

# Priority Climate Action Plan for the Monacan Indian Nation



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## **Acronyms**

- CAP – Criteria Air Pollutants
- CCAP – Comprehensive Climate Action Plan
- CPRG – Climate Pollution Reduction Grant
- DFW – Department of Fish & Wildlife
- EPA – Environmental Protection Agency
- ERE – Earth Right Energy Mid-Atlantic
- GHG – Greenhouse Gas Emissions
- HAP – Hazardous Air Pollutants
- ICC – Intertribal Conservation Council of the Chesapeake
- IPCC – Intergovernmental Panel on Climate Change
- ITEP – Institute for Tribal Environmental Professionals
- LIDACs – Low Income and Disadvantaged Communities
- LULUCF – Land Use, Land Use Change, and Forestry
- MIN – Monacan Indian Nation
- NOFO – Notice of Funding Opportunity
- NRCS – Natural Resources Conservation Service
- PCAP – Priority Climate Action Plan
- QAPP – Quality Assurance Project Plan
- USET – United South & Eastern Tribes
- VADEQ, DEQ – Virginia Department of Environmental Quality
- VADOF – Virginia Department of Forestry

## Executive Summary

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*The Monacan Nation has been a part of the Eastern Siouan Confederacy, which has resided in the Piedmont Region of Virginia, for over 10,000 years. Our cultural beliefs have taught us to respect and honor our ancestors and the earth; we are all related. We are taught to think seven generations ahead. In doing so, we are working on a climate action plan to ensure the future of The People (Yesa) will inherit our ancestral territory, in hopes that they continue to preserve and care for the land, air, and waters, and carry on cultural traditions as the ancestors have, for the millennia to come. – **statement from Chief Diane Shields, March 2024***

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The goal and purpose of the Priority Climate Action Plan (PCAP) is for the Monacan Indian Nation (MIN) to generate a plan that will reinforce tribal needs and sovereignty while also building resilience in the face of climate change. By identifying major sources of greenhouse gas emissions as well as sequestration assets within the community, the nation has taken a huge step towards developing climate measures on Monacan terms.

### **PCAP elements and key takeaways**

The Monacan PCAP's structure is based on the requirements of the CPRG grant, and contains the following elements:

- A **simplified Greenhouse Gas inventory** for the Monacan Indian Nation's tribal lands and tribal government buildings, based on data collected by the MIN Environmental Program Manager from publicly available records, regional/state and local sources, or direct billing sheets from utility providers. Information collected was subject to the MIN Quality Assurance Project Plan (QAPP) also established as part of the CPRG planning grant. The GHG inventory was based on the Tribal Greenhouse Gas Inventory Tool, TGIT.
- **Quantified projected GHG reductions for priority implementation measures**, identified by MIN leadership and collaborating specialists.
- A **benefits analysis for co-pollutants** (both criteria and hazardous air pollutants) for projected pollutant reductions in the event of implementation.
- A **review of authority to implement** on all priority measures.

The key takeaways from the PCAP were the nation's carbon-negative status, contingent on the large acreage of healthy forested land owned by the nation. Protection of this forest, and improving connectivity to larger forests, is of vital importance to Monacan citizens and environmental program staff. Energy efficiency is also of key importance, as are reduction of transport greenhouse gases and other sources of pollution.

## **1 - Introduction**

The Monacan Indian Nation has built this PCAP in support of MIN's environmental mission to protect the environmental, natural, and cultural resources of the area now known as Central Virginia for future generations of tribal people. The main goal of this planning grant was to document the baseline level of greenhouse gas emissions for the Monacan Nation, which we can then build into a more comprehensive plan that reduces emissions across all sectors and boosts carbon sequestration as well. To this end, the MIN Environmental Program emphasizes the importance of planning and responding to the imminent and long-term threats posed by climate change.

This plan is intended to lay the groundwork for future environmental developments that will improve the quality of life and environmental quality of the Monacan Indian Nation's ancestral land. In line with citizen feedback, this document will support MIN's investment in policies, practices, and technologies that are both culturally appropriate and will provide meaningful benefits to the Monacan community. After receiving federal recognition in 2018, the Monacan Indian Nation has been working tirelessly to develop its environmental capacity in a way that centers Monacan interests, history, and identity. The creation of this PCAP represents another leap forward for the Monacan Nation's environmental program.

As a people, the Monacan Indian Nation have lived with this land for countless generations as hunters and fishers, foragers and farmers, art makers and craftspeople. The history of colonialism and subsequent segregation on the land now known as Virginia created a massive disparity in the quality of education, public resources, and other infrastructure needs available to Monacan people, one that is still largely unaided and unaddressed by state and local authorities. Legal segregation and oppression have ended, but prejudice and hardship remain in their wake, affecting Monacan citizens to this day.

The development of this PCAP began in the MIN government's housing program, as a way to improve energy efficiency in Monacan households. However, the scope of planning quickly grew as public feedback and data indicated that energy efficiency was just one piece of the puzzle. Monacan citizens often identify their ancestors and themselves as woodland people, and fittingly, preservation of forested areas, healthy forest management, and rematriation of ancestral land are key priorities of the Monacan environmental program and climate plan. However, climate change has effects at every scale, from microscopic to global, and will cause change and friction in every sector. It is of vital importance that the Monacan Indian Nation develop this plan and join the many other state, local, tribal, and other recipients of the CPRG grant in creating an actionable work plan that will allow them to alter the prognosis of climate change.

## 1.1 - CPRG Overview

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*“The Climate Pollution Reduction Grants (CPRG) program provides \$5 billion in grants to states, local governments, tribes, and territories to develop and implement ambitious plans for reducing greenhouse gas emissions and other harmful air pollution. Authorized under Section 60114 of the Inflation Reduction Act, this two-phase program provides \$250 million for noncompetitive planning grants, and approximately \$4.6 billion for competitive implementation grants.”<sup>1</sup>*

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The above from the EPA’s CPRG describes the EPA’s commitment to greenhouse gas reduction through the CPRG grant. The CPRG program is designed to support the development of strategic plans that aim to reduce greenhouse gas (GHG) emissions. It also aims to implement projects that can effectively reduce GHGs and associated co-pollutants. The initial planning phase involves the creation of a Priority Climate Action Plan (PCAP) and a Comprehensive Climate Action Plan (CCAP). The Monacan Indian Nation’s PCAP contains the necessary components outlined by EPA guidance documents, including GHG emissions inventories, quantified emissions reduction measures, benefits analysis, and review of authority to implement.

The CPRG program intends to reduce climate pollution while creating jobs and lowering energy costs, while also working to address environmental justice concerns and empower communities to take action and deliver cleaner air by reducing harmful pollution.

The CPRG program is structured in two phases, Planning (PCAP and CCAP) and Implementation. The PCAP is focused on emission reduction measures that will then be further explored in phase 2. The CPRG tribes and territories competition for implementation grants is designed to enable tribes and territories to achieve the following goals, per the notice of funding opportunity (NOFO):

1. Implement ambitious measures that will achieve significant cumulative GHG reductions by 2030 and beyond
1. Pursue measures that will achieve substantial community benefits (such as reduction of criteria air pollutants (CAPs) and hazardous air pollutants (HAPs))
2. Complement other funding sources to maximize these GHG reductions and community benefits; and
3. Pursue innovative policies and programs that are replicable and can be “scaled up” across multiple jurisdictions.

## 1.2 - PCAP Overview and Definitions

For the preliminary planning phases of the CPRG program, the Monacan Indian Nation needed to establish a baseline level of greenhouse gas emission. The baseline year of 2023 was selected as a reasonable starting point for this plan. For the inventory, all data was collected from Tribal Government records in accordance with the methodology outlined in the Quality Assurance Project

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<sup>1</sup> [Climate Pollution Reduction Grants | US EPA](#)

Plan. Data collected included electricity/utility bills, on-road and non-road mobile GHG sources, solid waste generation statistics, agricultural and land management practices, water data, and other information. If site-specific data was unavailable, emissions estimates were made using national or regional data and scaled down based on the characteristics of the Monacan nation.

This section contains a brief overview of CPRG and PCAP terms, definitions, methods used, and challenges encountered during the process. A deeper-level analysis of these terms and definitions can be found in Section 3. Additional information on the elements of the PCAP can be found in the EPA's CPRG Program Guidance for Federally Recognized Tribes, Tribal Consortia, and U.S. Territories.

