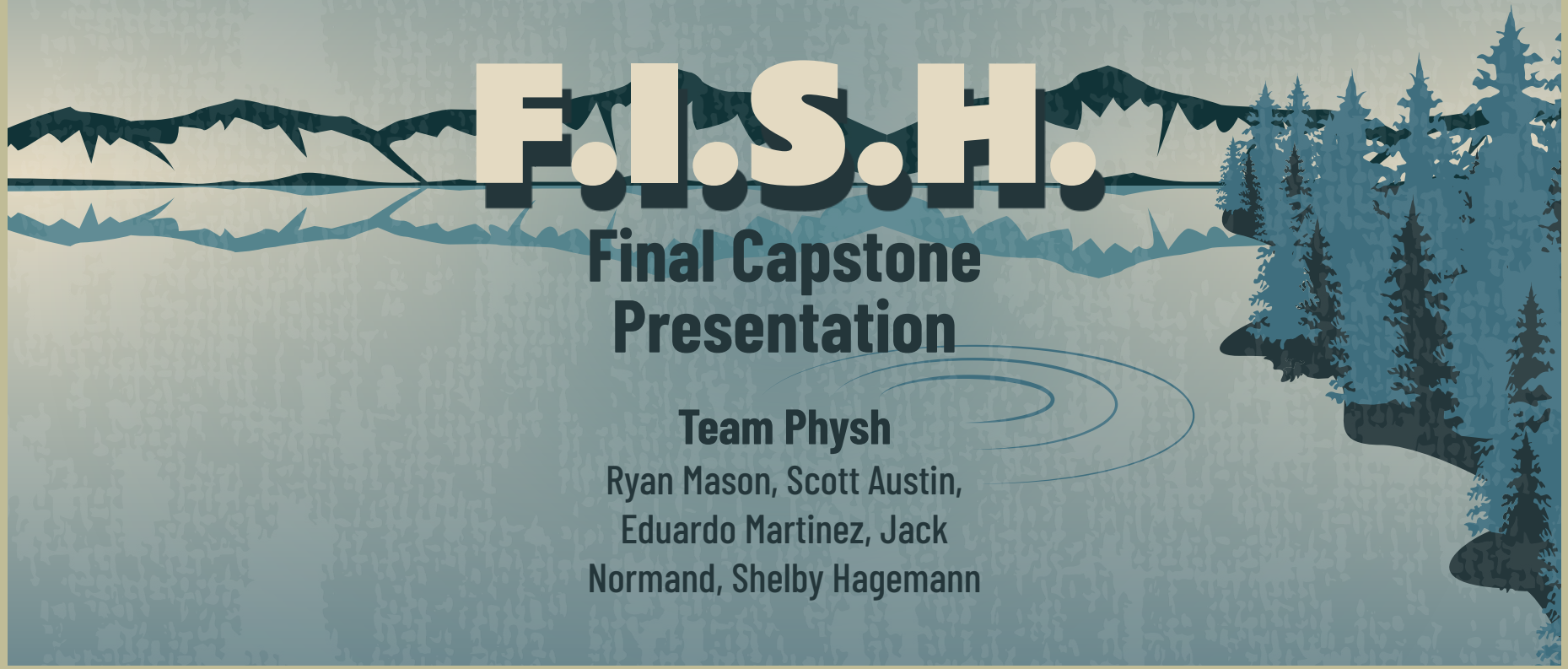
NORTHERN ARIZONA UNIVERSITY | College of Engineering, Informatics, and Applied Sciences



F.I.S.H.

Final Capstone Presentation

Team Physh

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Introduction

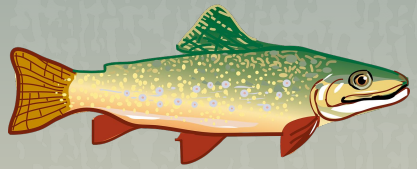
- AZGFD & GCMRC researching the major fish populations below the Glen Canyon Dam
- See the potential effects dams might be having on these populations
- Large volumes of data needs to be collected

Problem Statement

- Researchers/scientists have had a hard time collecting large amounts of data

- To view a caught fishes previous information an angler must call a scientist with access to the database

