

Orlando Trujillo-Ortiz

# Team Last Place

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## NCRLT Interactive Map

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March 6, 8, and 9 of 2025

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# Basic starting questions

## What is a conservation?

- **Voluntary Land Protection:** A conservation easement is a voluntary legal agreement where landowners agree to limit certain uses of their property.
- **Long-term Preservation:** The easement protects the land's ecological, historical, or scenic values while allowing landowners to retain full ownership.
- **Permanent Commitment:** Easement terms remain binding and continue to protect the land, even if ownership is transferred to new owners.

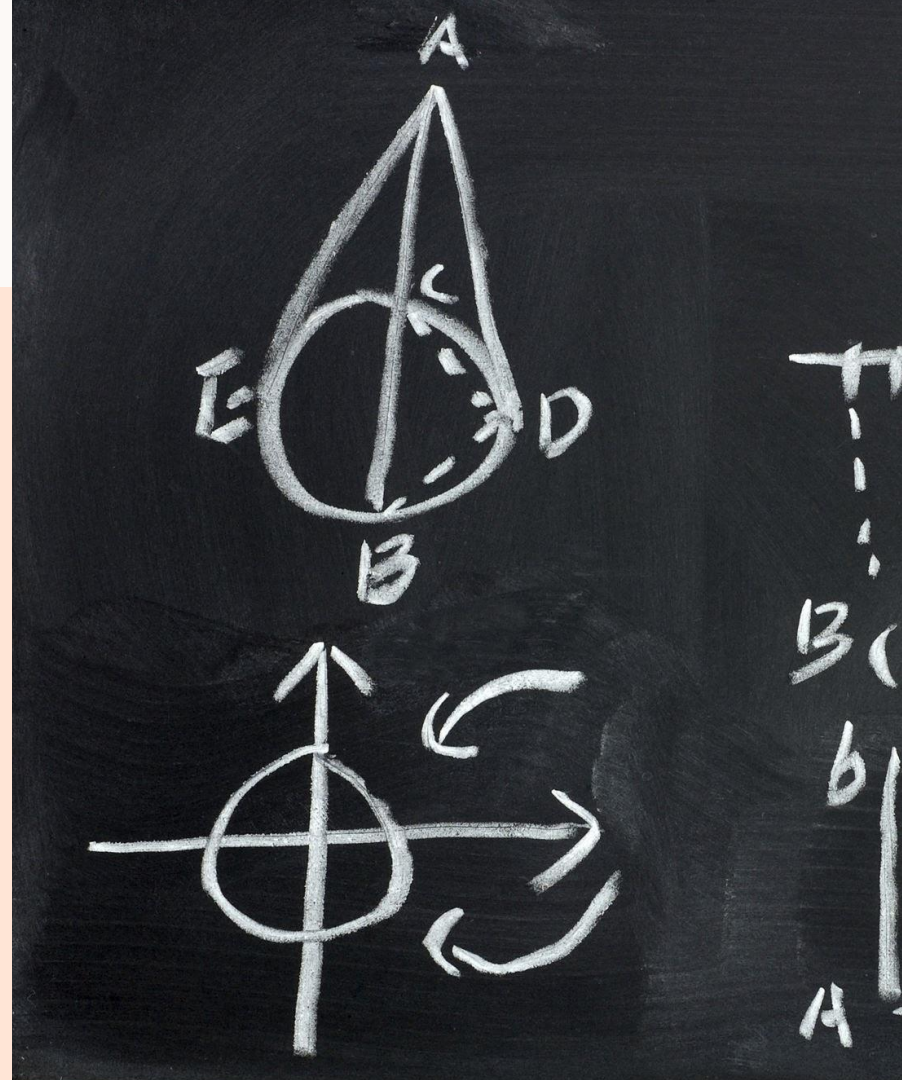
## Why are they important?

- **Ecosystem and Resource Protection:** Conservation easements safeguard natural habitats, agricultural lands, and historically significant areas from harmful development.
- **Financial Incentives for Owners:** Landowners benefit from tax incentives, encouraging participation in conservation efforts.
- **Encouraging Sustainability:** Easements promote long-term, sustainable management practices, fostering responsible stewardship of the land.

# The problem

## Helping a non-profit organization

- **Interactive Conservation Map:** Developed a dynamic web map for the Northern Coast Regional Land Trust to clearly present conservation easements and protected properties.
- **Intuitive User Experience:** Designed the map to be easily navigable, enabling stakeholders to quickly explore geographic locations and conservation details.
- **Enhanced Accessibility:** Provided stakeholders with instant access to detailed information, including land use restrictions and conservation benefits.



# Goals and Objectives

- **Interactive Mapping Platform:** Develop an engaging, easy-to-use web map to boost public interaction with NCRLT's conserved lands.
- **Enhanced User Experience:** Offer intuitive navigation with zoom, pan, clickable pop-ups, and multimedia integration to showcase property details.
- **Advanced Search & Mobile Accessibility:** Include search, filtering, and responsive design to ensure seamless exploration across all devices.

# Core Components

## Search Bar

- Effortless Easement Search
- Real-Time Updates
- Responsive User Interface

## Easement List

- Clear Easement Listings
- Instant Interactivity
- Integrated Map Highlighting

# Core Components

## Interactive Map

- **Visual Easement Representation**
- **Clickable Information Tooltips**
- **Dynamic User Interaction**

## Admin Panel

- **Centralized Data Management**
- **User-Friendly Administration**
- **Real-Time Data Synchronization**



**LIVE DEMO**

# Tech Stack

## Front-End (HTML, CSS, JavaScript)

- **Dynamic Web Interface:** Developed a responsive front-end using HTML, CSS, and JavaScript, creating an engaging and interactive user experience.
- **Structured and Responsive Design:** HTML organizes content clearly, while CSS provides a visually appealing and adaptable layout across devices.
- **Enhanced Interactivity:** JavaScript drives real-time functionalities—including filtering, sorting, and map interactions—leveraging libraries like Leaflet or Google Maps API for intuitive geographic visualization.

