# MysidsSim (Working Title)

By

The Infamous

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# Preface

Marine Biology is a complex field. The importance of the ecology of our rivers, bays, and oceans can not be understated. The ongoing research into such small but important parts of the ecosystem that are the mysids is fascinating. Despite members of the team having a genuine interest in marine biology and the Chesapeake Bay's ecology like it seems many people, no one on the team was previously familiar with mysids.

So it was with enthusiasm and curiosity that the below proposal was composed. Particular attention was given to crafting mechanics and gameplay that could help communicate the vital location in the food web that mysids occupy. It felt appropriate to also develop gameplay around Mysids cyclical habits, both those between day and night and their migration patterns between spring and winter months.

The current proposal is an attempt to balance fact and gameplay, to use mechanics as metaphor and reinforcement for important facts about mysids. Though the research isn't entirely focused on pollution's direct effect on the species and the ecosystem the team felt strongly that pollution is a concern worth featuring in our mechanics and filled a vital role for a challenge in our project.

# Project Overview

MysidsSim is a game that abstracts our current understanding of mysids behavior and their place in the ecosystem. The project focuses on mysids role in the food web along with the daily and seasonal patterns of mysids behavior using mechanics and varying types of gameplay to communicate these trends.

MysidsSim will feature settings and mechanics that represent mysids behavior to form dense aggregations in deep water during the day; conversely, mysids habit to be more active at night will be represented as well. Additionally, mysids migration patterns to higher salinity waters in winter and lower salinity waters in spring will be present. The key gameplay will focus on mysids' important role in the ecosystem as a key food source that goes on to affect fishery production.

## Target Audience

MysidsSim is aimed at elementary school children age 5 - 10. MysidsSim will help kids internalize the information presented through the mechanics and setting, giving children more of an opportunity to engage with the material.

Aiming for a younger audience will require a lower bar of difficulty to improve accessibility. MysidsSim will aim to create flow by creating a level of difficulty that will challenge the younger audience but not be so dry as to cause boredom. Levels will be kept shorter to make sure players feel like they're making positive progress and keep players engaged cycling through the various level types.

## Platform

MysidsSim is being created primarily for a web-based platform. This will allow the game to be made widely and easily accessible through embedding so that it can be accessed from a PC, laptop, tablet, or phone.

As a stretch goal, the team hopes to port Mysids to a downloadable app for mobile devices.

Since the game is being made to be widely accessible interactions and controls will be focused on click/taps.

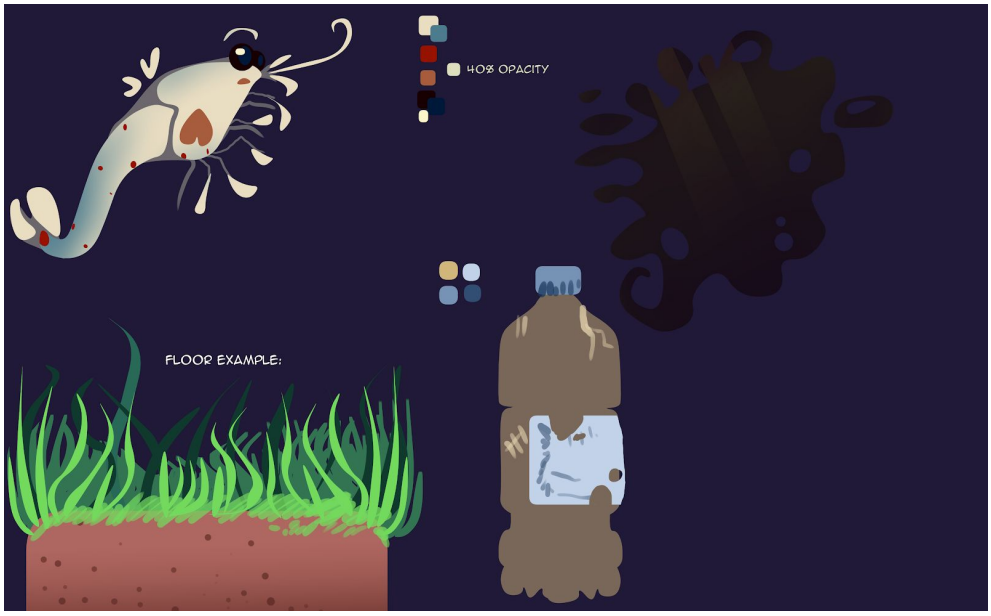
# Technical Information

## Software

MysidsSim will be created using the Unity engine. Unity is a versatile engine with built-in capabilities for 2D that will aid in the creation of the project. Unity is also capable of exporting into WebGL allowing the project to be made available on the intended platform.

