CAMP AGQ FIELD GUIDE AND ECOLOGICAL EXPLORATION FOR THE ANN ARBOR YMCA

by

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A practicum submitted
in partial fulfillment of the requirements
for the degree of
Master of Science
(Environment and Sustainability)
in the University of Michigan
April 2026

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ABSTRACT

This practicum documents the creation of a place-based environmental education resource for Camp AGQ, a YMCA summer camp in northern Michigan. The project responded to a need expressed by the client: to strengthen environmental education on the camp property by creating a resource that is accessible, visually engaging, and closely tied to camp culture. The resulting field guide was designed for campers, staff, and alumni and organized around four major components: mapping, woody plants, general ecology, and carbon analysis.

The project combined field data collection, geospatial analysis, ecological interpretation, and graphic design. Site features, tagged trees, buildings, and habitat areas were recorded and mapped using GIS workflows, then translated into a set of wayfinding and interpretive maps. More than 100 trees were tagged across the property, and approximately two dozen dominant species were converted into illustrated identification sheets. Additional pages highlighted common vines, wildlife, and well-known camp landmarks. A final carbon analysis used mapped forest area, field sampling, and published reference values to estimate annual carbon sequestration on the property. Collectively, the practicum demonstrates how environmental methods can be translated into a client-facing resource that supports both ecological learning and long-term attachment to place.

ACKNOWLEDGEMENTS

I would like to thank the Ann Arbor YMCA and Camp AGQ for supporting this practicum and for providing a site that is both ecologically rich and personally meaningful. I am grateful to the camp community for shaping the questions that guided this work and for demonstrating the value of outdoor education in a way that is experiential, relational, and lasting. I also appreciate the guidance of my practicum advisor and instructors, whose feedback strengthened both the ecological and cartographic dimensions of the project. Finally, I acknowledge the campers, counselors, and alumni whose curiosity about the natural world made this project worth creating.

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INTRODUCTION

This practicum emerged from the intersection of professional training, personal experience, and client need. Camp AGQ, operated by the Ann Arbor YMCA, is a summer camp in northern Michigan that offers one and two-week sessions in an immersive natural setting. The camp functions not only as a recreational space but also as a place where young people build confidence, relationships, and a sense of connection to the outdoors. Because the property itself is central to the camp experience, the landscape offers significant potential as an educational resource.

The project was motivated in part by my longstanding relationship with Camp AGQ as a former camper and counselor. That personal history created an awareness of how strongly camp identity is tied to place and how much ecological learning already happens informally through day-to-day exploration, waterfront activities, outdoor play, and repeated encounters with plants and animals across the site. The practicum therefore sought to transform that informal environmental learning into a more intentional, accessible, and lasting resource. The guiding idea was to create a field guide that could teach campers, staff, and alumni about the environment around them both during the summer and after they return home.

Rather than producing a conventional scientific report alone, the practicum focused on making an applied product that could be used directly by the client. At the same time, the work demanded a rigorous process that combined spatial data collection, ecological interpretation, visual communication, and limited environmental analysis. The result was a field guide organized around four major components: mapping, woody plants, general ecology, and carbon analysis. These components reflected the project's dual purpose as both a practical educational deliverable and an applied environmental capstone.

PROJECT GOALS AND DELIVERABLES

Three project goals guided the practicum from start to finish. First, the project aimed to strengthen environmental education at Camp AGQ by giving campers and staff a tool for interpreting the camp landscape. Second, it aimed to make ecological information accessible by presenting it through maps, illustrations, short explanations, and camp-specific examples rather than through technical language alone. Third, it aimed to create a resource rooted in the AGQ property itself so that environmental learning would feel immediate, relevant, and memorable.

To meet these goals, the practicum produced a field guide organized into four primary content areas. The first area consisted of maps of the camp property, including navigational, ecological, and interpretive map products. The second area focused on woody plants and included tree tagging, species inventories, and illustrated identification sheets. The third area expanded outward to general ecology, with pages on vines, wildlife, and notable camp landmarks. The fourth area presented an estimate of annual carbon sequestration across the forested portions of the site in a form that could be understood by non-specialist readers.