This PCAP represents hours of work on behalf of the Monacan citizens, to forge a way forward for the Tribal Government in the face of climate change. It includes a greenhouse gas (GHG) inventory, a downscaled inventory of co-pollutants based on Amherst County's statistics, and finally, a discussion of potential measures, benefits, and milestones organized into six overarching themes, and finally a brief discussion of Tribal Authority to Implement and next steps. The CCAP will expand upon all themes presented here, based on guidance from Monacan citizens, particularly the elders & youth, who are our connections to the past and the future.

#### Definitions:

**Priority Climate Action Plan (PCAP):** a narrative report that includes a focused list of near-term, high-priority, and implementation-ready measures to reduce GHG pollution and an analysis of GHG emissions reductions.

**Comprehensive Climate Action Plan (CCAP):** a narrative report that provides an overview of the Tribe or Territory's significant GHG sources/sinks and sectors, establishes near-term and long-term GHG emission reduction goals, and provides strategies and identifies measures that address the highest priority sectors to help the Tribe or Territory meet those goals. A source is any activity that emits greenhouse gases over its normal operation. A sink is any activity that sequesters carbon. For this PCAP, trees/forest vegetation are the main carbon sinks under consideration in this PCAP.

**Greenhouse gas (GHG) Inventory:** a list of emission sources and sinks, and the associated emissions quantified using standard methods. The PCAP must include a "simplified" inventory (see Section 3). The CCAP must include a comprehensive inventory of emissions and sinks for the following sectors: industry, electricity generation/use, transportation, commercial and residential buildings, agriculture, natural and working lands, and waste and materials management.

## GHG inventory Structure

The greenhouse gas inventory presented in Section 3 of this document is a recorded tabulation of all of the carbon emissions occurring as a result of the day-to-day activities of the Tribal Government of the Monacan Indian Nation.

To provide further structure, the Tribal Inventory Greenhouse Gas Inventory Tool used by the Monacan Nation to calculate these results is divided into three scopes, as follows:

- Scope 1 – Stationary combustion of fossil fuels, mobile combustion of fossil fuels, solid waste disposal, and wastewater treatment facilities located on tribal land.
- Scope 2 – Building/Facility electricity use (can be location or market-based)
- Scope 3 – Employee commutes, water consumption in city facilities, agricultural & land management, urban forestry and land use change, waste generation

Table 1 – MIN’s Tribal GHG Emissions Inventory

A summary of the emissions findings of the PCAP is displayed below.

<b>Sector</b>	<b>Emissions (Megatons of CO2 equivalent, MTCO<sub>2</sub>e)</b>
Electricity Generation	80.81
Transportation	9.10
Waste	22.60
Forestry	-3,619.59
Employee Commute	36.96
Other emissions	1.63335E-05 (16.5 T or 0.0000165 MT)
Gross Total	149.47
Net Total	-3470.12

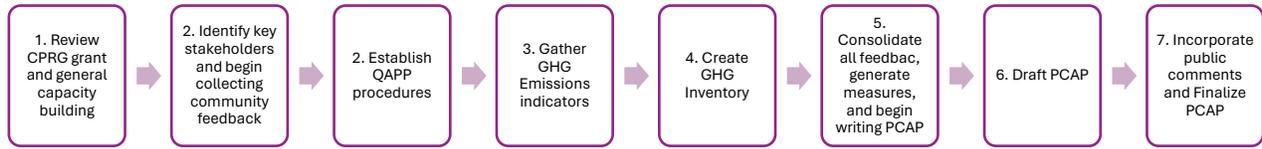
All measurements are in imperial megatons of CO<sub>2</sub> equivalents, a common standard unit of greenhouse gas emissions. Typically, emissions of non-CO<sub>2</sub> GHGs (i.e. methane) are converted into tons of CO<sub>2</sub> equivalent, or TCO<sub>2</sub>e, which is defined as “the amount of CO<sub>2</sub> which would have the equivalent global warming impact.”<sup>2</sup> Definitions, methodology, and findings for each emission sector will be further discussed in Section 3.

### 1.3 – Approach to Developing the PCAP

The Monacan Indian Nation employed a multi-step process to create this PCAP. Figure 1 shows a process timeline for the program. The baseline year 2023 was selected as it would allow for ease of access to all records, and estimations of current activities and holdings for the Monacan Nation.

<sup>2</sup> <https://ecometrica.com/assets/GHGs-CO2-CO2e-and-Carbon-What-Do-These-Mean-v2.1.pdf>

Figure 1: Process for developing Monacan Indian Nation PCAP



The above diagram shows the rough timeline of the development of the Monacan PCAP after the grant was awarded. Community feedback was an ongoing aspect of the project throughout all steps, and invaluable information regarding priorities and values was obtained and incorporated into this plan.

This PCAP was developed in conjunction with guidance documents and feedback from the EPA and followed directly from the CPRG work plan. The initial focus on housing was altered early as it became clear that the Monacan Nation’s members prioritized ecosystem stewardship, and that the preservation of healthy forest patches has the potential to offset massive amounts of carbon, in addition to performing ecosystem, recreation, and aesthetic services.

To begin, a firm baseline understanding of Monacan holdings and infrastructure had to be established. While creating the QAPP and planning for the PCAP, emphasis was placed on gathering public information and increasing the Environmental Program Manager’s organizational understanding. Once this was accomplished, planning and inventorying of assets and carbon expenses began. During the creation of the inventory, seven broad, overarching themes of greenhouse gas reduction and carbon sequestration within the Monacan Nation’s purview became clear. These themes are shared in further depth in their respective segments of Section 3.

## 1.4 – Scope of the PCAP

This PCAP fulfills the original requirements set out by the CPRG program and adheres to the guidelines therein regarding its scope. The PCAP is focused on creating a baseline GHG emission profile for the MIN, from which the Environmental Program can work to plan new emission reduction programs, build capacity, gather community feedback, and evaluate associated GHG reductions and other benefits. In addition, it is focused on creating opportunities, jobs, and green spaces for recreation and cultural practices for the citizens of MIN. As a result, this PCAP serves as an itemized and researched blueprint for keeping the Monacan Indian Nation carbon-negative and reducing all greenhouse gas emissions. Per the terms of Monacan federal recognition, the Monacan PCAP is limited to the geographic boundaries and parcels owned by the tribal government but can also act on behalf of its citizens to provide services as requested. HUD properties, owned by the nation but rented out to Monacan citizens, were not included in this PCAP but will be included in the expanded GHG inventory of the CCAP.

## **2 – Tribal Organization & Considerations**

### **2.1 Monacan Indian Nation History and Organizational Structure**

The Monacan Indian Nation achieved federal recognition status from the United States Congress on January 30, 2018, but the ancestors of modern Monacan citizens had lived in the Piedmont region of Central Virginia for at least 10,000 years. The original Monacan capital of Rassawek is in Fluvanna County at the meeting of the James & Rivanna Rivers. Rassawek was listed in the National Trust for Historic Preservation 2020 List of America's 11 Most Endangered Historical Places Program. Comparatively little is known from European records about Monacan society pre-contact because of their reluctance to welcome outsiders. Monacan ancestors spoke a now mostly extinct branch of the eastern Siouan language family and lived as a hunting, fishing, and farming society that was known for their copper, pottery, and beadwork among other things. A combination of colonial pressures, disease, prejudice, and later administrative and legal campaigns to erase their identities resulted in many Monacans leaving their homeland. This systemic discrimination has resulted in significant economic disparities for much of the Monacan community, and many left to pursue opportunities outside of Amherst County as a result of these racist discriminatory policies and segregation. As a rural area, MIN headquarters is located in a Low Income and Disadvantaged Community as defined by the US Government. All benefits analyses are conducted with this in mind.

The current extent of Monacan land is a 1500-acre area of land owned by the tribal government, as well as a service area established by the Thomasina E. Jordan Indian Tribes of Virginia Federal Recognition Act of 2017. This land is not a reservation, but the Nation is currently working to put its land into trust. The Monacan Nation has been headquartered in Amherst County since at least the 1830s, when an ancestor of many modern Monacans, William Johns, purchased a parcel of 452 acres on Bear Mountain, part of which is the present-day site of the Monacan Cultural Museum, Schoolhouse, and Tribal Hall. A portion of the Tribe's previous holdings on Bear Mountain has since been rematriated, totaling about two hundred acres on Bear Mountain, a prominent sacred and historic site. Since federal recognition, MIN has rematriated several more parcels known as Laurel Cliff, which are currently being assessed for their potential uses. As of early 2024, the number of enrolled tribal citizens is 2,910, with roughly 1,227 living in the MIN Service Area.