## Art

MysidsSim's art should be vibrant and colorful, while also being easy to read and adaptable to both Web Browsers and Mobile devices. To do this the best, a lineless vector style, focused on rounded edges, soft gradients, and no shading has been decided. The color palette consists of bright and bold colors, with a darker background. The art style is inspired by other games such as "Night in the Woods" and "Electroplankton". A few pieces of rough concept art will be below




## Audio

Audio's driving goal is to create sounds and backing tracks that are minimalist in composition and meld with the more cartoony aesthetic. Audio cues will be distinctive, using rising/bright tones and whole root chords to convey positive events while falling/subdued tones and diminished chords will be used to convey negative events.

Backing tracks are guided by creating an appropriate soundscape typical of tributaries or watery environments with minimal instrumental accompaniment. The audio team will work between recorded audio and synthetic audio created using tools such as Ableton DAW and Native Instruments plugins.

# Gameplay Overview

MysidsSim will feature four distinct segments that will represent, convey, and enforce the information the project looks to impart.

**Night Levels**

Night levels are the single largest gameplay section. Players are put in control of a swarm and tasked with helping improve the health of the local ecosystem. The player does so by navigating the environment, eating, and being eaten. The player will come across other local fauna (fish primarily) and have to use in-level mechanics to entice the fish to eat some of the swarm, by doing so they increase the health of the environment/fishery. The player will have to be careful not to come in contact with pollution though, otherwise, they might do more harm than good.

Night levels are used to convey the idea that mysids feed on smaller life such as zooplankton and phytoplankton while also being a key staple of the diet of larger fish. The inclusion of pollution creates a challenge but also represents how toxins in the food chain can be perpetuated.

**Interludes**

Interludes are quick single still images used to bridge sections and convey the impact the player is having on the environment and what is happening to the environment around them. It'll feature strongly increased pollution and how productive the fisheries they assisted were. Some of these will vary such as the representations of fishery production depending on how well the player performs, others will be pre-scripted events.

**Day Levels**

Day levels will be short and fairly simple breaks in the gameplay. During the day the player's swarm will rest near the bottom of the tributary with wayward mysids occasionally floating across the screen. The player will have a chance to interact with the mysid to incorporate it into their swarm. The larger a resting swarm they can make during the Day level the larger their swarm the next night will be.

**Migration**

Migration levels will work similarly to an overworld level select. The player will be prompted with a change of season and presented with an overview of the local area. Several areas on the map will be highlighted with a salinity rating. Going into spring the player will want to choose lower salinity environments while going into fall the player will want to choose higher salinity waters. The better suited the environment is for the season the more benefit the player will get. Choosing the perfect level of salinity for the season will give the player a movement

speed buff and provide more mysids to add to their swarm during day levels. Choosing poorly will have the reverse effect, slowing the player down and having fewer errant mysids in the area.

