



PREVENTING INVASIVE SPECIES INCURSION IN THE PROVO RIVER DELTA

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Background

Utah Lake is currently being ravaged by invasive fish. One of these two fish is the Common Carp. It ravages the bottom of the lake and makes plants struggle to grow.



The Northern Pike is a predatory fish that eats small fish in the lake.



Both of these non-native fish have been decimating the population of the native June Sucker.



Objectives

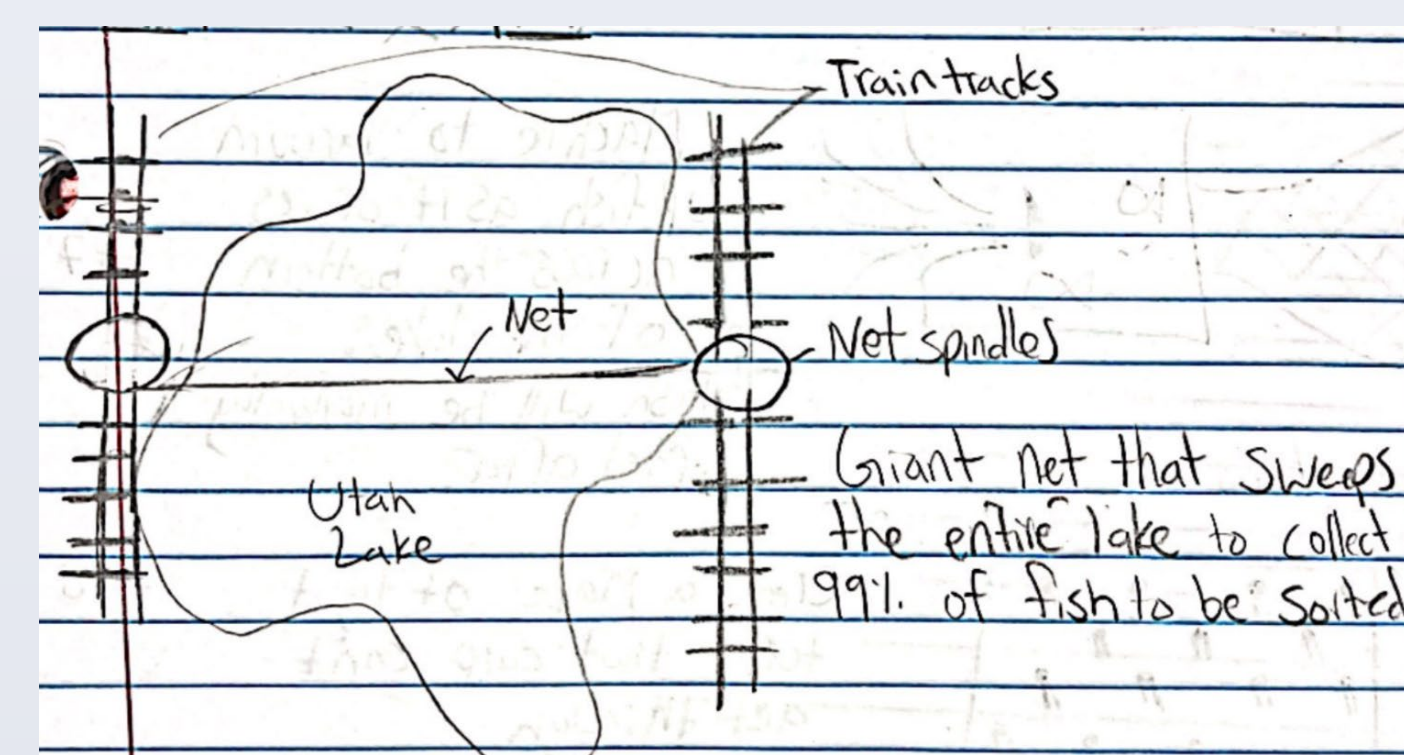
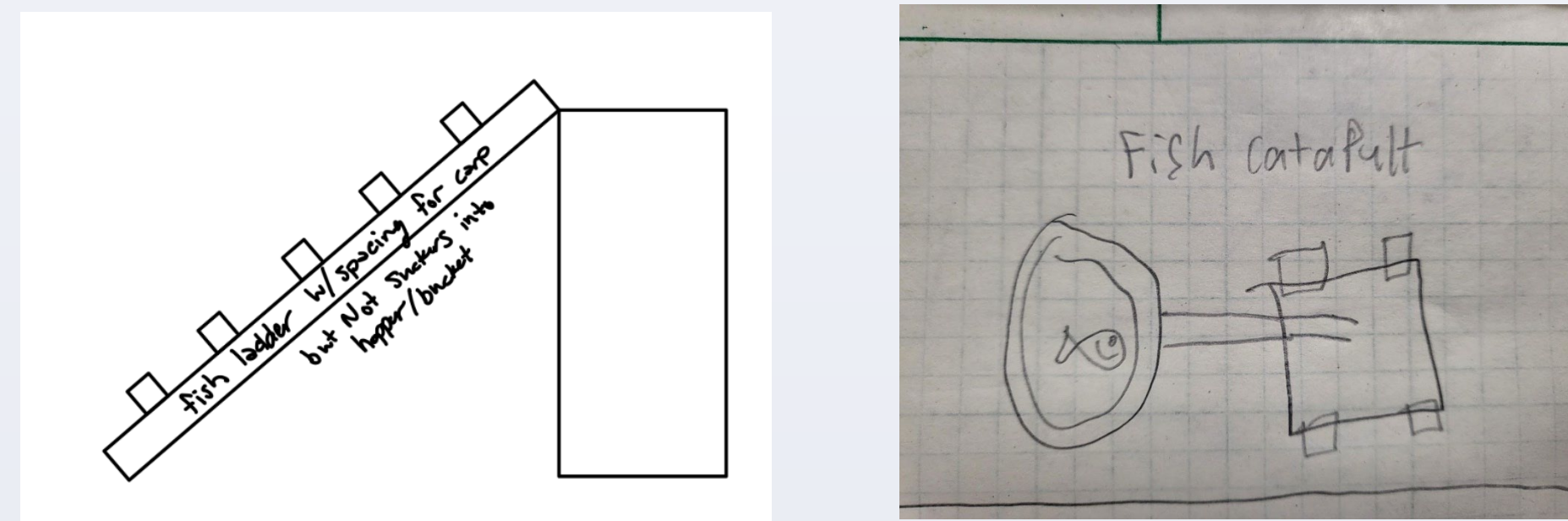
To aid the Department of Wildlife Resources (DWR) and local fisherman in removing Common Carp and Northern Pike from Utah Lake.

