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Forest Management Plan for Camp Algonquian

Image credit: Ann Arbor YMCA. 2023

Introduction

Camp Al-Gon-Quian of Burt Lake Michigan, is home to an unmanaged forest area that presents a unique and invaluable opportunity for ecological conservation, outdoor education, and sustainable management. The forest, with its natural successional processes largely untouched, serves as a living laboratory where the dynamic interplay of natural ecosystems can be observed and studied. This unmanaged character is not a liability but rather a strength, offering a rare window into how forests evolve without intensive human intervention, which aligns perfectly with the camp's mission of fostering a connection with nature (Camp Algonquian, 2023). Furthermore, such opportunities are critical for understanding how applying new human intervention affects ecosystem services and forest resilience in the face of environmental stressors, a growing focus in ecological management research (Brancalion et al., 2020).

Additionally, the unmanaged nature of the forest provides an invaluable baseline for learning and comparison. It offers a chance to observe and document how a forest naturally develops in the absence of human-directed management. This makes it an ideal control site for evaluating the effectiveness of current forest management practices implemented in new experimental areas. Campers and researchers alike can explore how interventions such as invasive species removal, prescribed burns, or tree harvesting and planting affect forest health and biodiversity compared to the natural progression of the untouched section. By juxtaposing the unmanaged forest with actively managed areas, this dynamic setting enables a deeper understanding of ecological processes and the impact of human actions, fostering critical thinking and scientific inquiry. This hands-on learning approach mirrors the principles of Forest Schools, where fostering connections with nature

encourages stewardship and environmental responsibility (Good2Know, Network, 2023).

History of the Camp Al-Gon-Quian Land

Geologic and Ecological History

The landscape of Northern Lower Michigan, including the land where Camp Al-Gon-Quian now resides, was profoundly shaped by the Wisconsin glaciation during the Pleistocene Epoch. This massive ice sheet began receding approximately 13,000 years ago, leaving behind a complex terrain of moraines, outwash plains, drumlins, and abundant freshwater lakes, such as Burt Lake (Albert, 1995; Talbot et al., 2021). The glacial retreat influenced soil composition and hydrology, creating an ecologically rich and diverse environment (Pielou, 1991).

Post-glacial ecological succession initially brought tundra and boreal forests, which later transitioned into the hardwood and coniferous forests characteristic of the area today. Circa 1800, the region featured northern hardwood forests dominated by beech, sugar maple, and hemlock, as well as fire-adapted pine forests like red and white pine. These ecosystems were shaped by both climatic forces and Indigenous land management practices, including controlled burning (Frelich, 1992; Whitney, 1986).

Indigenous Presence and the Burt Lake Band

For thousands of years, the land around Burt Lake was home to the Burt Lake Band of Ottawa and Chippewa Indians, part of the Anishinaabe cultural group. The Anishinaabe people cultivated a deep relationship with the environment, practicing sustainable hunting, fishing, and land management techniques that maintained ecosystem balance and biodiversity (Pielou, 1991; Cleland et al., 2004).

This harmonious relationship with the land was disrupted in the 19th century as European settlers encroached on the area. Under the Treaty of 1836, the Burt Lake Band was allocated a reservation at Burt Lake. However, in 1900, they were forcibly removed in an event known as the "Burt Lake Burn-Out," during which settlers burned their homes and unjustly sold their land (Cleland et al., 2004). The Burt Lake Band’s dispossession left

them without federally recognized land, a status they have fought to regain for over a century (Cleland et al., 2004).

The Land Before Camp Al-Gon-Quian

After the Burt Lake Band's forced removal, much of the land transitioned to agricultural use. Farmers worked the area, but the sandy, glacially derived soils were not ideal for long-term cultivation. Over time, parts of the region suffered from soil degradation, leading to the abandonment of some farmland (Frelich, 1992; Pielou, 1991).

The pre-camp landscape was a mixture of small-scale agricultural plots and natural regrowth, with remnants of the once-dominant northern hardwood and pine forests.