These deliverables were designed to work together rather than stand alone. The maps oriented readers to the property and its features. The plant identification sheets trained observation and recognition. The general ecology pages broadened attention beyond trees to other organisms and abiotic phenomena. The carbon analysis added a quantitative dimension by connecting the camp forest to wider conversations about climate and environmental stewardship. Together, the deliverables created a field guide that was interpretive, educational, and place specific.

METHODS

Mapping and Spatial Data Collection

Mapping formed the spatial foundation of the practicum. Field data were first collected on the Camp AGQ property using the ArcGIS Pro Field Maps tools. I walked the property to locate relatively large and visible trees, important buildings, and sites of interest. Tagged trees were recorded as georeferenced points, and each point stored location information, diameter at breast height (DBH), and an associated photograph. Additional point data were collected for buildings and activity areas that were not easily interpreted from imagery alone.

The field-collected data were then brought into ArcGIS Pro for verification and correction. This step was necessary because raw field points alone were not sufficient for publication-quality mapping. Features were checked against high-resolution imagery, corrected where needed, and integrated into a broader spatial database that also included digitized polygons for habitat types, property lines, buildings, activity areas, the waterfront, and other major site features. ArcGIS Pro supported both the geospatial organization of these data and the cartographic preparation of multiple map products (Esri, n.d.).

Once the geographically accurate base data were assembled, maps were exported for additional visual refinement in Adobe Photoshop. This design stage allowed for a more stylized and approachable visual language than a conventional GIS output alone. Photoshop was used to organize, simplify, and stylize the maps so they would be both informative and understandable for camp audiences, especially younger readers. In one case, a stylized perspective map also drew on three-dimensional modeling workflows in ArcGIS Pro and Fusion 360 before being translated into a colorful illustrated map.

Woody Plant Inventory and Identification Guide Development

The woody plant component combined field inventory, species identification, data management, and illustration. Over the course of approximately one week, more than 100 trees were tagged and identified across the property. For each tree, I recorded species information, measured DBH, and preserved its location through a field map point. The resulting dataset allowed individual tagged trees to be linked spatially to a digital map while also supporting broader interpretive products such as champion tree identification and species-level field guides.

Following field collection, a species spreadsheet was created to organize scientific names, common names, scientific families, and key identifying traits. These traits included characteristics such as leaf arrangement, leaf margin, fruit type, and other vegetative features used in field identification. Representational photographs for each species were assembled into folders, drawing either from my own summer photography or from iNaturalist images that were marked for permissive reuse. iNaturalist notes that uploaded content may be shared under Creative Commons licenses or under public-domain-style declarations such as CC0, while some material remains all rights reserved (iNaturalist, 2025).

The photographs were then processed in Photoshop. Backgrounds were removed, and a cutout-style filter was applied to create a visual middle ground between photographs and hand drawings. This process preserved important detail while avoiding the distracting variability of raw photos. The final tree guide sheets emphasized bark, buds, leaves, fruit, and other useful field characters for approximately two dozen dominant species on the property. The sheets were organized by scientific family to help readers notice relationships among species rather than approaching each tree as an isolated example.

General Ecology and Landmark Interpretation

Although woody plants occupied a major portion of the project, the practicum deliberately expanded beyond trees. The general ecology section documented additional species and features that are especially visible, culturally meaningful, or educationally useful at Camp AGQ. Four additional woody vine species were selected for separate identification sheets, including riverbank grape, Virginia creeper, poison ivy, and black raspberry. These species were chosen because they are common on the property, readily observable, and in some cases important for safety and awareness.

Wildlife pages were also created for amphibians, birds, and insects. Species selection emphasized those that campers are likely to notice, those that are safe and interesting to interact with, and those that hold particular importance in camp identity. Frogs, the red-backed salamander, common bird species, and a set of frequently encountered insects were all included. These pages used the same general illustration approach as the plant guides so that the visual language of the field guide remained coherent across topics.

The final portion of the general ecology work focused on camp landmarks with ecological significance: Bubbling Springs, the Mud Pit, and the Clay Pit. These features have long been part of camp culture, yet they had not previously been explained through a dedicated educational resource. The practicum therefore interpreted them as both cultural landmarks and ecological phenomena, with explanations simplified for campers roughly nine to fifteen years of age.