The MIN government has a Chief and Assistant Chief, as well as a Tribal Administrator and 10 other office staff members who specialize in different departments. The Tribal Council is an elected group of seven tribal citizens that serve as the liaison between the Tribal Government and the Monacan Citizens at large. The Tribal Government is currently in the process of ratifying a constitution, which will establish and codify governmental structure and procedure.

#### ***Natural and Cultural Features***

Land currently owned by MIN is comprised of 1494 acres (6.04 km<sup>2</sup>) in Amherst County VA. 73% of that is covered by forest, 173 acres on Bear Mountain, and the remaining 899 acres on the Laurel Cliff property. Including small patches of forest at the museum and tribal office, this is a total of 1094 acres of forested land. The landscape is typical of the Piedmont and Blue Ridge region, with rolling hills and valleys elevating up to low, forested mountains to the north and west. Bear Mountain is a site of immense cultural importance to the Monacan people, as it is the site of the schoolhouse and church, the museum and tribal hall, several cemeteries and older burial sites, and a

memorial garden. As the center of the Monacan community for nearly two centuries, Bear Mountain's cultural importance cannot be overstated.

Several unnamed tributaries of the James River flow through Monacan territory. Forested riparian buffers surround these streams on both sides where possible. These mixed deciduous hardwood riparian corridors serve as buffers between the pastures and streams as well as connected woodland habitat for animal species. The forest and streams on the properties are frequently used for hunting, fishing, recreational, and cultural purposes by Monacan citizens, and the main accessible field is used to host the annual powwow. In addition to the water and forestry resources on the Laurel Cliff property, the remaining acreage is largely agricultural pasture, formerly used for grazing by dairy and beef cattle. One tributary contains a dam known as Hummingbird Lake, which is currently in the early stages of assessment and repair. This lake can be seen on the map on page 22, as the hummingbird or cross-shaped lake outlined south of the square blue patch of Chestnut Oak.

### Facilities

The Monacan Indian Nation has a total of 8 buildings housing official MIN Government activities. The MIN Tribal Government Headquarters is the largest, with a 500-person capacity community room that frequently holds tribal meetings and elder luncheons during the construction of the new elder center. The Government directly employs 14 people, but the office also holds five Indian Health Services employees, as well as the staff at the food bank and museum which are part of the 501c3 nonprofit.

The site is also the location of the MIN food bank, which is open to citizens and the public, as well as a second office building on the eastern side of the property. The Big House at Laurel Cliff is a large brick house that is currently not being used except by infrequent hunting parties or other maintenance staff. The remaining buildings are located at the foot of Bear Mountain, the Monacan Cultural Museum, Tribal Hall, Cabin, and Schoolhouse (a historic landmark with no electricity). The Monacan Indian Nation also has seven HUD houses, which were outside the scope of this PCAP and will be analyzed for the CCAP phase. As capacities grow, more buildings will likely be added to the Monacan Indian Nation portfolio, and the energy and other greenhouse gas footprints of these properties will need to be totaled in the CCAP.

## 2.2 Tribal PCAP Management & Development Personnel

This PCAP was managed and prepared by the Monacan Indian Nation's Environmental Program Manager, as well as all other servicing of the grant's work-plan. The development of the initial plan and grant narrative and budget was performed by the former MIN EPA Manager and current manager of Housing & Urban Development (HUD). The development of the Quality Assurance Project Plan was also performed by the Environmental Program Manager, and quality assurance was assisted by the HUD Manager. Support to the Environmental Program Manager was provided by staff at the United South & Eastern Tribes (USET) and Institute for Tribal Environmental Professionals (ITEP) among other organizations.

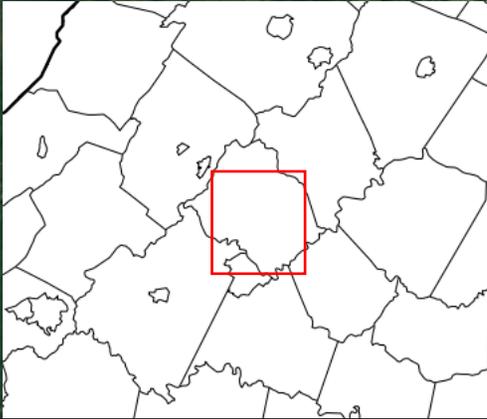


**Monacan Indian Nation Tribal Land**

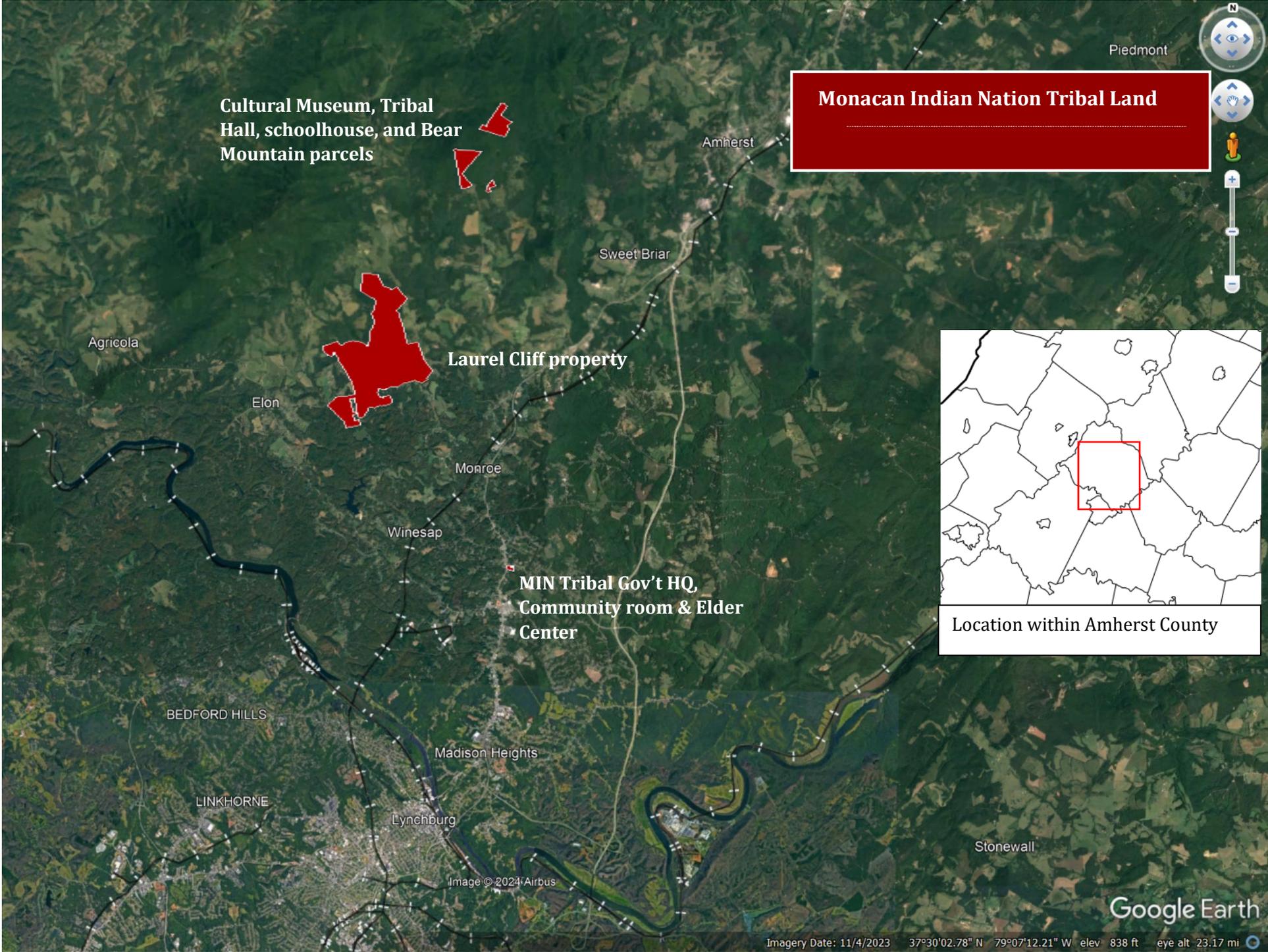
**Cultural Museum, Tribal Hall, schoolhouse, and Bear Mountain parcels**

**Laurel Cliff property**

**MIN Tribal Gov't HQ, Community room & Elder Center**



Location within Amherst County



## 3 – PCAP Elements

### 3.1 Greenhouse Gas (GHG) Inventory

#### Summary

The Tribal Greenhouse Gas Inventory Tool was provided by the EPA as an easy way for small municipalities and tribal entities to measure their greenhouse gas emissions from all sectors. It divides GHG emissions into three different “scopes” as an easy shorthand for identifying different types of climate policies and goals. These scopes are broadly defined, then examined based on current activities of the Monacan Tribal Government, and will then be expanded to include estimates of GHG emissions from tribal citizens if possible.