Founding of Camp Al-Gon-Quian

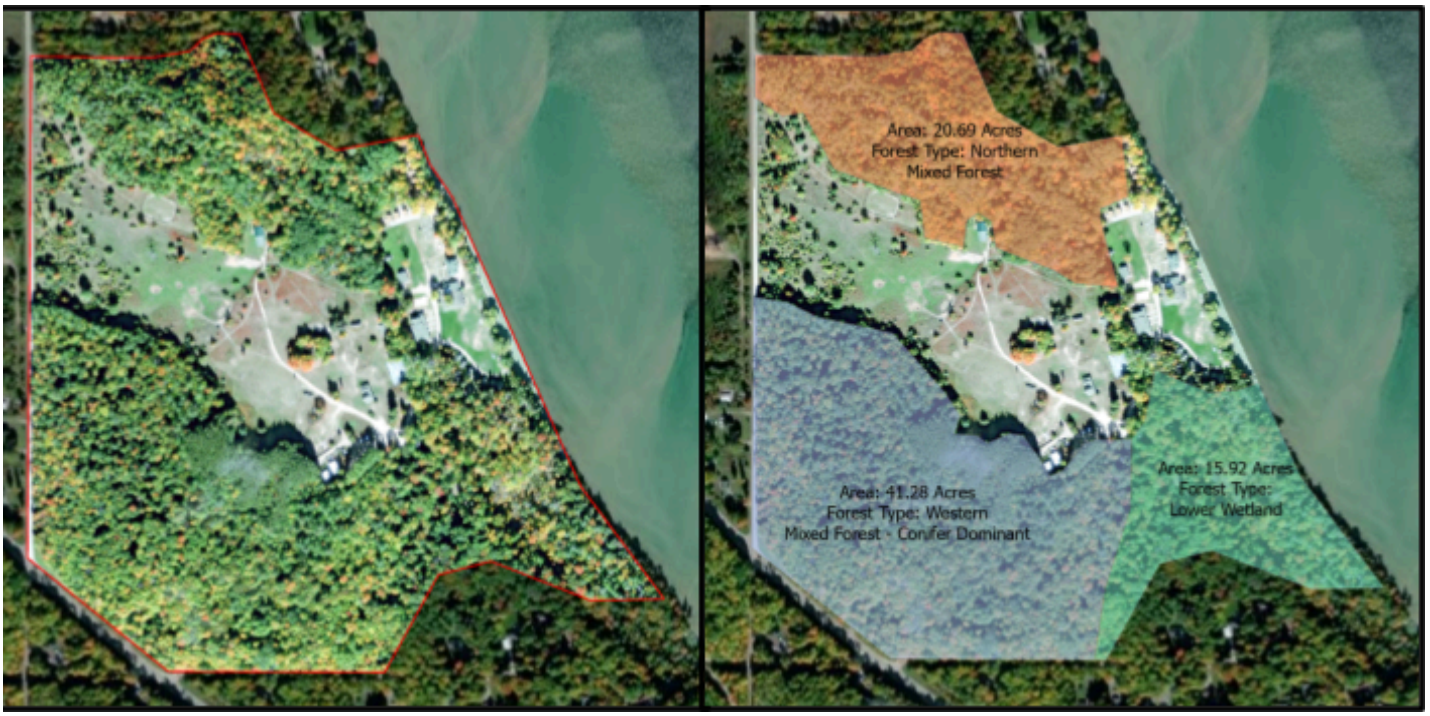
In 1925, the Ann Arbor YMCA established Camp Al-Gon-Quian on the shores of Burt Lake. The camp's mission was to provide outdoor education and personal development opportunities for youth. Over the years, it has become a cherished institution, fostering environmental stewardship and a deep connection to nature among generations of campers (Cleland et al., 2004).

Site Description

Camp Algonquian is home to a 77 acres of forest located on Burt Lake in Northern Michigan, a region shaped by the glacial retreats of the Pleistocene Epoch. This has resulted in diverse terrain and soil types, supporting a mix of northern hardwoods such as sugar maple and beech, along with coniferous species like white pine and white cedar. The forest serves as a habitat for local wildlife and a carbon sink that contributes to climate regulation. However, it also faces challenges such as habitat fragmentation, invasive species like buckthorn (*Rhamnus cathartica*) and honeysuckle (*Lonicera maackii*), and increased fire risk due to accumulated fuels in unmanaged areas.