Carbon Sequestration Analysis

The carbon analysis was the most explicitly analytical and quantitative part of the practicum. Its purpose was not to produce a definitive forest carbon inventory, but rather to reach a reasonable estimate of annual carbon sequestration that could be communicated in a familiar and understandable way. Two methods were used to estimate forested area on the Camp AGQ property. The first relied on digitizing forest polygons from imagery in mapping software. The second used image classification to separate pixels into forest and non-forest classes and to distinguish broadleaf from evergreen cover where possible.

To complement the mapped-area calculations, field sampling was carried out to examine whether different forest areas on the property were compositionally distinct enough to justify separate carbon assumptions. I established nested plots along three 80-meter transects representing wetland forest, aspen-maple forest, and pine-hemlock forest. Each transect contained three nested plots with 20-meter, 10-meter, 5-meter, 2-meter, and 1-meter components so that different size classes of vegetation could be sampled efficiently. Nine 20-meter nested plots were sampled in total, and Shannon diversity values did not reveal a substantial difference among the sampled forest areas.

Because field results suggested broad similarity among sampled areas, later calculations treated the camp forest as effectively homogeneous for the purpose of applying a published sequestration value. To select an external reference, I compared northern Michigan forest conditions to information in the Forest Atlas of the United States and used a per-acre annual sequestration estimate from the Forest Ecology

Network in Maine (Forest Ecology Network, 2008; Perry et al., 2022). Final carbon totals were then translated into everyday equivalencies involving passenger vehicles using the U.S. Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator, which is intended to make emissions data easier to communicate to general audiences (U.S. Environmental Protection Agency, 2024).

RESULTS

Map Products

The practicum produced a suite of map products intended to serve different educational and navigational functions. The base property map highlighted the overall structure of the camp, including major camp areas, forested sections, and the waterfront. The wayfinding map provided a more practical orientation tool by identifying buildings, bathrooms, activity areas, and other destinations likely to matter to new and returning campers. This map was meant to reduce the disorientation that can accompany arrival at an unfamiliar camp environment and to make the site legible even for younger readers with limited map reading experience.

Additional map products expanded the educational range of the field guide. An elevation map translated terrain into a simple color gradient that linked low-lying areas to blue tones and higher ground to orange tones. A blank map retained only the most recognizable site features so that campers could annotate their own experiences, such as where they camped, explored, or found notable plants and animals. A stylized perspective map represented the property in a more imaginative and visually immersive way, inviting readers to envision the camp from a miniature or bird's-eye perspective.

Taken together, these maps showed that cartography could function as both infrastructure and interpretation within the field guide. They oriented the reader spatially, established the geography needed for later ecological pages, and reinforced the idea that camp is a landscape to be read as well as inhabited. Because these maps were built from site-specific field data rather than generic references, they also increased the guide's long-term value as a client resource.