The GHG Inventory found that the total gross emissions of the Monacan Indian Nation is 149.47 megatons of CO<sub>2</sub>e (Tables 3.1 & 3.2). By scope, the largest emissions were from electricity generation offsite (80.40 MT CO<sub>2</sub>e), then employee commute (36.96 MT), followed by waste management (22.6 MT), and finally mobile combustion from company vehicles. The true Monacan carbon footprint is likely larger than this, as citizen housing and activities were not considered. These will be incorporated as part of the more comprehensive inventory of the CCAP. As discussed later, the entirety of Monacan Tribal Government HQ’s emissions is offset by the carbon sequestration services of the 1,100 acres of forests on Bear Mountain and Laurel Cliff, which the nation owns. The Monacan forests are responsible for 3,582.63 MT of CO<sub>2</sub>e sequestration, which completely offsets greenhouse gas emissions in other areas.

The tables below summarize baseline greenhouse gas emission totals by scope for the Monacan Indian Nation’s government activities. The net megatons of CO<sub>2</sub>e emitted by the MIN is 3,470.12:

**Table 3.1 – Net MIN GHG Emissions by Scope**

Total Monacan Indian Nation Emissions (MT CO <sub>2</sub> e)								
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Total MT CO <sub>2</sub> e	Percent of Total
Scope 1	9.10	-	-	-	-	-	9.10	6%
Scope 2 - Location Based	80.40	0.18	0.23	-	-	-	80.81	54%
Scope 2 - Market Based <i>(for informational purposes only)</i>	80.40	0.18	0.23	-	-	-	80.81	
Scope 3	(3,582.63)	22.60	-	-	-	-	(3,560.03)	-2382%
<b>Total Gross Emissions</b>	<b>126.46</b>	<b>22.78</b>	<b>0.23</b>	-	-	-	<b>149.47</b>	<b>-2322%</b>
<b>Total Net Emissions</b>	<b>(3,493.13)</b>	<b>22.78</b>	<b>0.23</b>	-	-	-	<b>(3,470.12)</b>	<b>-2322%</b>

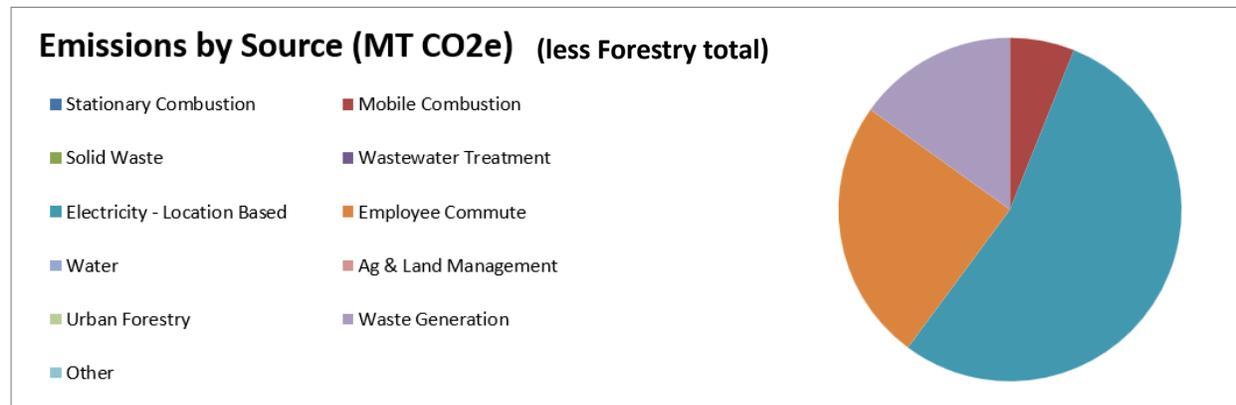
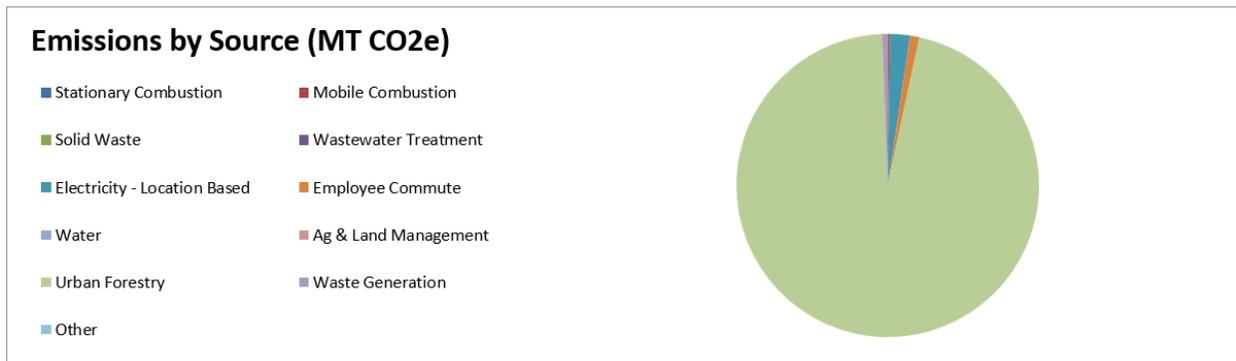
This table and the one below were generated by the Tribal Greenhouse Gas Inventory Tool and shows a high net negative emission because of the forested acreage owned and managed by the Nation. The gross emissions are representative of the totals calculated for Mobile Combustion, Electricity Generation, and Employee Commute & Waste Generation.

**Table 3.2 – Net MIN GHG Emissions by Source**

Source	Emissions by Source (MT CO <sub>2</sub> e)						Total	Percent of Total
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>		
Stationary Combustion	-	-	-	-	-	-	-	0%
Mobile Combustion	9.10	-	-	-	-	-	9.10	6%
Solid Waste	-	-	-	-	-	-	-	0%
Wastewater Treatment	-	-	-	-	-	-	-	0%
Electricity - Location Based	80.40	0.18	0.23	-	-	-	80.81	54%
<i>Electricity - Market Based (for informational purposes only)</i>	80.40	0.18	0.23	-	-	-	80.81	
Employee Commute	36.96	-	-	-	-	-	36.96	25%
Water	-	-	-	-	-	-	-	0%
Ag & Land Management	-	-	-	-	-	-	-	0%
Urban Forestry	(3,619.59)	-	-	-	-	-	(3,619.59)	-2422%
Waste Generation	-	22.60	-	-	-	-	22.60	15%
Other	0.00	-	-	-	-	-	0.00	0%
<b>Total (Gross Emissions)</b>	<b>126.46</b>	<b>22.78</b>	<b>0.23</b>	-	-	-	<b>149.47</b>	<b>100%</b>
<b>Total (Net Emissions)</b>	<b>(3,493.13)</b>	<b>22.78</b>	<b>0.23</b>	-	-	-	<b>(3,470.12)</b>	<b>-2322%</b>

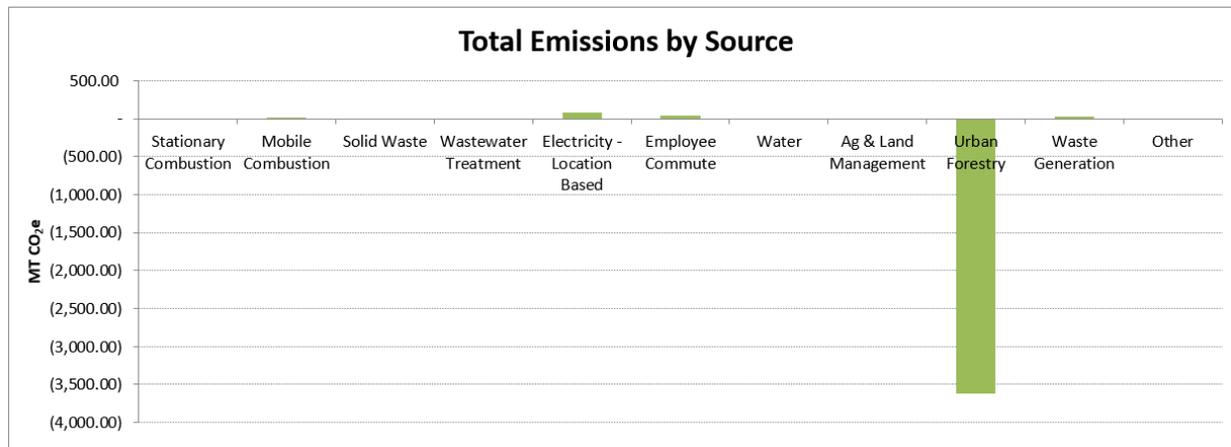
This table shows a more granular breakdown of the GHG emission totals based on input to the TGIT tool.