Three Forests of Camp Algonquian

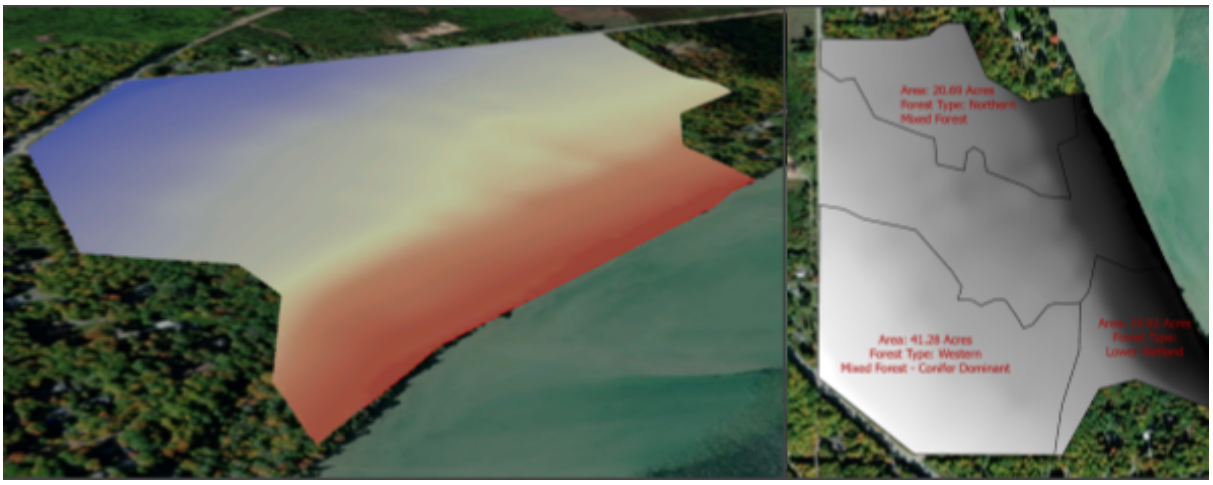
While the greater geography in the Northern Lower Michigan area is described as “Sandy, coarse-textured morainal slopes and ridges [...] support forests of white pine, red pine, and oaks”(Michigan Natural Features Inventory, 2023), the land surrounding the central campgrounds is filled with a mix of tree species and have slightly different habitat types across the three segments due to the proximity to Burt Lake, large highways, and neighboring unmanaged forest. There are no forest management strategies in any of the three segments today.



Map 1: Boundary of Camp AGQ property (left), with segmented section of the forest (right). By Shaman Garcia.

Northern Mixed Forest and Western Mixed/Conifer Dominant Forest

These two sections of the forest on the Camp Al-Gon-Quian property are most similar. Having a similar age, species, soil, and hydrological composition between the two sections suggests they were once adjoining forests that were then separated to create open space in the center of the property.



Map 2: Hillshade model where red represents lower (0ft above lake elevation) and blue represents higher (100ft above lake elevation)(left). Digital surface model showing rapid elevation drop when approaching the lakeshore(right). By Shaman Garcia.

Eastern Wetland Forest

This section of the Camp Al-Gon-Quian property feels distinct from the other two. There is a clear drop in elevation that leads to a much wetter section of forest. Because of the drop, there are also small creeks that run from the upland, through this section of forest, and into Burt Lake. There are also a variety of naturally occurring surface springs throughout this section. With the increased wetness, there is also a noticeable increase in wetland species such as *Thuja occidentalis* and a decrease in some of the more common hardwoods found in the other two sections. This leads to a forest floor with much less leaf litter than the other two sections.

Threat and Challenges

Climate Change

Northern Michigan's forests are increasingly affected by the impacts of climate change. Over the past several decades, the region has seen rising average temperatures and more variable precipitation patterns. These changes lead to longer growing seasons, which may initially boost growth in some species but ultimately cause heightened drought stress as evapotranspiration outpaces available moisture (McDowell et al., 2020).

Additionally, rising temperatures push species like balsam fir (*Abies balsamea*) and paper birch (*Betula papyrifera*) beyond their thermal tolerances, potentially leading to localized declines or replacements by more heat-tolerant species. These shifts in species composition disrupt existing ecosystems and create new challenges for forest management.

Invasive Species


Frangula alnus

Invasive species pose a significant threat to Michigan's native ecosystems, including the forests at Camp Al-Gon-Quian. Without a management plan in place, the property is at significant risk of invasion. Invasive plants like garlic mustard (*Alliaria petiolata*) outcompete native understory species by monopolizing light and nutrients, disrupting forest floor dynamics crucial for regeneration (Lovett et al., 2016). Similarly, the emerald ash borer (*Agrilus planipennis*) has devastated ash populations, leaving forests vulnerable to secondary stressors like erosion and disease (Pond and Froese, 2015). Beyond their ecological impacts, invasives burden properties like Camp Al-Gon-Quian by requiring intensive labor and the costs associated with removal.