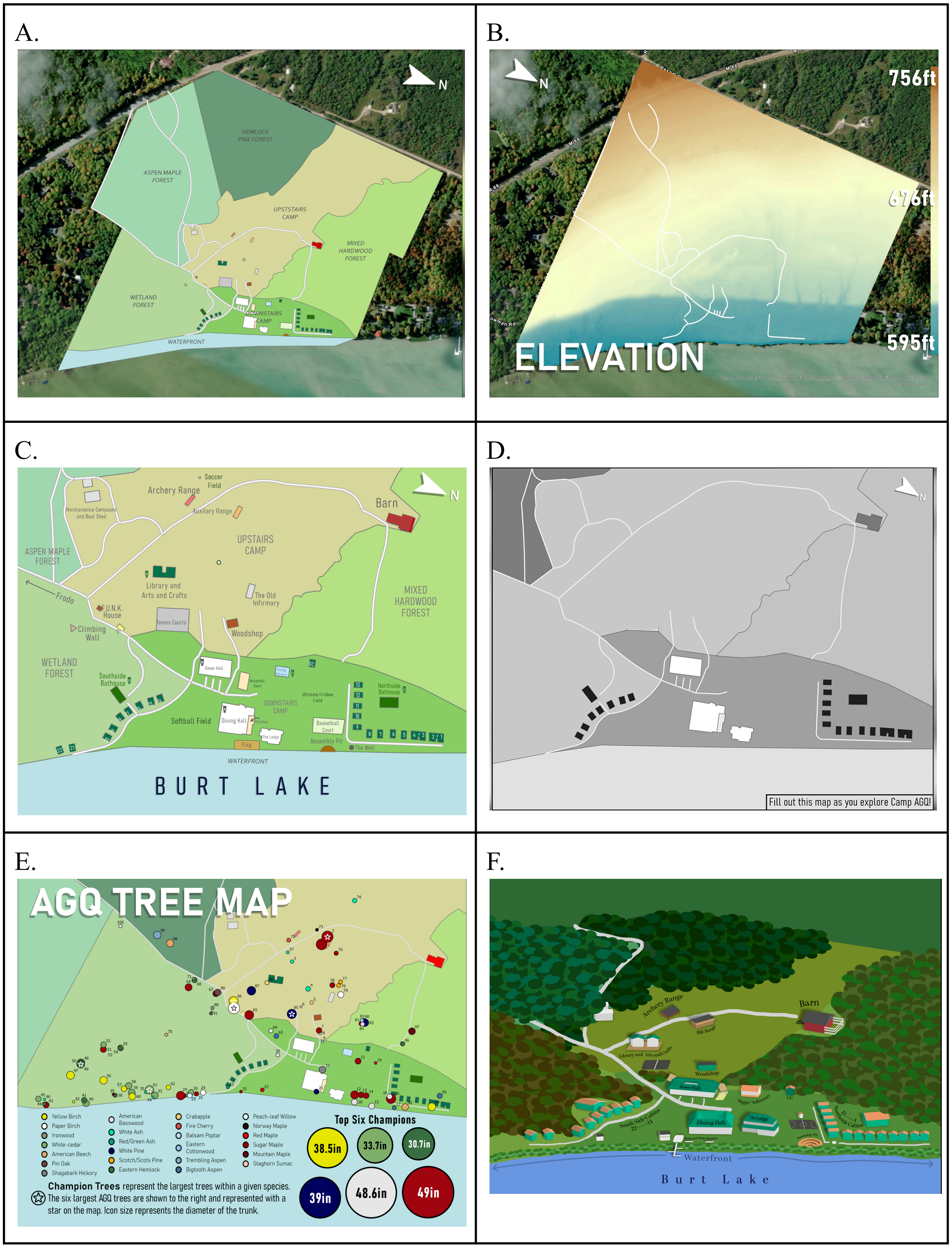


Figure 1: Six maps were created in order to communicate spatial and ecological information of the Camp AGQ property. A. Overview map of the general areas. B. Elevation map. C. Wayfinding map. D. Blank map that can be filled in. E. Tree map. F. Stylized map.

Plant and Species Interpretation Materials

The woody plant section resulted in one of the most substantial and distinctive sets of deliverables. More than 100 tagged trees were documented across the property, enabling the production of a tree map and the identification of champion trees for selected species. The final identification materials focused on the most common and ecologically prominent species that campers were likely to encounter. By using stylized illustration rather than raw photography alone, the guide sheets emphasized the most reliable and repeatable field characters while still retaining a strong sense of realism.

The plant-related outputs also included a tree characteristic guide sheet that explained important identification terms such as leaf margin, leaf arrangement, leaf type, fruit type, leaf base, leaf tip, and leaf shape. This instructional page extended the field guide beyond species recognition and into basic botanical literacy. In practice, it helped transform the guide from a static reference into a teaching tool that could support repeated learning over time.

Beyond trees, the inclusion of common vines and other woody species broadened the ecological scope of the guide and improved its practical usefulness. Species such as poison ivy served an important safety function, while others introduced readers to growth forms that might otherwise be overlooked if the guide had focused exclusively on trees. These outputs collectively strengthened the guide’s capacity to support informal outdoor learning.