- Established dams are known to have negative impacts on fisheries

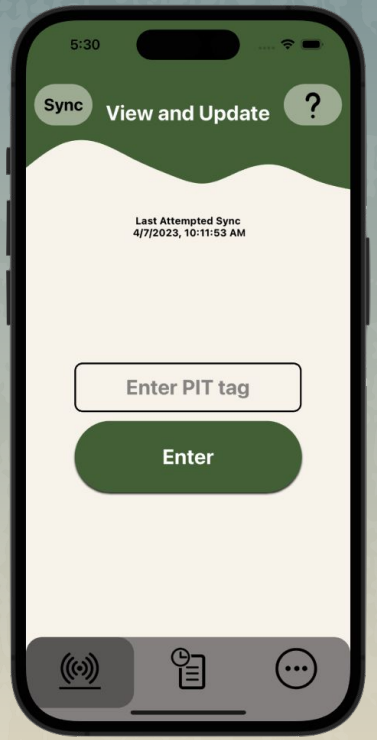


- Anglers from AZGFD only go collect fish data on the fishery 3-4 times a year

- To update a fish's information it must be verbally relayed to the same scientist

Solution Overview

- Easy pairing via Bluetooth, with an option for manual entry as a back-up
- The app will be able to verify that a PIT Tag is correct and already in the system when it is entered
- Date and time will automatically be recorded, so anglers will only need to record mile marker and length
- The app will store the data until the phone is connected to the internet, where it will then upload all information to the server's main database
- Anglers will only need to worry about entering data on their fish in the moment, the app will handle relaying it to AZGFD



Requirements / Specifications Review

Product description: A mobile-based fish identification tool for the Arizona Game & Fish research group.

Key requirements:

- Ability to retrieve a fishes information via pit ID
- Integration with the Home again scanner (Bluetooth)
- Ability to work on both ios and android devices
- Ability for app to function offline
- Easy to use interface

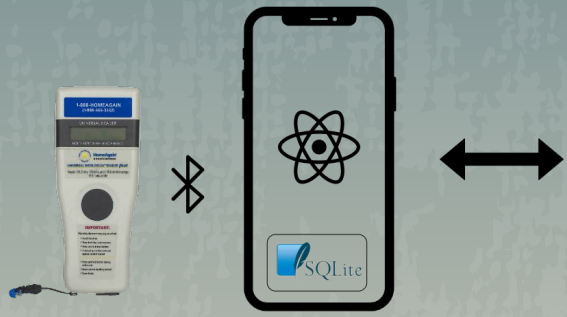
Technical requirements:

- Build using React Native, Node.js, Express, Bluetooth classic
- Utilizes a MYSQL database for storing project data
- Designed for scalability and performance

Implementation Overview

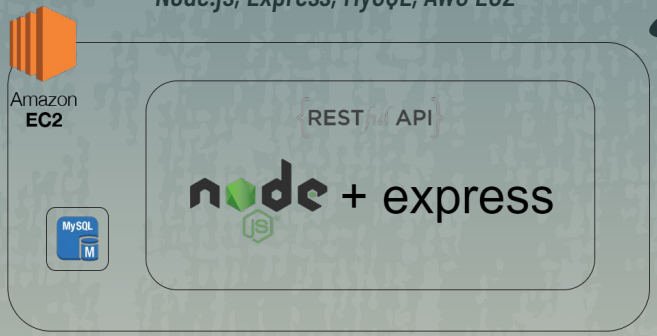
Frontend

React Native, JavaScript, SQLite



Backend

Node.js, Express, MySQL, AWS EC2



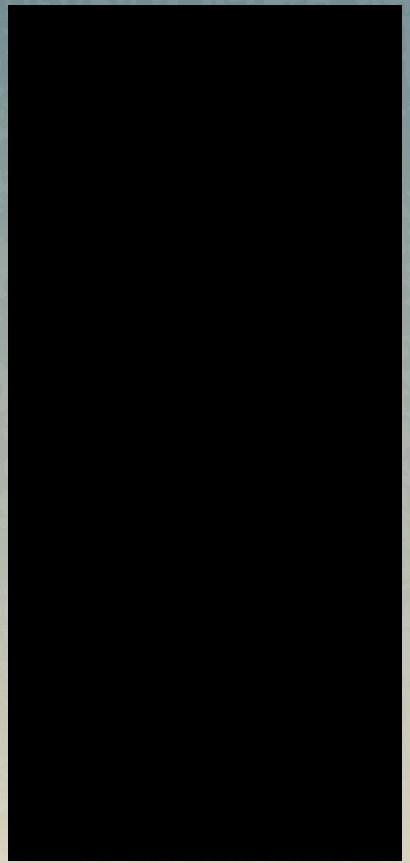
Main Components

- Syncing
  - API calls
- New Data Entry Screen
  - New Length and River Mile for existing PIT
  - All info if newly scanned fish
- Session History Screen
- Total Catch History Screen
- View Screen
  - View all catches for that fish