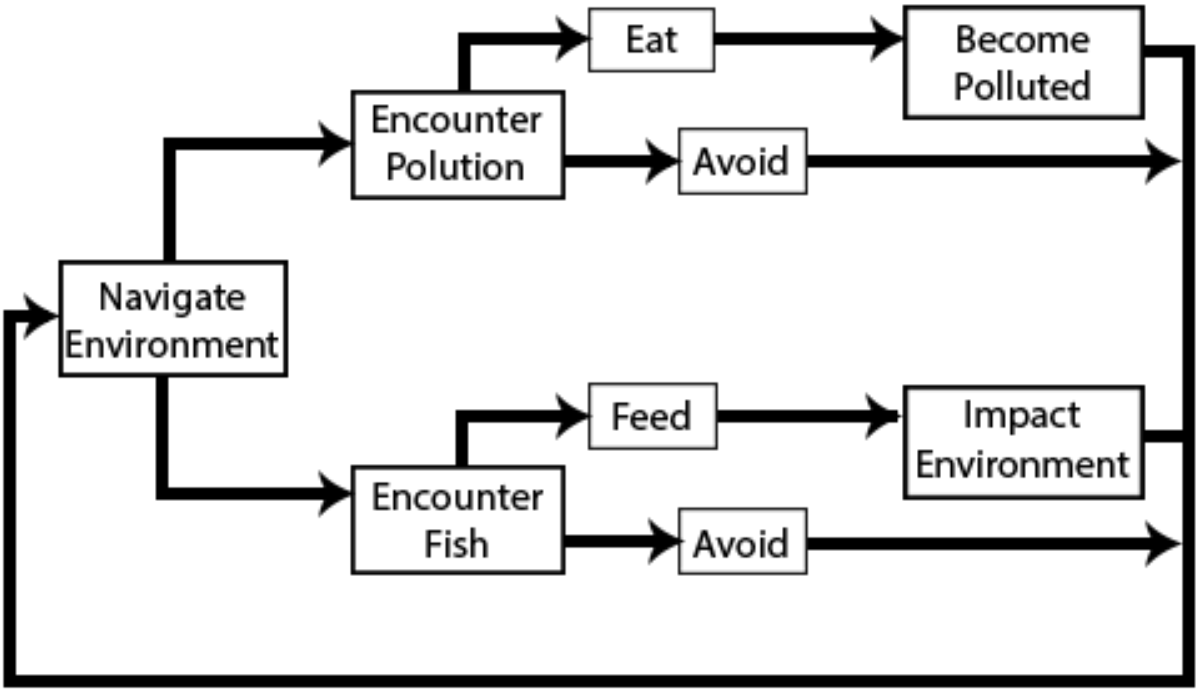
# Night In-Depth Breakdown

Levels that occur at night feature the player guiding a swarm of Mysids around a body of water. The player navigates the swarm around obstacles with the goal of finding NPCs representative of other fauna indigenous to the Chesapeake Bay. The player will have to outmaneuver the NPCs so they can feed the NPC with a portion of their swarm in order to positively improve the level's overall health gauge. The level's health gauge is representative of the local area's environmental health. The player will also have to avoid environmental hazards that are pollution. When the player is unable to avoid pollution a portion of their swarm becomes polluted, and when they are consumed by other NPCs the environmental health is negatively impacted.

**Input**

The player will click/tap on the local play area to set a destination for their swarm. The swarm will then attempt to move directly to the designated point. The player will have to use the careful direction to make sure the swarm efficiently navigates the environment.

**Gameplay Loop**




**Fish NPCs**

Player's will encounter NPCs representative of other fauna such as fish that commonly occupy the Chesapeake Bay and local tributaries. The player will have to get near the NPCs so

they can feed on the swarm the player is controlling. When the fish has fed the local area's health will be adjusted (positively as long as consumed mysids aren't polluted.) The player will have to make choices on what fish to avoid and what fish to feed though since some fish improve the health of the area more than others, and it is possible the whole swarm will be eaten and the player will not achieve the necessary health score to beat the level. Once the NPC has been fed they will move away and vanish from the play area.

This would be achieved through making each fish into state machines that have four different states they can swap between. These four states would be roam, eat, leave and dead. The eating state would be triggered by the swarm getting close enough to the fish so that it gets noticed which would then make the fish attempt to chase down eat one of the shrimp. If the shrimp have consumed a food that's compatible with that fish then the detection range will be increased as well. The leaving state would be triggered after the fish has eaten a healthy shrimp and would then leave the play area and add to the health of the ecosystem. The roam state can be triggered if the swarm is out of the fish's detection range or leaves the detection range. The dead state is triggered with a polluted shrimp is consumed and the fish will become ill from consumption and the health of the ecosystem will be reduced.