Fire Risk

The accumulation of deadwood and other combustible materials in unmanaged forests increases the likelihood of severe wildfires. These risks are further amplified by the warmer and drier conditions brought by climate change (Hagmann et al., 2021). Fires in unmanaged forests tend to burn more intensely due to fuel buildup, threatening biodiversity and infrastructure. However, fire is a natural and essential ecological process that promotes regeneration and supports fire-adapted species like jack pine (*Pinus banksiana*), maintaining biodiversity in the long term (Binkley, 2011). A proactive approach, incorporating prescribed burns and fuel reduction, is necessary to balance the ecological benefits of fire with its risks.

The Grayling fire in Michigan during 2023 and the widespread wildfires in Canada highlight the vulnerability

of ecosystems similar to those found at Camp Al-Gon-Quian. These fires occurred in northern forests with similar species compositions and fuel dynamics, underscoring the need for active management to reduce wildfire risk and enhance forest resilience.

Management Objectives

The management plan aims to achieve the following objectives:

1. Enhance forest resilience by promoting native and climate-adaptive species.
2. Control invasive species through strategic removal and monitoring.
3. Implement fire management strategies, including prescribed burns and fuel reduction.
4. Maintain biodiversity by protecting habitats that support a variety of species.
5. Integrate conservation goals with educational and recreational opportunities for the camp's community.

Management Strategies

Rewilding and Passive Restoration

Rewilding and passive restoration are among the simplest and most effective strategies for managing the forests at Camp Al-Gon-Quian. This approach relies on natural successional processes to promote recovery and biodiversity, requiring minimal human intervention (Binkley, 2011). Passive restoration is particularly suitable for the camp, which operates with a full staff only during summer months, leaving little opportunity for active management in the offseason. Allowing the forest to recover naturally not only reduces costs but also provides an opportunity to study unmanaged ecosystem dynamics, which are essential for understanding resilience to climate change and disturbances (Leefers, 2020).

Selective Thinning

Selective thinning plays a vital role in maintaining forest health by reducing competition for resources and improving safety for campers and staff. Removing dead or weakened trees can minimize the risk of injuries from falling branches, a risk heightened by the increasing frequency of intense storms and high winds

(McPherson et al., 2016). This was evident during the summer of 2020, when a severe windstorm and tornado warning caused extensive tree damage in the area, posing significant safety concerns. Thinning also creates light gaps that encourage the growth of understory vegetation and help restore natural forest dynamics.

Prescribed Burns

Prescribed burns, while challenging to implement in a camp setting, offer a controlled way to reduce fire fuel loads and support fire-adapted ecosystems. Small experimental burn plots could serve as a test case to evaluate the feasibility and ecological benefits of prescribed burns at Camp Al-Gon-Quian (Hagmann et al., 2021). Fire-adapted species like jack pine (Pinus banksiana) rely on periodic burns to regenerate and maintain biodiversity. Integrating prescribed burns in a controlled and phased manner, even at a small scale, can reduce the risk of larger, uncontrolled wildfires while supporting ecological goals (StoryMaps, 2024).

Monitoring

A monitoring system is essential for tracking forest health and ensuring long-term ecological stability. Camp Al-Gon-Quian could establish permanent sample plots to monitor key indicators such as species composition, tree growth, and invasive species prevalence during the summer months (Pond and Froese, 2015). Remote sensing technologies, such as satellite imagery and drones, can extend monitoring into the offseason, providing valuable data with minimal effort. Moreover, involving campers in monitoring activities allows them to engage directly in ecological science, learning how to collect and analyze data while fostering a deeper connection to conservation (Leefers, 2020).

Despite these advantages, Camp Al-Gon-Quian currently lacks any systematic inventory or monitoring program. This absence means that much of the ecosystem’s demographics and structural composition are unknown. To address this gap, baseline sampling and data collection are crucial to establish an understanding of species diversity, forest health, and overall ecological dynamics. This initial data would provide a foundation for long-term monitoring and inform effective management strategies.