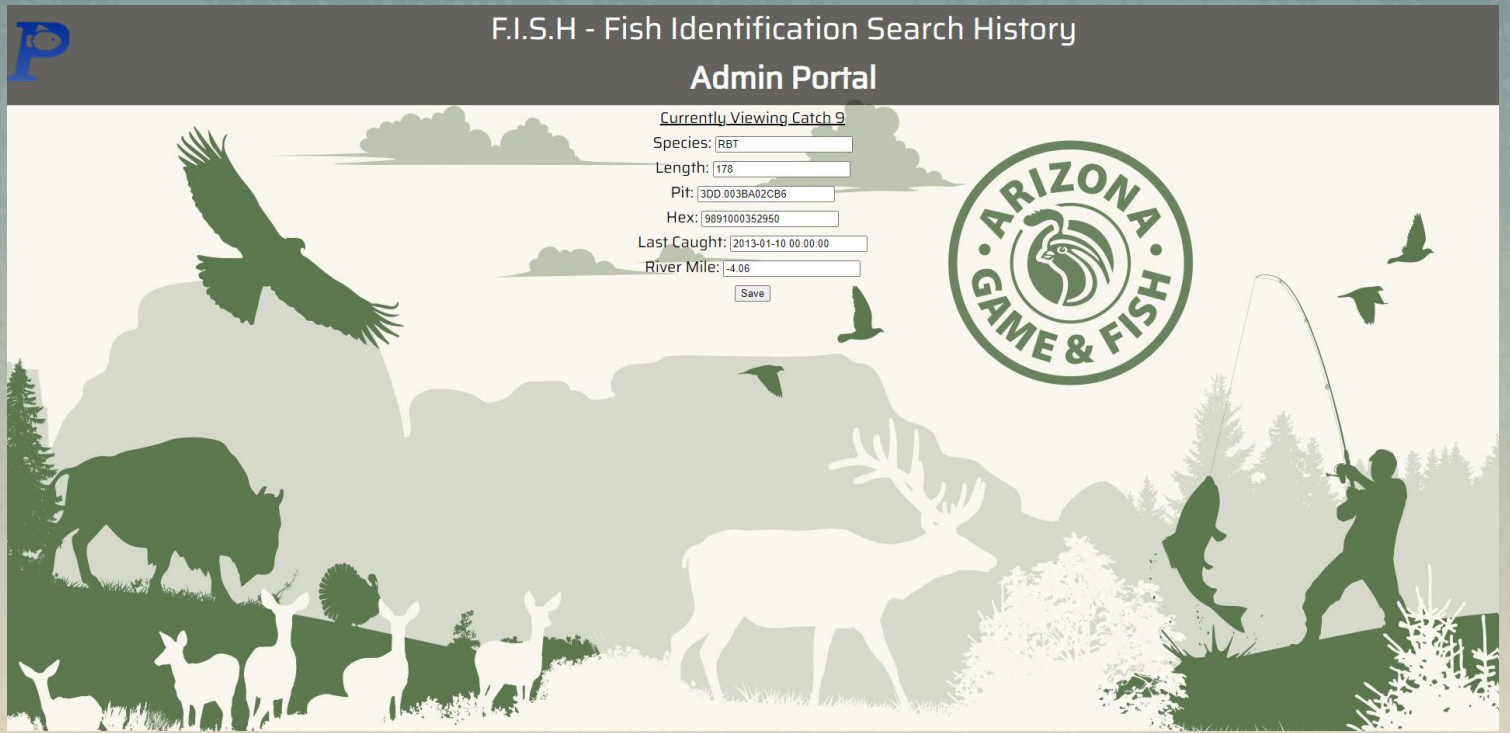
Prototype Review

Sample Scenario :

1. Anglers opens app for first time
    a. Database cached for offline use
    b. View help screen for instructions on use
2. Enter PIT Tag for caught fish
    a. View previous catch data for that fish
    b. Enter new length/rivermile for existing PIT
    c. If new PIT also need species
3. View Session Catch History
    a. Sync on homepage to send your new catches and get data from other angler's catches
    b. Session History cleared
4. View Total Catch History



Admin Portal



Challenges and Resolutions

Cloud computing: Fetching data from a database in real time.