## Back-End (PHP and SQL)

- **Efficient Back-End Processing:** Utilized PHP to effectively manage data handling, user authentication, and dynamic content generation.
- **Secure Database Integration:** PHP scripts facilitate secure interactions between the user interface and an Oracle database, reliably processing user requests and administrative functions.
- **Robust Security Measures:** Implemented prepared statements and secure session management to protect data integrity and ensure secure transactions throughout the application.



# Architecture and Data

## Architecture overview

- **Client-Server Architecture:** Designed the application using a clear and efficient client-server model to seamlessly handle user interactions and data processing.
- **Real-Time User Interaction:** Front-end JavaScript captures events like searches, sorting, and map clicks, initiating asynchronous requests to the server-side PHP scripts.
- **Secure and Efficient Data Processing:** Server-side PHP scripts securely handle user requests, query the Oracle database, and return structured responses, instantly updating the interactive map and easement listings.

## Data Flow

- **Seamless Data Flow:** User actions on the interface trigger JavaScript to send requests directly to server-side PHP scripts, ensuring smooth and responsive interactions.
- **Secure Server Processing:** PHP validates user inputs and securely retrieves relevant data from the Oracle database using prepared statements, safeguarding information integrity.
- **Dynamic Front-End Updates:** Server responses formatted in GEOJSON dynamically update the map markers and easement list, providing users with instant feedback without page reloads.

# Possible Improvements

## Improved PDF Support

- **Enhanced PDF Integration:** Improve user experience by enabling seamless, in-browser viewing of PDF documents with faster loading and smoother rendering.
- **Interactive PDF Features:** Allow users to easily search, extract text, and annotate PDFs directly within the application, boosting productivity and convenience.
- **Responsive Embedding and Navigation:** Implement responsive PDF embedding with intuitive navigation and streamlined document downloading, offering greater control and flexibility for users.

## Enhanced User Accounts and Role Management

- **Comprehensive User Accounts:** Introduce a robust account system with role-based access to deliver personalized experiences tailored to different user roles.
- **Efficient Data Management:** Allow administrators and editors specific permissions—such as managing, updating, or reviewing content—streamlining workflows and improving collaboration.
- **Personalized User Experience:** Enable general users to save searches, bookmark favorite easements, and customize their interactions, significantly boosting user engagement.

# Who was responsible for creating what?

## Orlando

Orlando served as the scrum master, guiding all of our stand-ups and ensuring agile best practices were followed throughout the project. He also played a crucial role in data and backend operations, writing most of the PHP code that powered the system.

## Logan

Logan led nearly all front-end development, creating the user interface with JavaScript, HTML, and CSS, except the map.js leaflet map. He made the Map Legend, Title, and zoom buttons. He also created the presentation and managed the AI citations.

## Anthony

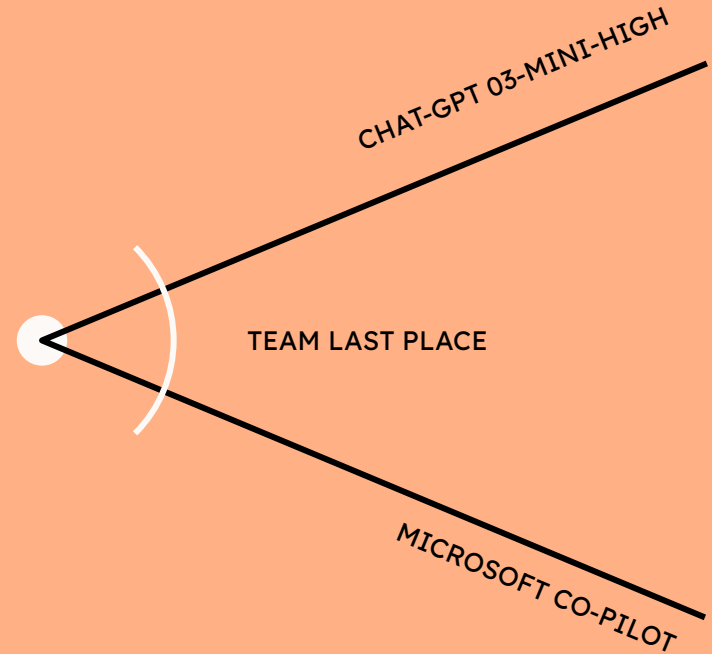
Anthony designed and implemented the SQL population file, contributed to PHP development, and collaborated with Dylan on the admin panel and the map.js leaflet map. He is a major player in the creation of the back-end data-tier.

## Dylan

Dylan created the database tables and later revised Anthony's SQL to incorporate his pop SQL functionality. He is the main person behind the admin panel. He also collaborated with Anthony to create the map.js Leaflet map. He is a major player in the creation of the back-end data-tier.

# AI Citations

Most of the AI-generated code in our project was utilized for front-end development, specifically in structuring the HTML, CSS, and PDF components. For database interactions, AI assistance was minimal, primarily aiding in small portions of INSERT statements. Regarding the map implementation, AI was mainly used for generating the legend and title, while the core functionality of the map itself—including rendering and handling polygon coordinates—was predominantly hand-coded. This approach ensured that the map was tailored to our specific requirements while leveraging AI to streamline certain UI elements. Additionally, AI played a significant role in enhancing our presentation, assisting with content organization, slide design, and refining explanations to ensure clarity and coherence.





**Q&A**