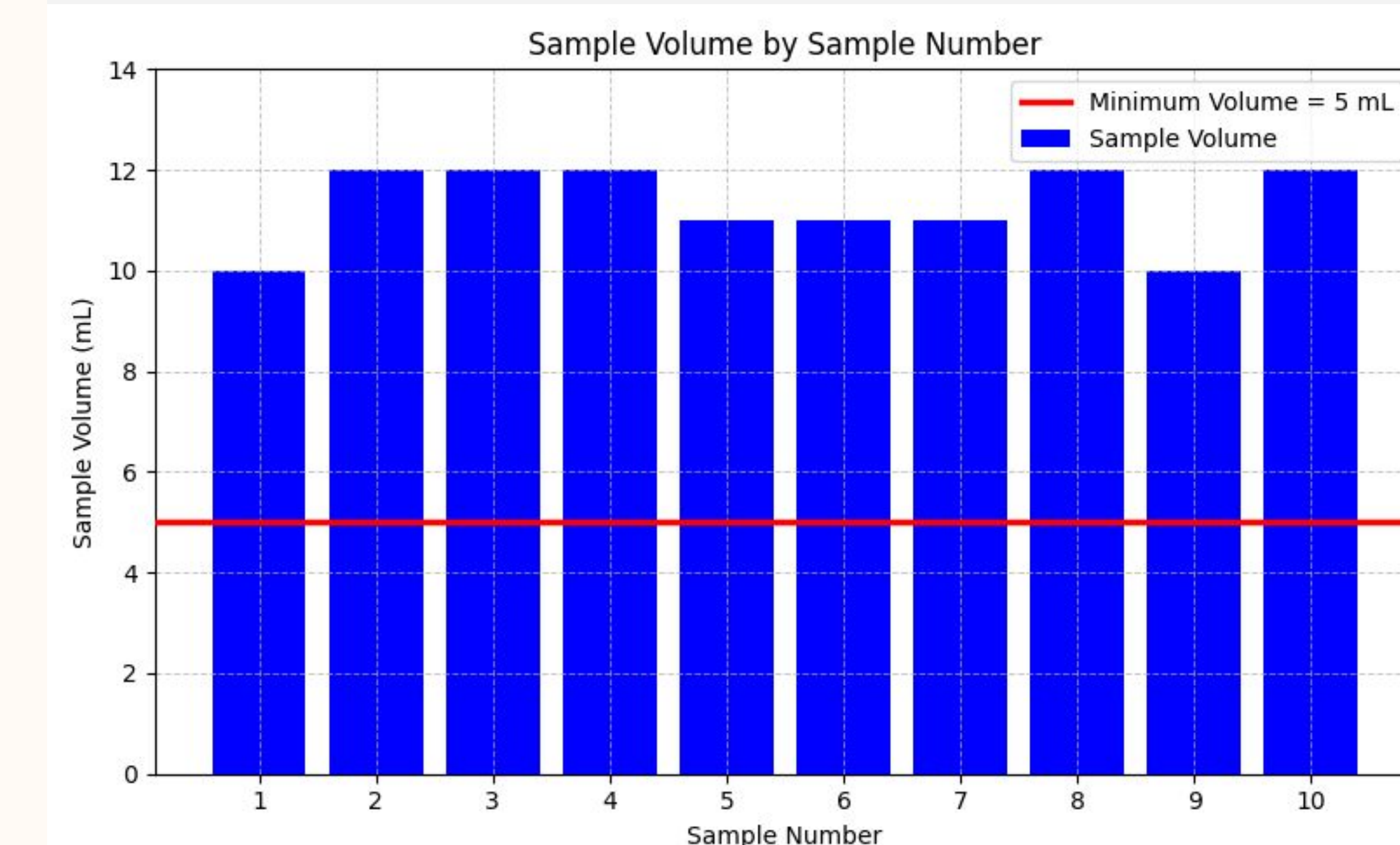
Accurate and Reliable

Battery Life → 32 days

Remote Control Delay → ≤ 15 seconds

Sample Capacity → 44 samples

Water Collection



Sample Taken → ≥5mL

UI

Bottle status

1 / 44

Next bottle: 2
Last selected bottle: 1
Attempts: 1
Last result: success
Last detail: COMPLETE
Last update: 2026-07-21 06:32:31 PM CDT

Clear Bottle Count

Current schedule

Status: **Enabled**
Next collection: 2026-07-21 06:29:59 PM CDT
Repeating: **No**
Repeat interval: **One time**
Stop at filled-bottle count: 44
Internal schedule version: 1784676804

Refresh Status

Schedule collections

First collection date and time

2026/07/21 18:37

The time is interpreted as America/Chicago local time.

☐ Repeat collections

Save Schedule

Immediate controls

Run One Collection Now

Disable Schedule

Run now fills the next bottle according to the Swan's stored successful bottle count.
Disabling a schedule does not interrupt a collection that has already started. It prevents subsequent scheduled collections.

Next Steps

- Implement filter
- Add pH and temperature sensor
- Package components in a waterproof container
- Implement flow meter

Acknowledgements

We would like to thank our SEED leads Dr. Hunter, Alice Owens, and Evelyn Hardy, our client Dr. Torres, and previous sampler teams for their advice and mentorship throughout this process.