A device will need to be created to remove these two fish from the newly created Delta System. This device needs to ensure that other fish are allowed to enter the Delta relatively unhindered.



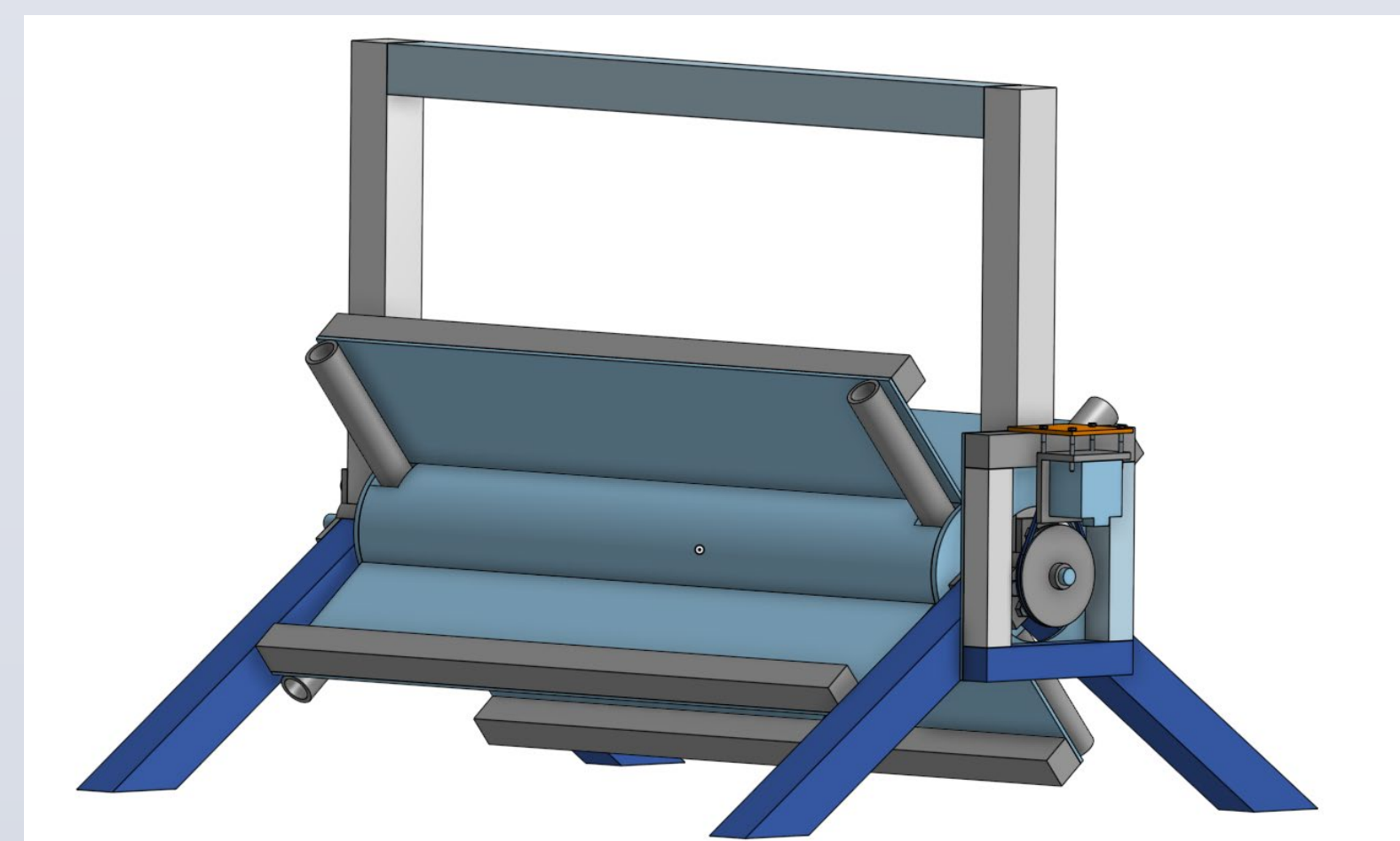
Procedure

Design Requirements were generated during initial conversations with DWR. After Design Requirements were finished, concept generation occurred.