**Pollution**

Levels will feature environmental hazards modeled after pollution. The player will be incentivized to avoid pollution. When parts of the swarm encounter pollution those members of the swarm they themselves become polluted. When those polluted mysids are consumed by other NPCs the environmental health gauge is reduced. The amount reduced depends on the NPC. The player will have to make a tough decision to try and navigate the swarm so the polluted mysids aren't consumed or to let smaller fauna consume the mysids and minimize the negative impact.

Like the fish AI, the pollution will be a state machine but will only have three states. These three states will be patrol, chase, and shoot. The chase state would be triggered by the swarm entering the pollution's detection range and would consist of the pollution moving toward the swarm. The shoot state would be triggered by the swarm entering the pollution's attack range and would consist of the pollution firing projectiles at the swarm in order to make as many of them sick as possible. The patrol state would be triggered if the swarm is outside of the detection range and would consist of them simply roaming the level.

**Phytoplankton/Zooplankton & Feeding**

Throughout the level will be small sources of food for the mysid swarm. Consuming the food sources will benefit the swarm and will provide an additional bonus to the level's overall health.

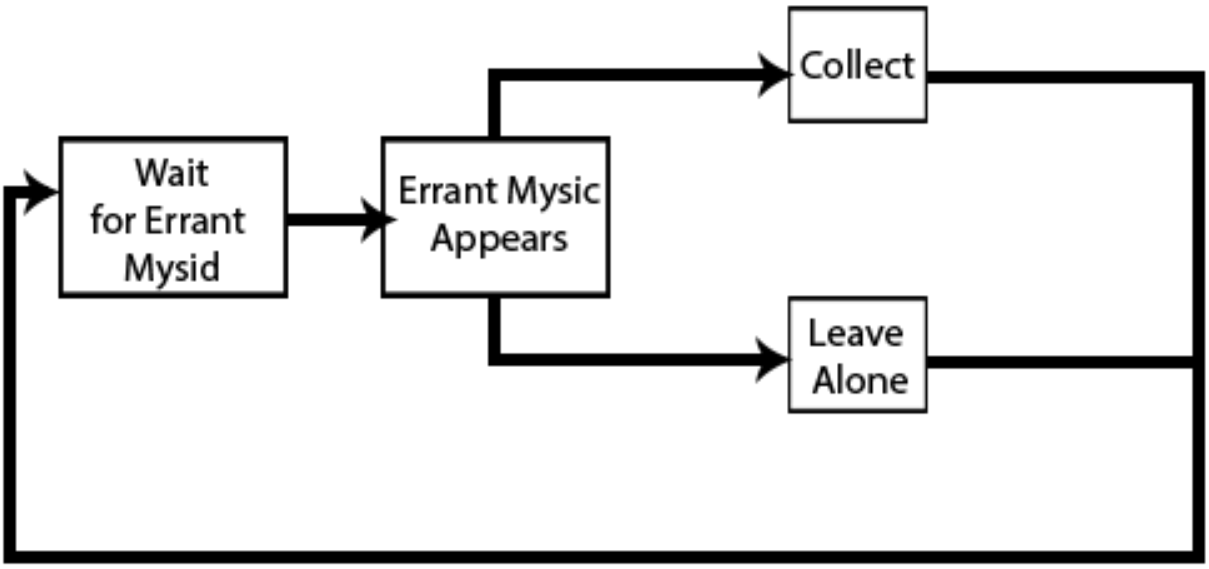
# Day In-Depth Breakdown

Day-themed levels have players navigating a smaller environment modeled to represent deeper areas of water. The player is using a limited amount of time to grow their swarm so that in the coming night levels they have a larger group of mysids to offer to the ecosystem. This sequence is based on mysids nature to form dense aggregations during the day in deeper waters. It gives the player an opportunity to give themselves an advantage in the coming level.

**Input**

The player will click/tap on the screen to try and tap/click on errant mysids so they are grouped into the swarm and to try and help them avoid pollution.

**Gameplay Loop**



# Example Level Design Doc (Night Level :: Test1)

**Goal Statement**

Create a working environment that tests the base intended features of the Night Level.

**Player Goal**

Reach the goal environmental health value and leave the area.