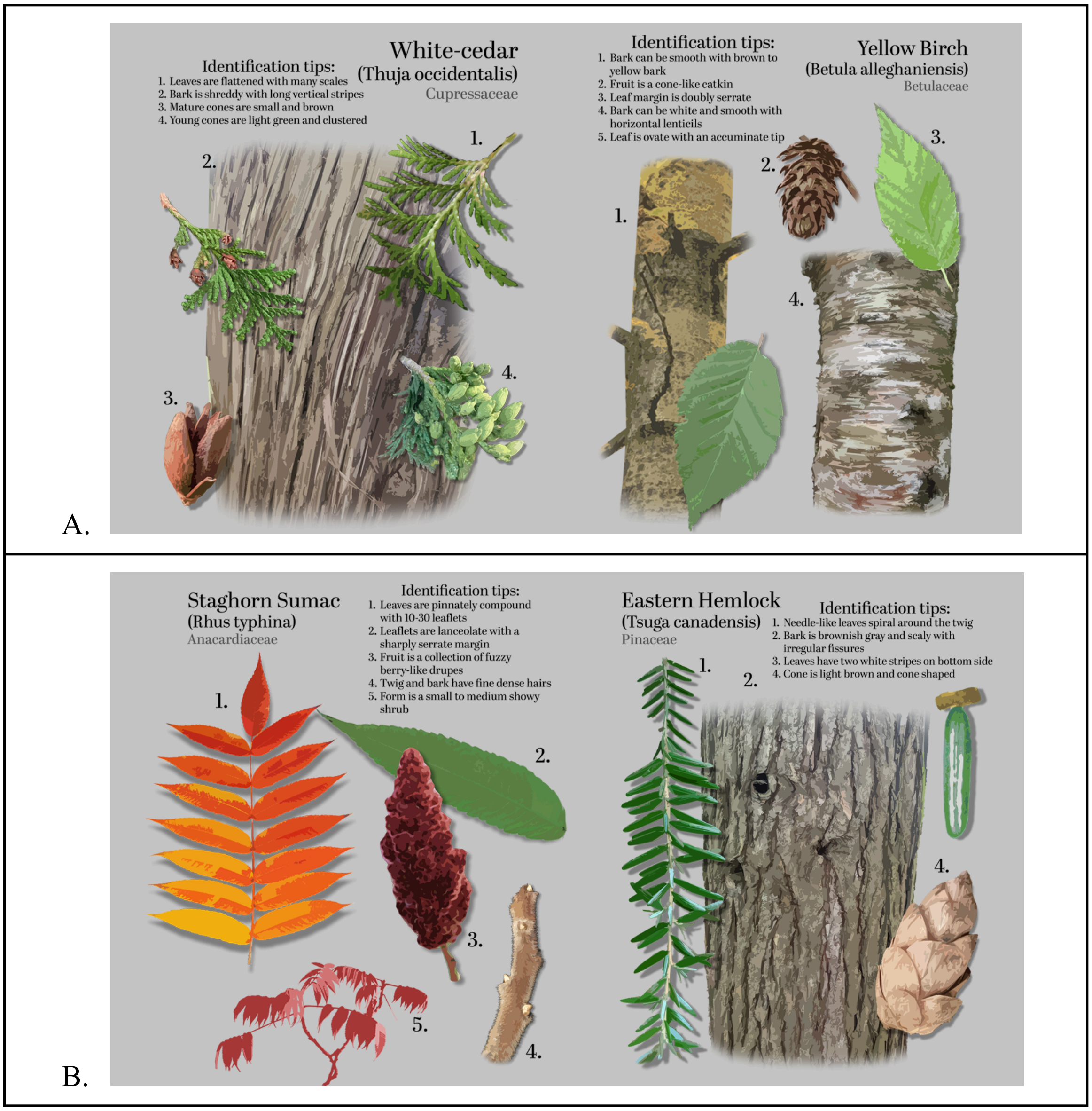


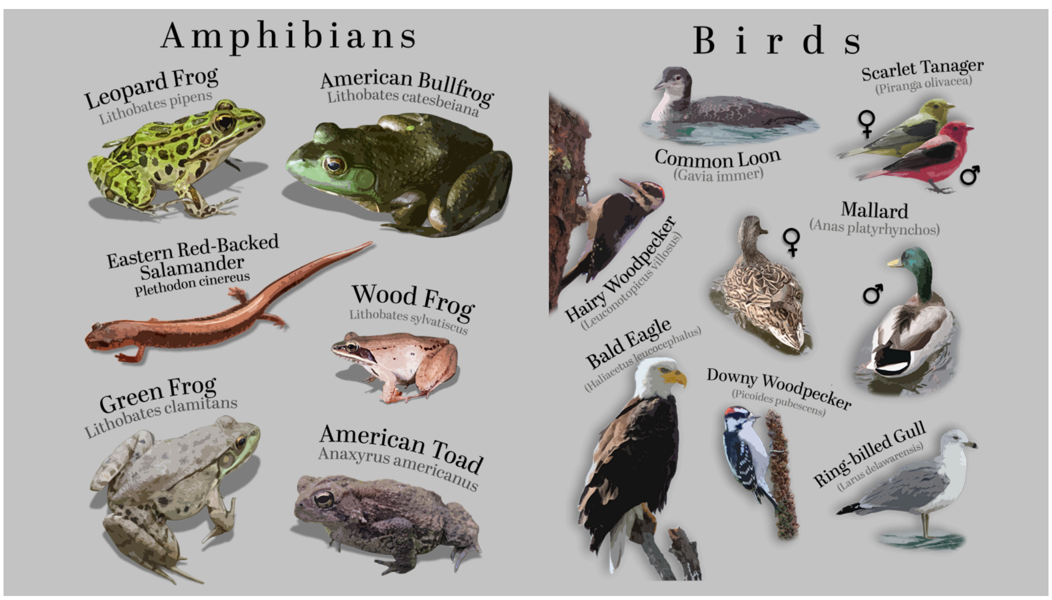
Figure 2. Four examples of plant identification guide sheets. A. White-cedar and Yellow Birch. B. Staghorn Sumac and Eastern Hemlock.