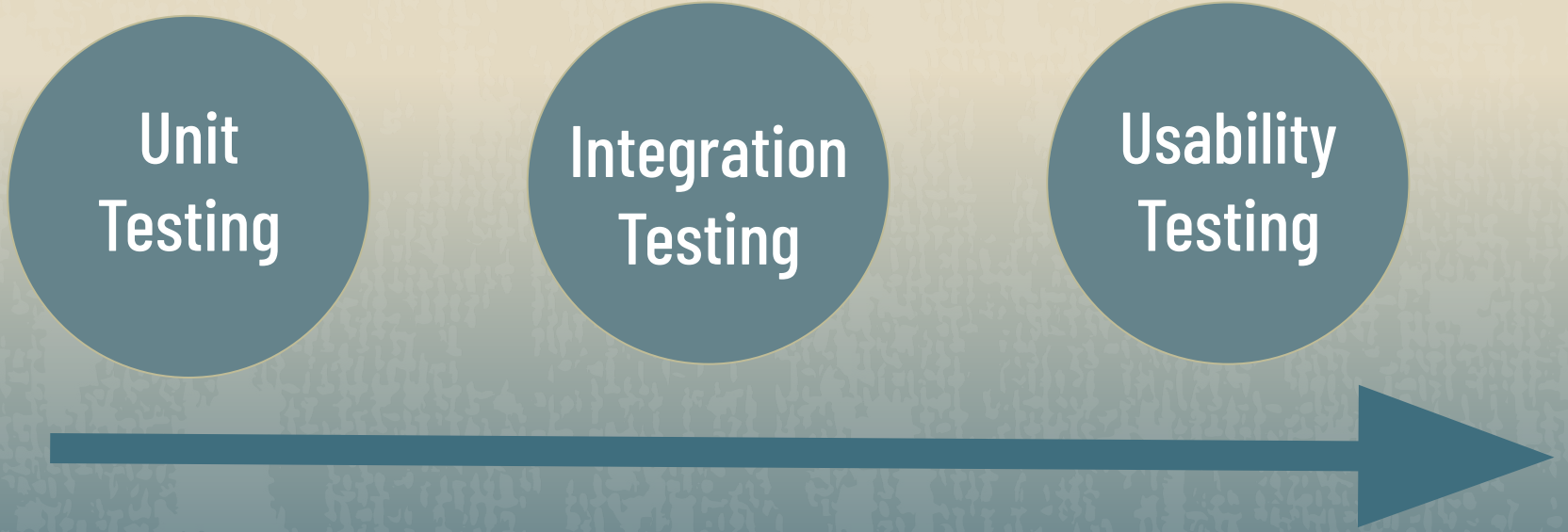
Cross platform: Utilizing modules that work for both android gradle and ios

Offline Caching: storing a local database on the users phone

Bluetooth: pairing

Duplicate data: utilizing time stamps to distinguish between different fish updates

Software Testing Plan



Unit Testing

- Goal: Verify that all modules work as intended, look for errors
- Our Use Cases:
  - Data Entry and Upload
  - Connecting via Bluetooth
  - Offline Syncing
  - Navigating Between Screens
- Testing by attempting to break the application