**Gameplay**

Tap/click on navigable portions of the environment to guide player swarm. Swarm should avoid pollution and attempt to feed NPC fish.

**AI**

- Mysid Swarm AI
- Fish Still AI
- Fish Path AI
- Polluted Mysid Path AI

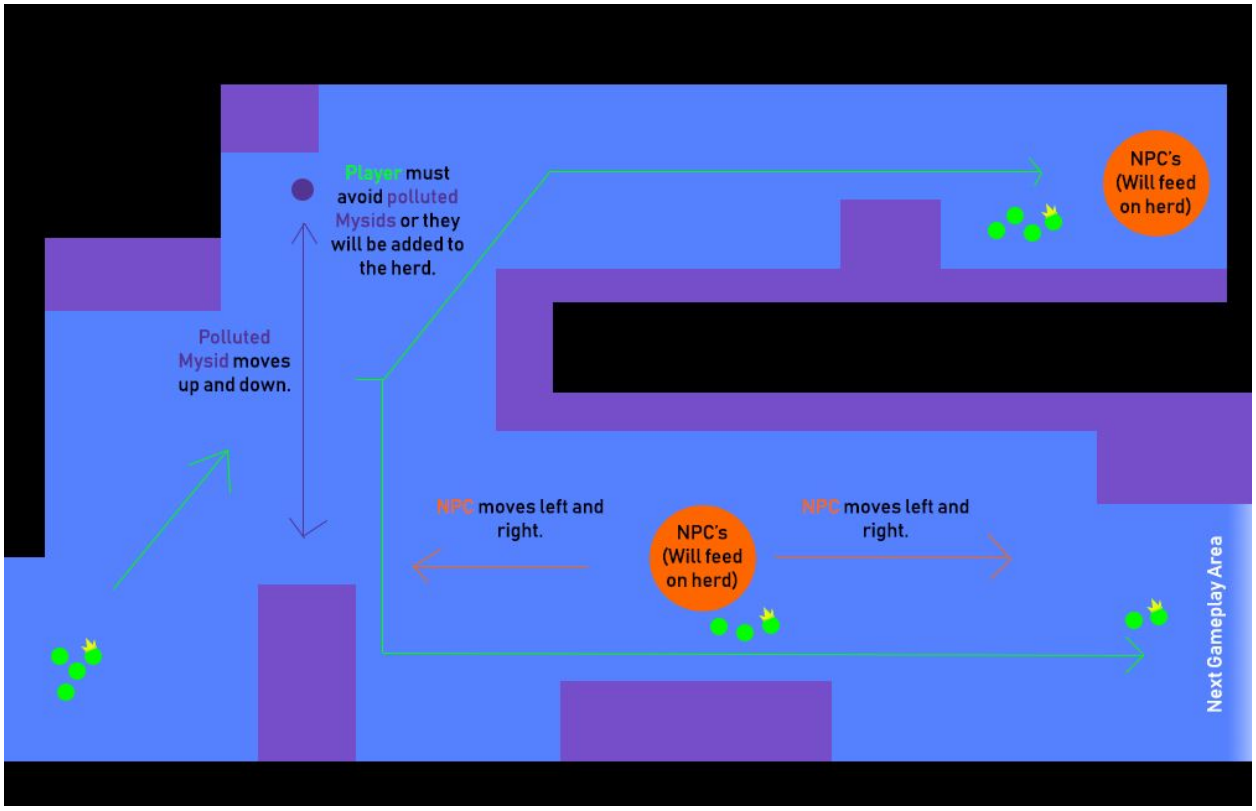
**Art**

- Mysid
- Polluted Mysid
- Pollution
    - TK
- Environment
    - TK
- Water
    - Water FX
- Fish
- Environmental Health Meter(Gauge)

**Audio**

- Backing Track (Looping)
- Player Interact Effect
- Pollution Collide Effect
- Fish Idle Effect
- Fish Eat Effect

**Level**




*(Above: example night level layout)*

In reference to the example above, the player would have to carefully navigate the environment to feed the NPCs in the ecosystem. Note that the herd shrinks after visiting both NPCs. Polluted Mysids roam night levels and can be collected by the player, so they must avoid them. NPC's are either static or float across the water as shown above. The player can move on to the next area once reach the lower right.