**Graph 3.1 & 3.2**



Note that because of how pie charts are generated in Microsoft Excel, the top graph's large green segment is the carbon-negative sequestration by trees on Monacan Land. The bottom graph removes forestry for a clearer view of CO<sub>2</sub>e emissions. Also note that not all sectors in the legend (for example Stationary combustion, solid waste, water) are represented in the GHG inventory in Section 3.

**Graph 3.3**



Again, note the heavy negative value of forestry on this emissions inventory.

### Scope 1

Scope 1 of the TGIT covers all direct greenhouse gas emissions, excepting direct CO<sub>2</sub> emissions from biogenic sources. In layman’s terms, this is the total CO<sub>2</sub> or CO<sub>2</sub>equivalents (CO<sub>2</sub>) produced directly by the Monacan Indian Nation as a result of power generation (both stationary & mobile), solid waste, and wastewater treatment methods. As the Monacan Indian Nation does not currently have any power plants, waste disposal facilities, or wastewater treatment facilities, the only major emitter in direct control of the Monacan government is the government’s fleet of vehicles. As infrastructure and development continues (for example, the purchase of backup generators for tribal buildings), it will be necessary to include any new items and their emissions in the Comprehensive Climate Action Plan (CCAP).

#### Stationary Combustion

The Monacan Indian Nation Tribal Government does not currently own or operate any stationary sources of combustion at the time of creation of this document. As such, this field was left empty. Backup generators and other emergency power sources will necessarily be included in the CCAP as they are procured.

#### Mobile Combustion

Mobile generators of greenhouse gases, AKA vehicles, are the only Scope 1 source of emissions existing currently within the scope of this inventory. The tribal government’s fleet of three gas-powered company vehicles is as follows:

- 2018 Honda CRV (hybrid)
- 2017 Toyota Highlander (hybrid)
- 2020 Toyota Tacoma

These vehicles are used for day-to-day, work-related travel but also include staff transportation to meetings, seminars, conferences, other tribes, etc.

In addition to the standard gasoline powered vehicles, the MIN government and food bank owns two buses used for transport of elders to the community spaces, as well as a 2020 Toyota Sienna with wheelchair access for senior pickup. Mileage records for these vehicles were unavailable, but

the odometer of the most frequently used bus, which was purchased new in July 2022, clocked 1770 miles as of March 2024. It is likely that ~1000 miles a year or roughly 19 miles a week is a good baseline number, as these vehicles are mostly used for transportation around town and only rarely go on longer trips.

ID#	Vehicle or vehicle group description	Department	Vehicle Year	Vehicle Type	Vehicle Model (optional)	Fuel type	Fuel consumption	VMT
<i>Saved Data</i>								
1	Honda CRV	Monacan India	2018	Passenger Car	CRV	Gasoline	178.25	5526
2	Toyota Highlander	Monacan India	2017	Passenger Car	Highlander	Gasoline	410	10506
3	Toyota Tacoma	Monacan India	2020	Light Truck (Vans, Pickup Trucks, Tacoma		Gasoline	250.389	5784
4	Elder Center Bus	Monacan India	2022	Heavy-Duty Vehicle	0	Gasoline	197.4333662	2000

Emissions for these vehicles were extrapolated from mileage records kept by employees; government policy requires employees to note the starting and ending odometer reading for every trip and write it in the notebook kept in each vehicle. These numbers were compiled by the MIN Environmental Program Manager on a month-to-month basis, noting the odometer reading at or near the first day of each month. Discrepancies on data were noted in the GHG Inventory Utilities tracker document – in places where data deficiency could not be resolved, a best guess estimate was used. Mileage totals were then translated into gallons of fuel consumed by simple conversion of mpg based on the year, make, and model of each vehicle, then the emissions per gallon of CO2 per gallon of fuel burned. The start and end totals for all mileage data were checked by the quality assurance process established in the QAPP.

#### Net Emissions from Mobile Combustion

Net Emissions by Department (MT CO <sub>2</sub> e)				
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	TOTAL
<b>Monacan Indian Nation</b>	9.10	-	-	9
Total Mobile Emissions	9.10	-	-	9

The above emissions totals represent 1036.1 gal of fuel consumed and 23,816 vehicular miles traveled.

Diesel-powered off-road vehicles will be discussed in the Additional Emissions section.

#### Solid Waste

The Monacan Indian Nation Tribal Government does not currently operate any solid waste disposal sites at the time of creation of this document. As such, this field was left empty. As waste management goals and priorities evolve, additions to this category will be reassessed. Waste generated by the office and processed or handled offsite is discussed in Scope 3

#### Wastewater

Similarly to stationary combustion and solid waste sites, the Monacan Indian Nation does not currently operate any wastewater treatment facilities. All buildings are either tied to the Amherst County Service Authority or on-site septic systems. As infrastructure changes, this section will need to be updated with estimates from any additional wastewater infrastructure.

## Scope 2

Scope 2 covers all indirect GHG emissions associated with the consumption of energy that has been purchased from an offsite provider for tribal operations. All of the Monacan Nation’s electricity is paid to AEP’s regional subsidiary Appalachian Power. The TGIT allows for calculation of Scope 2 emissions by either location based or market-based, dependent on where and how tribes have chosen to procure power. As the Monacan Nation’s government buildings are all using electricity

from the Amherst County grid, the location-based method was used. As energy needs increase, energy sources change, and development continues, it will be necessary to include any new properties and their electricity bills into the CCAP.

Electricity Use

For the purposes of this PCAP, only electricity-use directly resulting from Tribal government buildings or non-HUD buildings on land owned by the Monacan Indian Nation government were examined. MIN will analyze HUD buildings and residential energy in-depth in the CCAP. A brief summary of the buildings examined for this inventory is as follows:

<b>Name</b>	<b>Location</b>	<b>Use</b>
Tribal Government Headquarters	111 Highview Dr, Madison Heights, VA	Tribal Government offices, Community
Elder Center	111 Highview Dr, Madison Heights, VA	Tribal Government offices, Community
Back Offices	111 Highview Dr, Madison Heights, VA	Tribal Government offices
Monacan Ancestral Museum	2009 Kenmore Rd, Amherst VA	Cultural/Archival, Community
Tribal Hall	2009 Kenmore Rd, Amherst, VA	Community
Cabin	2009 Kenmore Rd, Amherst, VA	Community/hospitality
Laurel Cliff Big House	225 Laurel Cliff Rd, Monroe, VA	Unclassified
Food Bank	111 Highview Dr, Madison Heights, VA	Community

Buildings not included were the pottery barn on the museum property, which has no kilowatt hour usage according to electric bills, the church, which is not technically owned by the Monacan Nation, and the IHS Health Clinic on the parcel adjacent to the tribal government center, which is currently under construction and will be operated and owned by IHS rather than the tribal government. Regardless of ownership, future inventories like the CCAP will include estimates for these buildings.

All utilities were based on electrical bills received January 2023-January 2024, inclusive. On the next page is an estimate of Scope 2 electrical emissions based on the available information.

<b>Building</b>	<b>kWh</b>
Gov't HQ	157,975
Elder Center	23,600
Back Office Building	14,320
Food Bank	25,843
Museum	12,573
Tribal Hall	24,807
Laurel Cliff	40
Cabin	17,931
<b>Total</b>	<b>277,089</b>

<b>Total Emissions by Department (in MT CO<sub>2</sub>e)</b>				
	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>Total</b>
Monacan Indian Nation	80.40	0.18	0.23	80.81
<b>Total Emissions from Electricity Use</b>	<b>80.40</b>	<b>0.18</b>	<b>0.23</b>	<b>80.81</b>

### Scope 3

Scope 3 describes all other indirect GHG emissions as a result of tribal government activities not covered under Scope 2. This includes emissions from vehicles not owned or controlled by the tribe, waste disposal, emissions from agriculture, land management, and urban forestry. Each of these segments will be discussed in the following sections.