Wildlife, Landmarks, and Interpretive Pages

The wildlife and landmark pages added interpretive richness to the field guide by making space for the organisms and phenomena that shape camp memory as much as the trees do. Amphibian, bird, and insect pages highlighted species that are regularly encountered or especially valued on the property. These materials gave the guide broader ecological balance and acknowledged that environmental education at camp often begins with charismatic or memorable encounters rather than with taxonomy alone.

The landmark pages on Bubbling Springs, the Mud Pit, and the Clay Pit were especially important because they connected ecology to place-based camp traditions. Rather than treating these features as merely quirky attractions, the practicum reframed them as ecological stories that help explain why the property feels distinctive. In doing so, the guide made camp culture legible through environmental interpretation. This was a significant result of the project because it demonstrated that the educational value of the field guide lay not only in scientific content but also in its ability to deepen attachment to place.

Another notable result was the guide's visual consistency. The same general graphic logic used for plants was adapted for wildlife and landmarks, which helped unify the final product. This visual coherence made the field guide easier to navigate and likely more appealing to younger audiences.



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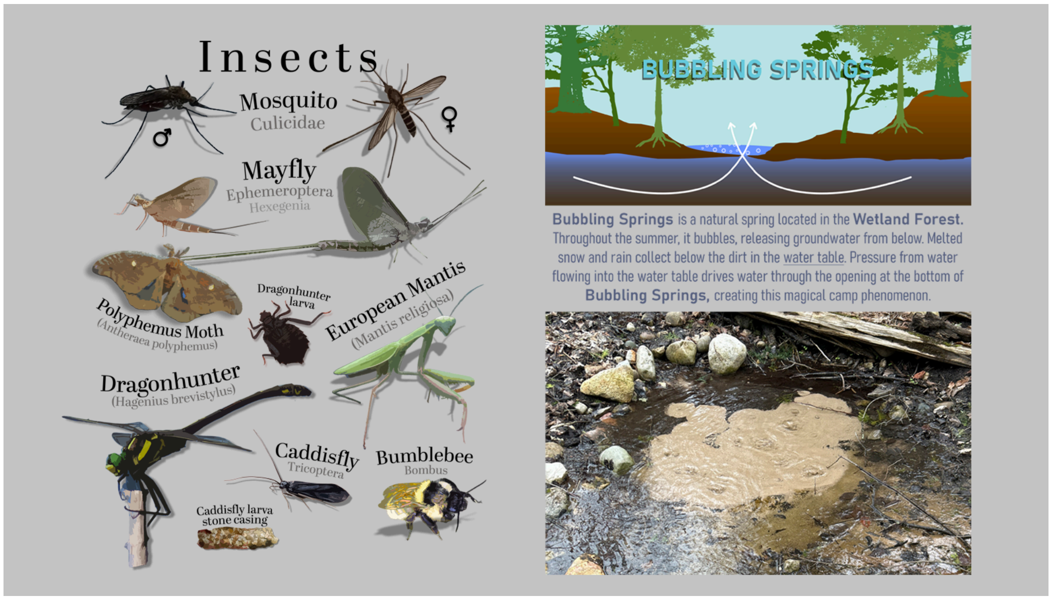