# Example Level Design Doc (Day Level :: Test1)

**Goal Statement**

Create a working environment that tests the base intended features of the Day Level.

**Player Goal**

Gather as many healthy mysids into the swarm as possible before time runs out.

**Gameplay**

Tap/click on errant mysids to incorporate them into the player's growing swarm.

**AI**

- Mysid Swarm AI
- Errant Mysid Path AI

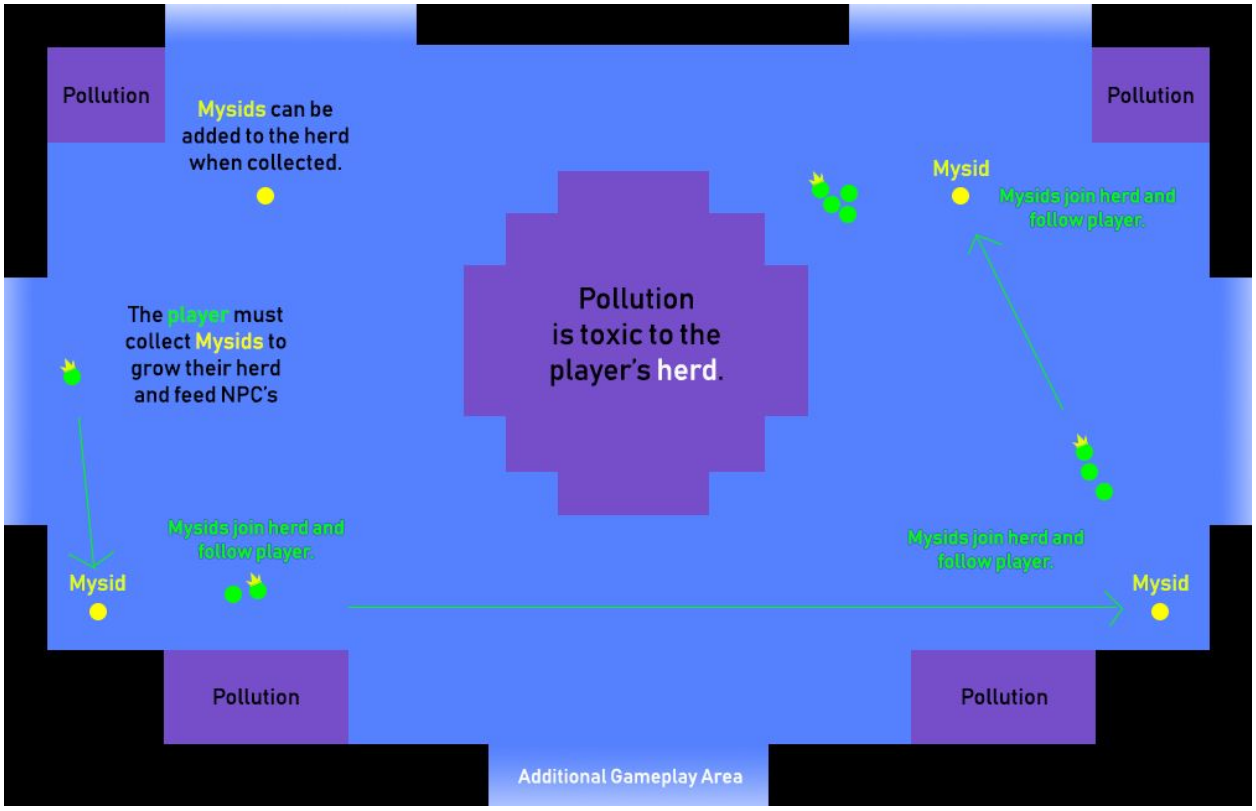
**Art**

- Mysid
- Polluted Mysid
- Pollution
    - TK
- Environment
    - TK
- Water
    - Water FX
- Timer

**Audio**

- Backing Track (Looping)
- Player Interact Effect
- Pollution Collide Effect
- Null Tapp Effect
- Healthy Mysid Tap Effect
- Polluted/Sick Mysid Tap Effect

**Level**




*(Above: example day level layout)*

In reference to the example above, the level is designed asymetrically so that the player has an easy and simple understanding of the environment. Mysids can be collected during these gameplay sections in preparation for the upcoming night level. There are other areas the player can go to, but those areas would not have additional areas to explore because day levels are short. There is still pollution in day levels so the player must avoid these.