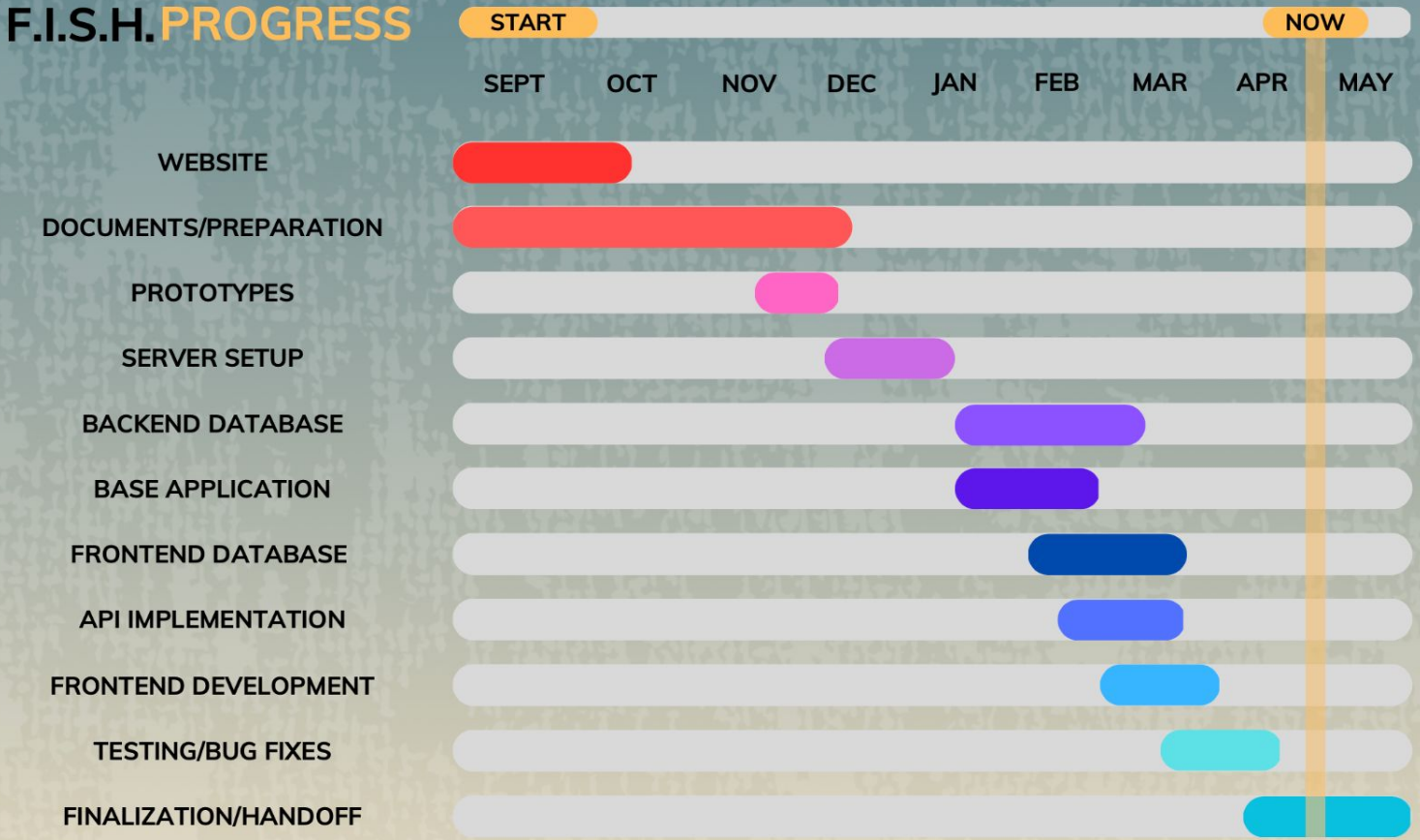
Integration Testing

- Goal: Ensure that all modules work together as intended
- Bottom-Up Approach
  - Focus on testing lower-level components first, working upwards towards higher-level components
- Ex: Testing the upload function first, then the download function, and finally the sync module which utilizes both

Usability Testing

- Goal: Make sure the app is intuitive
- Talking to anglers
  - Anglers are our key demographic
- Testing for intuitiveness is important
  - Users should be able to use all functions in the app with little-to-no guidance
- App should be simple and straightforward

F.I.S.H. PROGRESS



Future Work

- Expansion to other wildlife tracking organizations
- Expansion to Game and Fish Departments in other states
- Increasing the size of the main database
- Implementation of Bluetooth capabilities with IOS devices
- Data upload portal for web interfaces for users (not AZGFD researchers)
- Gamification to incentivize data entry

Conclusion

- AZGFD needs more data on the fish they are monitoring, our app will fix that
- Will help remove limitations
- Anglers will get to see information too, all while offline
- Met clients requirements
- Will revolutionize the angler data collection program
- NEXT UP: Documentation, giving to client
- Prototype was very well-received

Thank you!