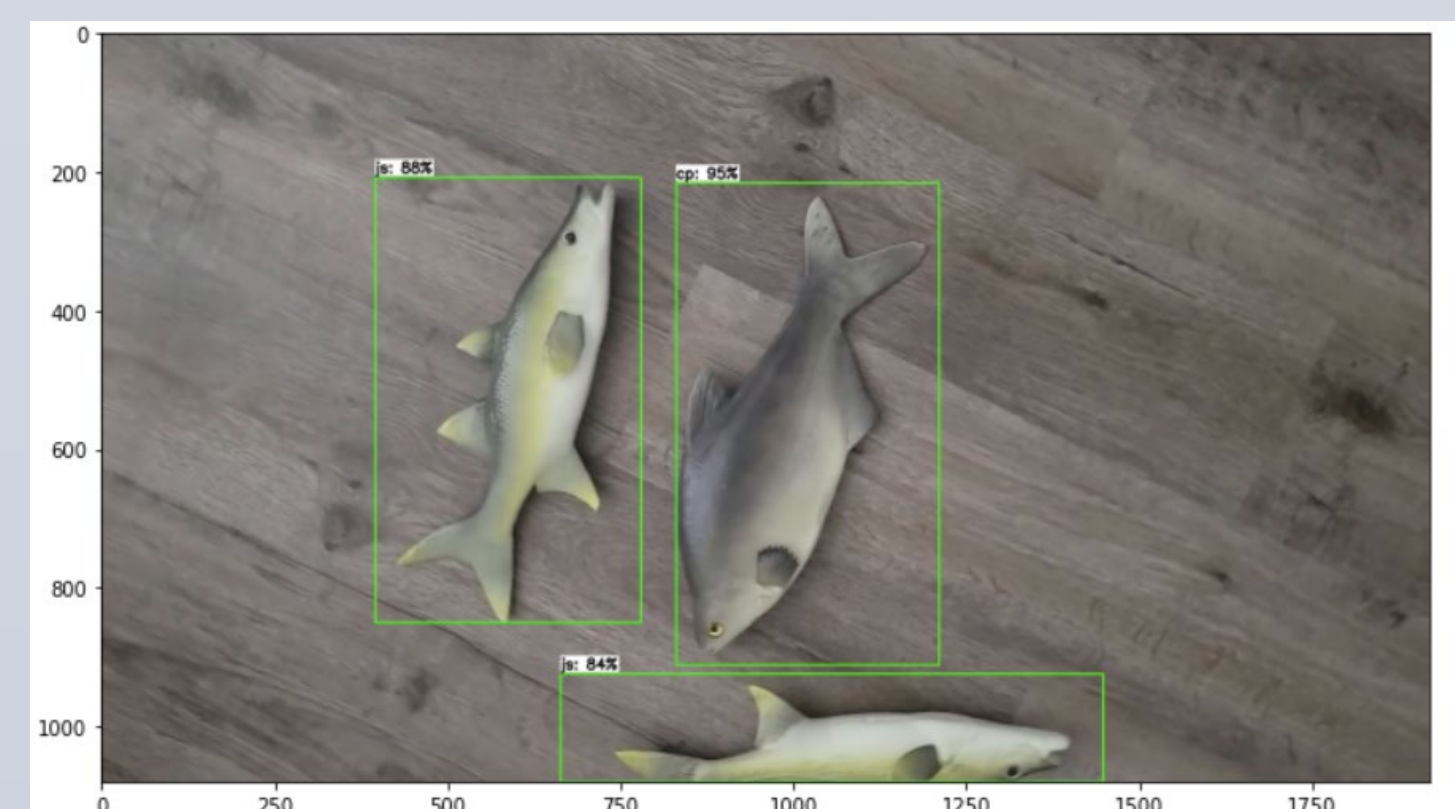


Once a final concept was decided, design on mechanical and electrical/coding systems began.

Physical Modeling began with a 3d model that was created in OnShape. This model was created in at half scale so our group could more easily recognize potential issues with the prototype.