# Broad Schedule

**September 12**

- Completed Proposal
- Early Concept Design Docs

**September 26**

- Revised Proposal
- Detailed Schedule Complete

**October 03**

- Vertical Slice Alpha
    - One Each Type Level Prototyped
        - Feature Completed
        - Beatable
        - Fail State (when appropriate)
    - Placeholder Interludes

**October 10**

- Milestone One!
    - Level Design Doc Complete
    - Majority of Levels Blocked Out
    - First Pass Art in Place
    - Some Audio Present

**October 11**

- Project Alpha
    - Art Close to Complete
        - No Missing Animations
        - No placeholder art
    - All Levels Present
    - Most Audio Present
    - Menus Present & Functional

**October 24**

- Milestone Two!
    - Presentable Initial Build

**November 07**

- Testing of Exported Application

**November 14**

- Milestone Three!
    - Bugs Fixed

**December 05**

- Project Completed and Verified Application Assembled

# MysidSim

The Infamous

# Preface

- Food-Web
- Fishery Health
- Effects of Pollution

# Deliverables

- Target Audience: Younger audience (5 - 11 years old)
- Genre: Educational, Arcade
- Platform: Web browser
- Engine: Unity 2019.1.14

# Art & Audio Style:

- Bright and Colorful
- Minimalistic
- Lack of sharp edges
- Soft Gradients



# Gameplay Overview

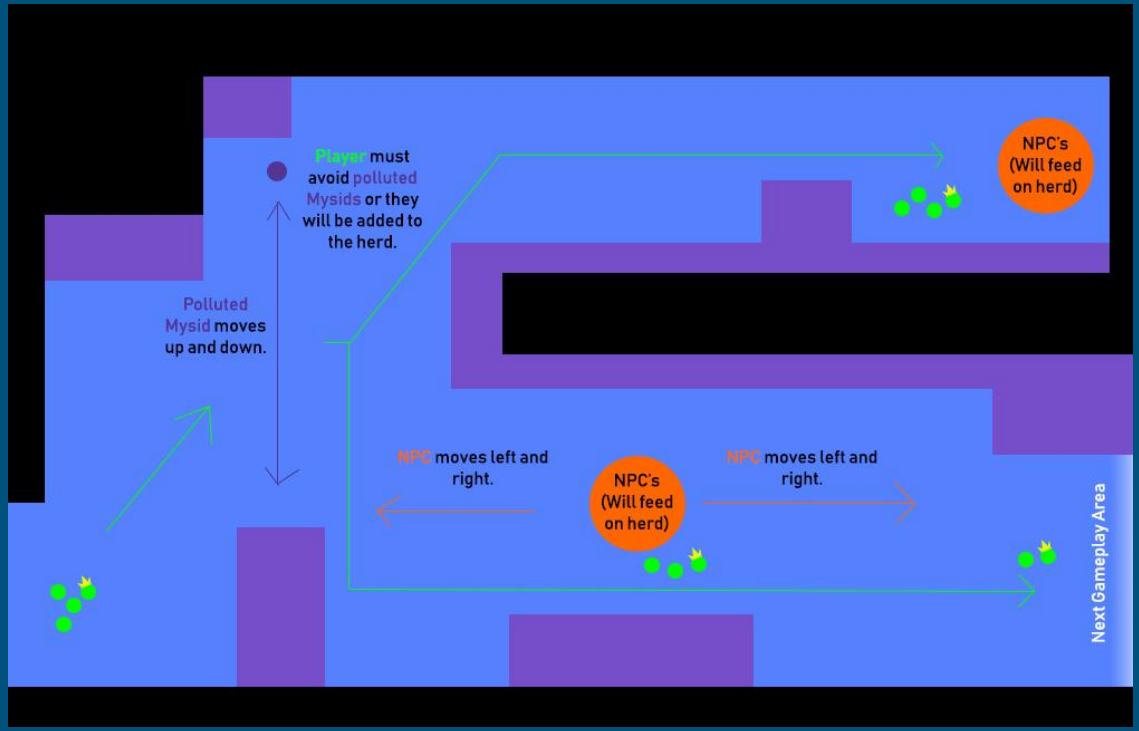
**4 Distinct Segments**

- Night Levels
- Interludes
- Day Levels
- Migration

# Night Gameplay

- Eat & Be Eaten
- Improve the Health of the Environment/Fishery
- Avoid Pollution
- Mysids are more active
- Players Engage with Food Webs

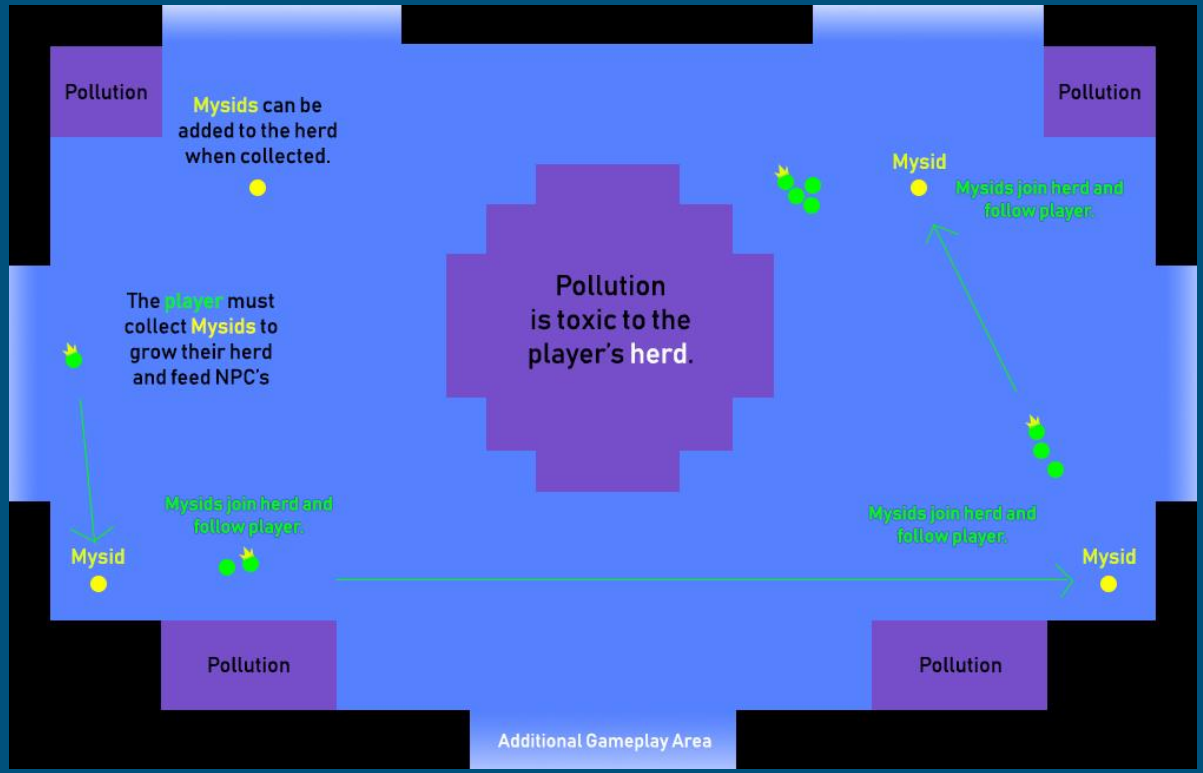
# Night Gameplay - Level Design



# Day Gameplay

- Relax(Interlude)
- Increase the Size of your Swarm
- Gain Advantages for Following Stages

# Day Gameplay - Level Design



# Educational Impact

- Get Players Engaged with Mysid Behavior
- Use Mechanics as Metaphor
- Important Elements of Mysids Repeated to Reinforce Mysids Impact on their Environment

# Questions?