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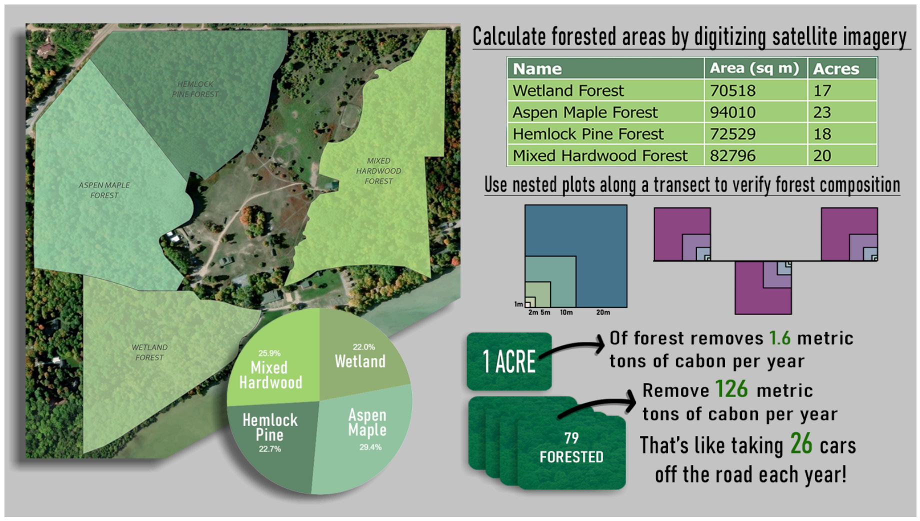
Figure 3: Abiotic guide sheets depicting the wildlife and ecological phenomenon Bubbling Springs. A. Amphibian and Bird identification guide sheets. B. Insects and Bubbling Springs guide sheets.

Carbon Sequestration Estimates

The two carbon estimation methods generated different but complementary annual sequestration values. Using mapped forest polygons and a reference value of 1.6 metric tons of carbon per acre per year, the first method produced an estimate of approximately 126 metric tons annually. A second estimate based on image classification and a more conservative mapped forest area produced a lower value of approximately 83 metric tons annually. These totals were further translated into equivalencies of roughly 26 cars and 18 cars driven for one year, respectively.

These estimates should not be interpreted as definitive measurements of carbon flux, because the project did not involve direct biomass equations, repeated growth measurements, or a full carbon accounting framework. However, they were successful for the intended purpose of the practicum: to make carbon sequestration visible and relatable at the scale of a familiar place. The carbon pages therefore served as a communication bridge between local ecological observation and broader climate concepts.

The difference between the two estimates was also useful analytically because it revealed the importance of method choice in even relatively straightforward environmental calculations. By presenting a range rather than a single unquestioned value, the practicum implicitly communicated that environmental analysis includes uncertainty, assumptions, and tradeoffs. This is an important lesson for environmental education in its own right.



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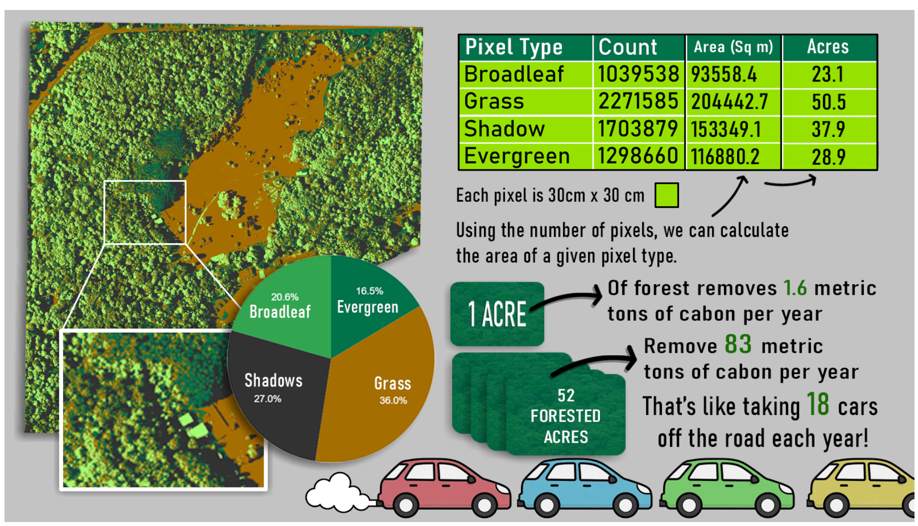

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Figure 4: Two pages depicting the two methods for which carbon sequestration was estimated. A. Carbon sequestration using forested area from polygon digitization. B. Carbon sequestration using forested area from image classification and pixel area.