Hydrology

Hydrology at Camp Al-Gon-Quian could be better understood by examining the streams, lakes, and wetlands on the property. Tools like piezometers for groundwater levels and flow meters for stream velocity can provide insights into water movement and availability. Testing water quality with probes for pH, temperature, and dissolved oxygen adds another layer of understanding. Monitoring hydrology isn't just about numbers—it helps maintain healthy aquatic habitats and ensures resources are managed wisely. Whether it's preventing erosion or keeping the water suitable for wildlife, understanding the camp's water systems benefits everyone, from the creatures in the stream to the campers on the shore.

YMCA Camp AGQ. 2023

Soil

Healthy soil forms the foundation of a resilient ecosystem, providing essential support for plant life and influencing hydrological and nutrient cycles. By employing soil core sampling and laboratory analysis, critical metrics such as nutrient content, pH, and organic matter can be assessed, offering insight into the soil's capacity to sustain biodiversity. This data is instrumental for designing effective restoration strategies, such as targeted reforestation efforts or erosion control measures. Identifying areas of soil degradation versus zones of optimal health allows for precise, evidence-based management interventions that enhance ecological stability.

Vegetation

The forests and meadows of Camp Al-Gon-Quian are biologically rich, yet existing data on plant communities remains limited. Comprehensive vegetation surveys, including species inventories, tree measurements, and invasive species mapping, can shed light on the composition and dynamics of the camp's flora. Utilizing methods such as quadrat sampling, transect surveys, or advanced remote sensing technologies can generate detailed insights into forest biodiversity and structural complexity. This information is crucial for guiding conservation efforts and sustainable land management, ensuring the ecological integrity and aesthetic value of the camp's natural landscape are preserved for future generations.

Wildlife

The wildlife at Camp Al-Gon-Quian, from avian species in the canopy to terrestrial fauna in the underbrush, plays a critical role in maintaining ecosystem balance and biodiversity. Employing monitoring tools such as camera traps, bird point counts, and motion-sensing devices can document species presence, population trends, and habitat use. Additionally, involving campers in wildlife observation programs promotes ecological literacy and engagement, transforming the forest into an interactive learning environment. Each recorded sighting or acoustic identification contributes to understanding ecosystem health and the interconnected relationships within the camp's natural habitats, providing a foundation for informed wildlife management and conservation.

Challenges

Starting a comprehensive monitoring program at Camp Al-Gon-Quian will undoubtedly come with challenges. Some equipment, like hydrological sensors, can be expensive and require expertise to operate. Soil sampling demands time and effort, especially across a diverse landscape. Tracking vegetation over the long term needs consistent methods and trained eyes to distinguish native from invasive species. Wildlife monitoring has its own hurdles—some animals are elusive, requiring patience and specialized tools. While these obstacles are real, they’re far from insurmountable. With commitment and creativity, the camp can rise to the challenge and set a standard for ecological stewardship.

Educational Programming

The forest provides a dynamic environment for integrating ecological education into the camp experience. Campers can participate in activities such as tree identification, invasive species removal, and data collection, gaining practical conservation skills while exploring the natural world. By comparing managed and unmanaged sections of the forest, campers can learn about the complexities of ecological balance and the importance of sustainable practices (Gough et al., 2019). These experiences nurture environmental stewardship and inspire a lifelong appreciation for nature.

Conclusion

Camp Al-Gon-Quian's forest is a rare gem, offering an incredible opportunity for ecological preservation, education, and proactive management. Its untouched, unmanaged state serves as a model ecosystem, where natural processes can be observed and understood, helping us learn how forests evolve without human interference. The camp, unlike many forests, doesn't rely on timber production or resource sales, allowing it to focus entirely on maintaining the health and integrity of its forest rather than prioritizing economic gain.

YMCA Camp AGQ. 2023

While the forest hasn't suffered significant degradation yet, climate change is increasing stressors and putting the property at greater risk. Tackling challenges like invasive species, fire risks, and climate change through smart strategies like selective thinning, invasive species removal, and ecological monitoring, can help ensure the forest stays resilient and operational. By weaving these efforts into its educational programs, the camp also empowers campers to take an active role in protecting the environment, fostering a connection that can last a lifetime.

By preserving and managing its forest now, Camp Al-Gon-Quian is safeguarding its natural beauty and inspiring future generations to appreciate and protect the delicate balance of the natural world. This plan seeks to preserve and improve upon the forests at Camp Al-Gon-Quian, forests that inspired myself and many more to come.

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