#### Employee Commute

Due to the small size of tribal government, employee commutes were tabulated by simply surveying the staff. The MIN average employee commute of 13.9 mi is slightly larger than the national average of 12.6 miles, which makes sense as the tribal government office is located in a more rural area directly north of the Lynchburg City metropolitan area. The ease of working from home since the COVID-19 pandemic means that occasional work from home is not uncommon, although all staff are frequently in the office building during operation hours. A rough estimate of 1% of total office time was work from home, per tribal administrator – roughly one day by one employee per week. No employees currently carpool, take public transit, bike, or walk to work. A year of 236 workdays (12 days of vacation and 12 federal holidays) was used, per the tribal government handbook. This also does not factor in any lunch break commutes or other trips in personal vehicles that are associated with working in the office but not accounted for by individual commute. From this data, the TGIT tool calculated 36.96 MT CO<sub>2</sub>e from Monacan government employee commutes.

Employees of IHS, who rent space in the tribal office building and also commute, were not tabulated for this inventory because they are not directly employed by the tribal government, but they should be included in the next steps of the CCAP to gain a more complete understanding of total commute GHGs from MIN.

## Commute inputs and outputs from TGIT:

Mode	Employees who use mode (%)	Default Values
Single Occupancy Vehicle	99%	76%
Carpool		10%
Motorcycle		0%
Transit		5%
Bike		1%
Walk		3%
Work at home	1%	4%
Other		1%
<b>Total</b>	<b>100%</b>	

Please enter the average one-way commute length for employees. Default commute distance is 12.6 miles (from FHWA's 2010 Status of the Nation's Highways Bridges and Transit, <http://www.fhwa.dot.gov/policy/2010cpr/execsum.htm>).

This commute distance may be longer or shorter than the average commute for your employees. For the most accurate emissions estimates, use data from a travel survey of employees.

<b>Average One-Way Commute Length (miles)</b>	13.9	12.6
---	------	------

Please enter the number of days each employee works per year. This number will be multiplied by the emissions from daily commutes. Default work-year days is provided (240 days), assuming a 5-day work week, two weeks (10 days) of vacation, and 10 federal holidays.

<b>Workdays per year</b>	236	240
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### Employee Commute Emissions Summary

Emissions by Department (MT CO <sub>2</sub> e)	
	CO <sub>2</sub>
<b>Monacan Indian Nation</b>	36.96

## Water Use

The tribe does not currently import water from any source. All water linkages in tribal buildings are a part of the Amherst County Service. This is not projected to change, but if estimates need to be established for future examples of water use, they will be enacted here.

## Agriculture & Land Management

Large-scale agriculture is not currently being undertaken on Monacan land, although feasibility studies for the Laurel Cliff property will hopefully reveal the areas where regenerative, low-impact farming to support the food bank will have the most beneficial effects to the soil and ecosystem health. The Land Management segment of the TGIT is focused only on emissions from fertilizer application – yard waste clippings are handled in the waste generation category. Cattle are also currently being grazed on the northern part of Laurel Cliff on a rental basis. As these activities continue and expand, their GHG emissions will need to be added to the CCAP and future inventories.

## Forestry

In terms of absolute value of carbon change, this category is by far the single largest part of the Monacan Indian Nation's carbon footprint. However, as Monacan Land is mostly covered in old-growth forest of varying compositions, this number is negative, completely offsetting the other emission categories as calculated by this inventory. The total acreage of Monacan Land is 1496 acres, or 6.05 km<sup>2</sup>, and 73% of that is covered in forest. Based on the TGIT estimate of 2.23 tonnes per hectare per year of CO<sub>2</sub>e sequestered, this gives a total estimated sequestration of 3619.59 MT CO<sub>2</sub>e.

Carbon Sequestered (MT CO <sub>2</sub> e)		
	Carbon Sequestration	TOTAL
Monacan Indian Nation	3,619.59	3,619.59
Total Sequestration from Urban Trees	<b>3,619.59</b>	<b>3,619.59</b>

Mapping/calculation of forested acreage and general assistance with forestry carbon sequestration data were provided by Tyler Everett, Mi'kmaq citizen and Forestry Adaptation Technical Assistant for USET. Using GIS software and shapefiles of Monacan land, he generated a rough estimate of species mix and land cover type that could then be used to calculate carbon sequestration, with the understanding that a more in-depth, *in situ* tree inventory would be necessary to more accurately gauge forest makeup and subsequently, carbon sequestration capacity.

The table below shows the total by-type forestry breakdown across all MIN properties. “No Value” represents areas that the USFS cover typing data had no classification listed. A brief examination of by-type tree carbon sequestration for individual Monacan properties and Carbon stock potential is included in Appendix A. This information will be used for more in-depth forest research in future inventories.

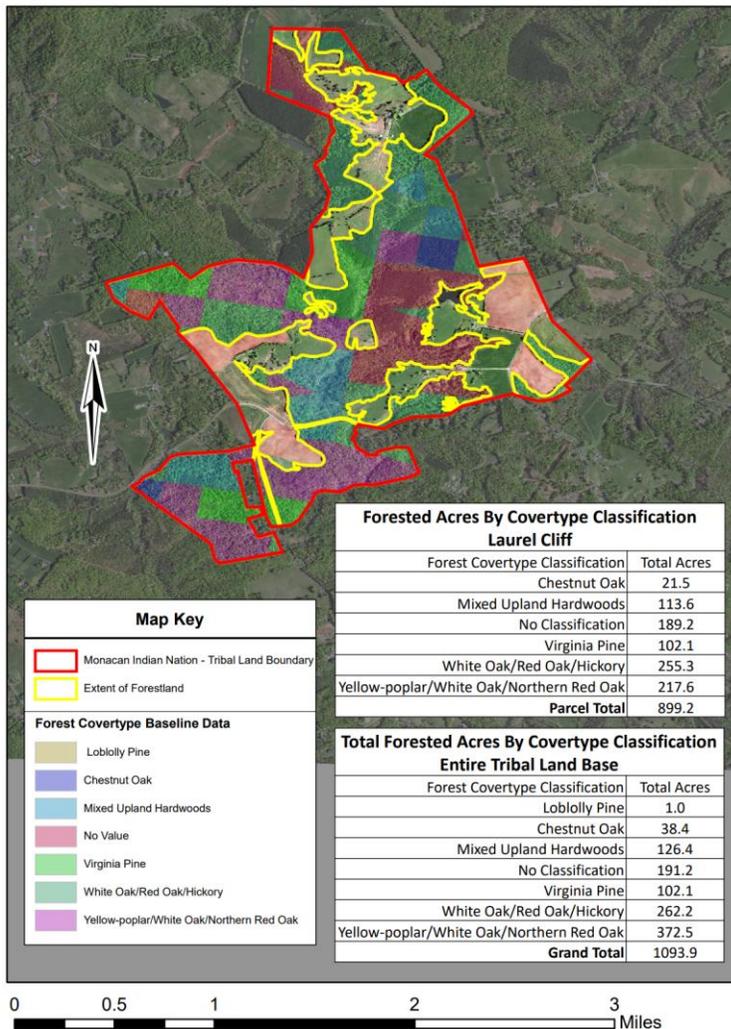
Row Labels	Sum of Acres
Loblolly Pine	1.0145
Chestnut Oak	38.386941
Mixed Upland Hardwoods	126.4346662
No Value	191.2259667
Virginia Pine	102.091987
White Oak/Red Oak/Hickory	262.224176
Yellow-poplar/White Oak/Northern Red Oak	372.4669932
<b>Grand Total</b>	<b>1093.84523</b>

Active management of these forests for carbon sequestration could improve this sequestration rate and reduce risks from expected climate impacts in the region. Projects in Minnesota and Vermont have shown that “[forest] management actions can be designed to enhance sequestration rates or to maintain or increase existing forest carbon stocks by preventing carbon losses. These management actions also can support other desired co-benefits for resource management objectives, such as timber supply, wildlife habitat, or water quality.”<sup>3</sup> The creation of a Monacan Nation Forestry and Land Use Plan is discussed in the next section as part of Measure 1.