DISCUSSION

The most important achievement of this practicum was the successful integration of technical environmental methods into a community-facing educational product. Many capstone projects produce either analysis for specialists or outreach materials with limited technical depth. This project occupied a productive space between those two modes. GIS workflows, field data collection, species identification, image processing, and carbon estimation were all used not as ends in themselves but as tools for creating a resource with direct practical value to the client.

A second important contribution of the practicum was its emphasis on place specificity. Environmental education materials are often generalized, which can make them informative but not necessarily memorable. In contrast, this field guide was anchored in the exact property, species, landmarks, and traditions of Camp AGQ. That specificity makes it more likely that readers will connect ecological information to personal experience. It also reflects a broader principle in environmental education: learners often engage more deeply when material is tied to places they know and care about.

The practicum also demonstrates the communicative strength of visual design. Maps, illustrated guide sheets, and concise ecological explanations were not secondary packaging around the project's real content; they were central to how the content functioned. This insight is especially relevant in interdisciplinary environmental work, where the ability to communicate spatial and ecological information clearly can determine whether a project is actually used after it is completed.

RECOMMENDATIONS

Several opportunities exist for extending the practicum in future iterations. First, the field guide could be updated over time as additional species are identified or as camp infrastructure changes. Because the map and species data were built from digital workflows, future revisions should be feasible without starting from scratch.

Second, the client could integrate the field guide more directly into programming. Counselors or nature staff might use specific map pages, tree sheets, or wildlife sections during hikes, cabin discussions, or activity periods. The blank map, in particular, lends itself to participatory use and could support journaling, scavenger hunts, or observational exercises.

Third, the carbon analysis could be expanded through more formal forest inventory methods if the client or future students wished to pursue a stronger research component. Additional plot sampling, allometric biomass estimates, repeated measurements, or LiDAR-based canopy analysis could improve accuracy. Even without those additions, the current analysis provides a useful interpretive foundation for talking about climate and forests at camp.

Finally, the practicum model itself could be adapted elsewhere. Other outdoor education sites, camps, preserves, or nature centers could benefit from similarly place-based resources that combine maps, species interpretation, and approachable ecological analysis.

CONCLUSION

This practicum set out to create a meaningful environmental education resource for Camp AGQ and succeeded in doing so through a field guide grounded in the camp's geography, species, and ecological character. The completed project translated field methods, geospatial analysis, and ecological interpretation into a product that the Ann Arbor YMCA and Camp AGQ can use beyond the duration of the capstone itself.

The field guide's value lies in the way it helps readers notice the camp landscape more carefully. It invites them to orient themselves through maps, identify trees and vines, recognize wildlife, understand the ecology of beloved landmarks, and think about the forest as a living system that also stores carbon. In this sense, the project does more than communicate information. It encourages ecological attention.

For an applied practicum, that outcome is significant. The project demonstrates how environmental scholarship can support community needs while remaining analytically grounded and visually compelling. Most importantly, it creates the possibility that future campers will leave Camp AGQ not only with memories of the place, but also with a deeper understanding of why the place matters.

APPENDIX A. SUMMARY OF FIELD GUIDE COMPONENTS

Component	Summary
Map set	Base property map, wayfinding map, elevation map, blank annotation map, and stylized perspective map.
Tree inventory	More than 100 tagged trees recorded with species identity, DBH, and mapped location information.
Tree guides	Illustrated identification sheets for approximately two dozen dominant tree species, organized by scientific family.
Plant characteristics	Reference sheet defining common identification terms such as leaf margin, arrangement, and shape.
General ecology	Identification sheets for common woody vines plus wildlife pages for amphibians, birds, and insects.
Landmark interpretation	Illustrated pages explaining Bubbling Springs, the Mud Pit, and the Clay Pit.
Carbon analysis	Two mapped estimates of annual forest carbon sequestration with everyday equivalency comparisons.

This appendix summarizes the principal components of the field guide deliverable produced through the practicum. It is intended as a quick reference to the scope of the final product.

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