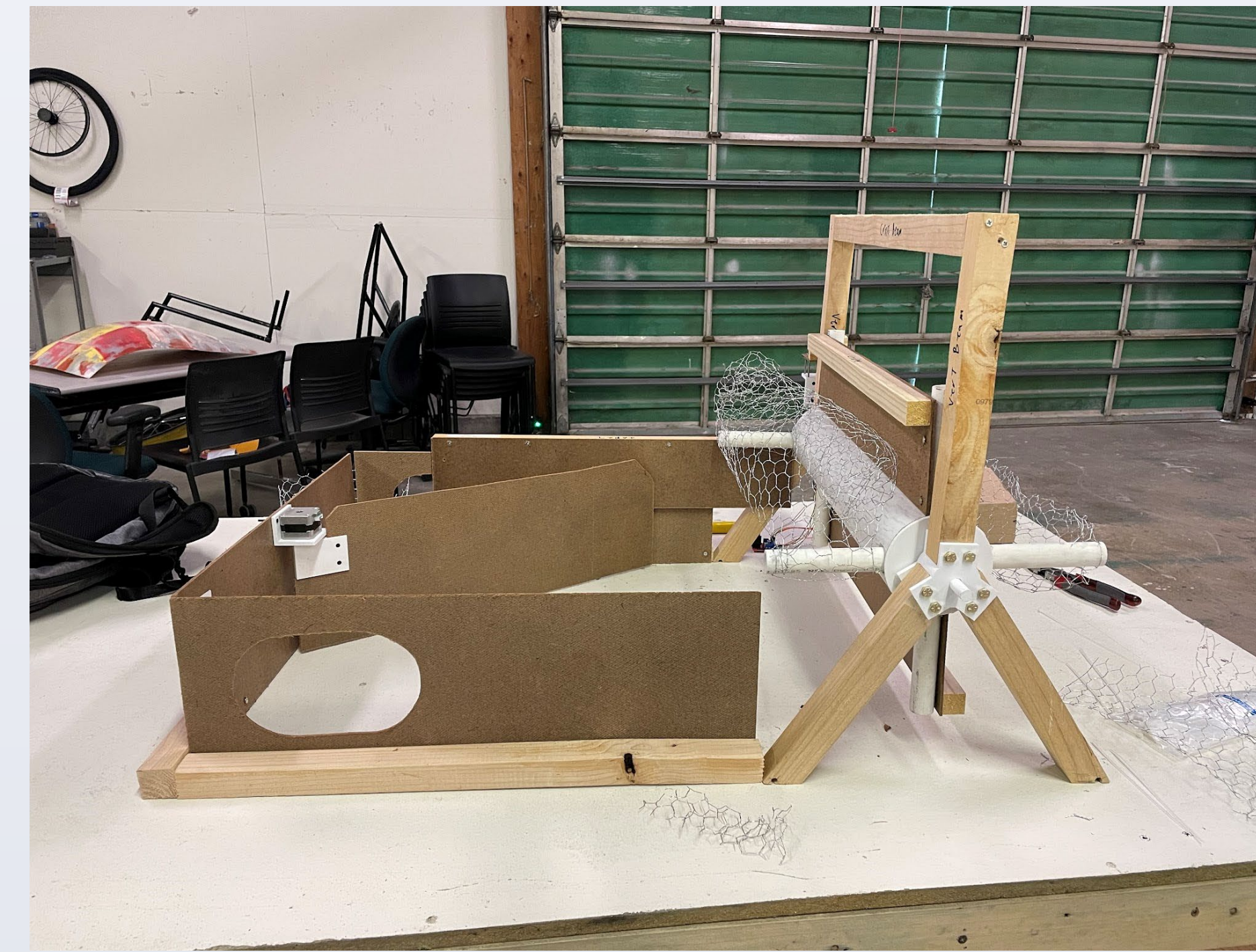


Using Tensorflow lite (which is a detection software), code was created that can recognize different objects from one another. A Raspberry Pi and an Arduino Uno are then used to execute all code that makes our physical model move and sort fish.



Modeling

Our first prototype was created using wood, PVC piping, and PLA printed parts. This model was used mostly as a crude representation of the designed model.



After construction of the prototype, electrical systems were attached to the physical model. After a few hiccups a half scale model was in working order.

There were a few parts of the design that needed to be improved. These changes were discussed as a group and a final model was designed.

The final model was then constructed using 8020 Aluminum and finer materials. While most of the model was 8020, other materials include PVC Pipe, ABS printed parts, and a cleaner design.



Conclusions

After construction of the final model, our group believes that DWR could purchase the model created and use it to remove troublesome fish from the Utah Lake as they travel up the Provo River Delta.

Our Group hasn't been able to actually test our model due to UVU's Animal Care and Use Committee.

The goal for next year's group would be to talk to this committee and test this model to ensure proper function.

Acknowledgments and Contacts

UVU Mechanical Engineering Department

Dale Fonken – DWR

Keith Lawrence – DWR

Russ Frankman – June Sucker Recovery Implementation Program

Melissa Stamp – Utah Reclamation Mitigation and Conservation Commission

Photos and videos of June Suckers were sent to us by Karmel Harper of Living Planet Aquarium in Draper, Utah