<sup>3</sup> Ontl et. al. 2020, Journal of Forestry, Volume 118, Issue 1, January 2020, Pages 86–101, <https://doi.org/10.1093/jofore/fvz062>

Example of forest coverage data for Laurel Cliff property

Monacan Indian Nation - Forestland Covertyping Acreage Report  
Laurel Cliff



Note the low resolution (blocky patches) of covertyping data – a more detailed on-the-ground inventory will be conducted for the CCAP. This preliminary mapping provided a great jumping off point for the GHG inventory. Mapped details of the other properties are included in Appendix A.

Waste Generation

As no waste generation records are available for the Monacan Indian Nation, the totals in this segment were based on estimates from common MIN activities occurring in the tribal hall. All activities were estimated in units of tons (T) per year. The results are summarized in the table below, with discussion to follow. All GHG estimates were generated by inputting these numbers into the Waste Reduction Model (WaRM) tool, which allows users to input baseline waste data and generates GHG emissions from different potential methods of waste management.

Material	Tons Recycled*	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total MTCO2E
Mixed Paper (general)	-	0.16	-	NA	NA	0.01
Food Waste	NA	1.90	-	-	-	1.01
Grass	NA	160.00	-	-	-	21.10
Mixed Plastics	-	0.07	-	NA	NA	0.00
Mixed Electronics	-	0.01	-	NA	NA	0.00
Mixed Metals	-	0.07	-	NA	NA	0.00
Glass	-	0.05	-	NA	NA	0.00
Concrete	-	0.10	NA	NA	NA	0.00
Dimensional Lumber*	-	0.10	-	NA	NA	(0.09)
Drywall	-	0.10	NA	NA	NA	(0.01)
Fiberglass Insulation	NA	0.10	NA	NA	NA	0.00
Tires	-	0.10	-	NA	NA	0.00
Mixed Recyclables	-	0.20	-	NA	NA	0.01
Mixed MSW	NA	2.00	-	NA	NA	0.62
		164.95				22.66

Highest likely estimates were used for all items here, to gauge a “worst case scenario” of waste emissions. Paper waste was calculated as 50 lbs. every 8 weeks, which is roughly the weight and frequency of paper waste pickup. Food waste was estimated at two 50 lb. bags per week minus holidays (~80 days a year). This accounts for waste from the food bank as well as elder luncheons held nearly every Tuesday and Thursday, roughly 3,800 lbs. or 1.9 tons. Yard trimmings were calculated as 800 lbs. per season per acre at 400 acres, a total of 320,000 lbs. per year. Some of the 400 acres is hayed, so it is unlikely that the final amount of grass/yard trimmings is this high; this was again selected to give an upper bound on likely waste generated.

Mixed plastics and metals were each calculated as around 130 lbs./year. Mixed electronics were calculated as 20 lbs./year. Glass was calculated as roughly 100 lbs./year. A mixture of construction waste from the new constructions on Monacan HQ grounds were calculated at roughly 200 lbs. each of concrete, dimensional lumber, drywall, and insulation. Four tires per year or roughly 200 lbs./year was the expected waste tire usage, all of which are handled by auto service centers nearby. Mixed recyclables and mixed municipal solid waste were calculated at 0.20 tons (200 lbs. per year) and 2 tons per year (2000 lbs. per year). This is a total of 165 tons of waste landfilled a year, for which the WaRM tool calculated a net total of 22.66 MTCO2E emitted per year. The inception of the Monacan Indian Nation’s Tribal Integrated Waste Program in 2024 as part of GAP planning will assist some of this, but recycling infrastructure and other waste management options are limited by what is available in Amherst County.

The WaRM tool also allows alternate waste management procedures to be tested for their carbon emissions potential. By recycling rather than landfilling, and composting a little more than half of the food waste, the Nation would effectively neutralize the carbon generated by waste. This is an extremely ambitious waste management goal but could be attained or nearly attained through proactive waste management and education of office staff.

### Additional Emission Sources

The MIN government also owns two diesel-powered vehicles, a tractor/brush hog used for maintenance and a John Deere Gator Utility Vehicle for waste/compost hauling and transport around Laurel Cliff. Restocking of the on-property diesel fuel tank indicates a usage of roughly 395 gal/year. Per EPA resources<sup>4</sup>, a gallon of diesel burned releases 10,180 g of CO<sub>2</sub>e, or 22.4 lbs. of CO<sub>2</sub>e per gallon burned. This totals 8867 lbs./year or 4.4x10<sup>-6</sup> MT of CO<sub>2</sub>e.

An estimate of air travel was also created from EPA figures of air travel emissions, roughly 90 kg of CO<sub>2</sub>e per passenger per hour. Figuring roughly 12 air travel round trips per year in total, with an average duration of 5 hrs. airtime, yields 10,800 kg CO<sub>2</sub>e per year, or 23,803.2 lbs. CO<sub>2</sub>e per year. This is equivalent to 1.19x10<sup>-5</sup> MT CO<sub>2</sub>e per year. Because the totals are calculated in megatons of CO<sub>2</sub>e, these numbers make up a minute fraction of the CO<sub>2</sub>e emissions of the MIN, but in the interest of thoroughness, they were included.

Description	Department	Scope	MT CO <sub>2</sub> e						Total
			CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	
Diesel non-road vehicles	Monacan Indian Nation	1	4.4319E-06						4.4319E-06
Staff Travel	Monacan Indian Nation	1	1.1902E-05						1.19016E-05

As the CCAP is developed, it will be necessary to include more robust information about diesel use on Monacan property. It is also recommended that more thorough recordkeeping of air travel and diesel usage is kept to assist with future inventories.

### Co-Pollutants

An inventory of estimated co-pollutants was generated from county-level data from the EPA 2020 NEI database, which was then scaled to the population of the Monacan Nation currently living in Amherst County and for all Monacan Citizens. The true level of co-pollutants generated by the Monacan citizen population is likely between these two amounts.

The most prominent sources of emissions were from:

- Natural sources
- Mobile sources
- Miscellaneous Area Sources
- Solvent Utilization
- Storage & Transport
- Stationary Source Fuel Combustion
- Waste Disposal, Treatment, and Recovery

The tribe's most significant source of co-pollutants was Volatile Organic compounds (VOCs), at 113 tons. This was followed by Carbon Monoxide, particulate matter 10 and 2.5, and Sulfur Dioxide.

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<sup>4</sup> <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>

Co Pollutants	Type	Amherst County Emissions (T)	Scaled Emission (T, Amherst Monacan Residents)	Scaled emission (T, All Monacan Citizens)
Volatile Organic Compounds	CAP	11590.00	113.09	1065.05
Carbon Monoxide	CAP	4832.60	47.16	444.09
PM10	CAP	1766.00	17.23	162.28
PM2.5	CAP	1101.00	10.74	101.18
Sulfur Dioxide	CAP	745.00	7.27	68.46
Nitrogen Oxides	CAP	732.00	7.14	67.27
Ammonia	CAP	439.00	4.28	40.34
Methanol	HAP	472.00	4.61	43.37
Formaldehyde	HAP	126.80	1.24	11.65
Acetaldehyde	HAP	103.00	1.01	9.47
Toluene	HAP	34.00	0.33	3.12
Xylenes (mixed isomers)	HAP	21.20	0.21	1.95
Ethylene Glycol	HAP	11.90	0.12	1.09
Benzene	HAP	10.00	0.10	0.92

No emissions under 10 tons for Amherst County as a whole were considered for this co-pollutant inventory. It may be helpful to research co-pollutants more in the CCAP and include outliers for Amherst County.

Reduction of pollution generally, and of electricity consumption, commute emissions, & increase of forest coverage specifically, will result in lower levels of these co-pollutants in the Monacan service area.

### 3.2 – Quantified GHG Reduction Measures & Benefits Analysis

The MIN GHG reduction measures are based on the findings of the greenhouse gas inventory and the information received from the MIN citizens through surveying. The CPRG grant was announced at a tribal meeting upon its being awarded in October, and periodic updates were provided by the environmental department at these monthly meetings. Unofficial surveying began immediately through discussions with citizens about environmental concerns. Official surveying began after the QAPP was accepted in February and was conducted through a Survey Monkey poll designed by the environmental manager. Versions in print and over the phone were also offered, although no surveys were filled out this way. Before discussing reduction measures, it is necessary to understand citizen opinions and priorities.

#### Discussion of survey methodology and structure

An eleven-question survey regarding climate concerns and remediation methods was sent out on 6 March to the Monacan Constant Contact email list, which reaches all actively enrolled Monacan Citizens who have provided their email address (roughly 1300 emails). Reminder posts were also

posted on the Monacan Indian Nation Facebook, but the link was only distributed via email to minimize non-Monacan voting. Respondents spent an average of five minutes on the survey. A copy of the survey is included in Appendix B. The order of all answers that allowed multiple selections were randomized to ensure that they were not perceived to be ranked or listed in order of importance and to assist with overall data quality.

After a brief introduction to the CPRG program for those unable to attend previous tribal meetings, the survey asked basic demographic information, tribal citizen status, and current frequency and importance of outdoor activity. All anonymized survey results are included in Appendix B, directly after the blank survey.

Following these questions, respondents were asked about their concern about climate change in general. 78.4% respondents were very or moderately concerned about, another 12.2% were slightly concerned, and 9.5% were not concerned at all about climate change.

The next questions asked about the specific nature of climate concerns – asking about the most pressing climate concerns to respondents, followed by an open answer box to submit other concerns not listed in the previous question.

Species and habitat loss, invasive species, and extreme weather events were the most commonly cited concerns, followed by human health concerns (both direct and indirect), soil erosion and degradation, mental and emotional health implications, weather pattern and precipitation shifts, followed by sea level rise, infrastructure, and shipping concerns.

The open-ended responses regarding climate change factors that were not included in the preceding question were varied. Responses included creating a future for children, building climate resilient housing, erosion, changes to growing seasons, cancer, land development, concerns about others doubting climate change, questions about the validity of climate change itself, doubts about nuclear energy, shifting to renewable energy, issues with the electricity grid and ability to power an increasing population, weather manipulation by the U.S. government, and general environmentalism and protection of the planet.

Fifty-five respondents (74.3%) listed increasing food sovereignty as a concern, followed by fifty answering wildlife management and hunting/fishing infrastructure (67.6%) and forty-three responses for land acquisition/rematriation (58.1%). Other concerns were, in order of interest, forest stewardship, land remediation/replanting and reintroduction of native species, home energy efficiency, reducing waste & composting, invasive species control, energy sovereignty, renewable energy, regenerative agriculture, improving or maintaining community resources, green jobs/workforce planning, infrastructure improvements, improving climate literacy, and finally, carbon sequestration.

Responses to the “other mitigation factors” prompt were again varied, and included responses that referenced recycling, more county/state parks, conduct at tribal meetings and difficulties reaching overall group consensus, recycling and waste reduction, reducing smoking, and protecting forestland.

The next question asked about **less** appropriate methods of climate change mitigation – things that had no place in a Monacan vision of a greenhouse gas and pollution plan. This question was included to gauge overall literacy of the concepts in question and see if there was strong negative interest in certain methods over other methods. Further surveying will be conducted as part of the

CCAP to get more detailed analysis and a more granular perspective on appropriate climate change mitigation efforts from a Monacan perspective.

Fleet electrification and transportation programs were listed by a majority of respondents as a **less** appropriate climate action method, with 35 respondents selecting it (53.0%). The next most common response was improving climate literacy with 15 responses (22.7%). Home energy efficiency and wildlife management both received twelve votes. (18.2%) All other responses were under 10 responses (15%) and were ranked as listed in the previous page. This question also received fewer responses, with ten respondents skipping the question entirely.

Open-ended responses regarding inappropriate methods of pollution reduction were once again varied and included: deforestation or further development, concerns over solar panels and solar farms, doubts about whether humans are changing the climate, removing government and settlers from the country, EVs, wind turbines, and hydroelectric, crime, and concerns over the Monacan Indian Nation's legal services.

The final question asked about any other major emitters or greenhouse gas producers that are not located on Monacan land but are likely to affect environmental quality. This open-ended response question received responses regarding: car production facilities, fracking, pipelines, the government, OPEC, nuclear power, smoke from burning yard debris, landfills, chemtrails, airplanes and private jet pollution, oil, GMOs, other countries' pollutants,

The low placement of carbon sequestration on both the Most and Least appropriate survey could indicate low familiarity with this term. Support of carbon sequestration practices like woodland preservation receiving high appropriateness ratings also points to this being the case. Open discussions about climate change, renewable energy, and other complex and often contentious topics will be necessary to truly gauge what renewable energy sources are considered broadly acceptable, but this survey provides a good starting point.

#### Themes and PCAP measures

Over the process of developing the survey, conducting the inventory, and planning for the PCAP, six overarching themes were identified, within which are various specific, itemized projects to reduce GHG emissions. All projects will need to be discussed and decided upon by council and Monacan citizens to ensure that community needs are being met before beginning implementation.

These themes are as follows:

1. Create a Monacan Land Management Plan
2. Evaluate climate risks and anticipate system stressors
3. Reduce GHGs from energy production
4. Reduce transportation GHGs
5. Manage & improve water quality, waste management, and onsite GHG sources
6. Support clean air initiatives within Monacan service area

Each of these themes and the potential projects under them will be discussed in more detail in the next sections. The order of these themes is not indicative of their importance, but rather their ability to be actioned under Monacan authority and autonomy. The projects and priorities established here are example ideas and may need to be altered or adjusted as further outreach and public involvement is conducted.

The related inventory sector column represents the sections of the greenhouse gas inventory that are primarily served or supported by these measures. Priorities established within this document are preliminary and based on regulatory and governmental needs and capacity, public feedback, and current environmental program policy. Research and public outreach on the topics above will be performed concurrently, as possible, to increase overall efficiency and reduce the need for multiple meetings. As conversations evolve, it will be necessary to engage contractors, local, state, and federal agencies, and citizen volunteers to continue to develop these programs.

#### Potential agencies to engage

- **Federal agencies** like EPA, BIA, and FEMA – regional oversight and funding for large scale programs linked to other tribal nations’ climate resiliency and pollution plans
- **State and regional agencies** such as VADEQ, VADOF, DFW and NRCS – more regional and local focus tailored to the needs of legal entities within the Commonwealth of Virginia.
- **Private entities and nonprofits** that specialize in food sovereignty and food forestry, land conservation, soil conservation, wildlife restoration, invasive species management, etc.
- **Educational facilities** – University of Richmond, Sweetbriar College, Randolph University, Virginia Tech, University of Virginia, and other primary secondary schools with environmental science, natural resources, agriculture, and environmental justice programs
- **Other tribal nations or regional entities assisting tribal governments** – Eastern Band of Cherokee, other Virginia tribal environmental directors, ITEP and USET
- **Engineers and civic planning specialists** – to provide designs and functional schematics for any public-facing or building development needs.
- **Utility providers, local contractors,** and entities that generate power for the grid – AEP/Appalachian Power, Earth Right Energy Efficiency Mid-Atlantic
- **Developers and other stakeholders** who are likely to benefit from increased development – to make Monacan presence known and reinforce community needs and Monacan sovereignty.

## Measure 1 – Create a Monacan Land Management Plan

MIN CPRG PCAP Measures				
Investing in Clean Energy & Land Reclamation for the Future of the Monacan Indian Nation				
No.	Proposed PCAP Measure	Related Inventory Sector	Project Examples	Status
1	Create a Monacan Land Management Plan that emphasizes Monacan culture, supports Monacan sovereignty, and improves ecosystem health & carbon sequestration	Land Use, Land Use Change, and Forestry (LULUCF) Water/Wastewater Agriculture	Develop a Tribal Food Sovereignty Plan to improve access to hyperlocal food and boost indigenous health and welfare.	Preliminary
			Work with state agencies to create a forest management plan that maximizes carbon sequestration and ecosystem health to key species in Monacan Culture	Preliminary
			Identify key species of interest for Monacan Cultural Preservation designation and create a community-sourced list of culturally important species that will allow protection measures within Monacan service areas	Ongoing
			Planting of native forest species in disturbed pasture and pine forest lands, food forests, and other projects that will increase food security, carbon sequestration and habitat	Preliminary
			Increase soil carbon capture capacity and reduce erosion and invasive species by boosting soil fertility at Laurel Cliff property	Preliminary
			Perform feasibility study for Laurel Cliff property that will determine best areas for low-impact agriculture (with the goal of food sovereignty and soil carbon sequestration), energy efficient housing, and renewable energy infrastructure	Preliminary/ Ongoing
			Evaluate land acquisition potential and stewardship goals for any newly acquired parcels.	Preliminary
			Research carbon sequestration and other carbon reduction measures that center Monacan cultural and land use practices, and arrange public meetings to discuss these projects, garner feedback, and adjust planning accordingly.	Preliminary
			Begin and maintain a Tribal Composting program, involving Monacan Citizens, local utilities and municipal sources of compostible waste	Ongoing
			Prioritize wildlife corridor and forest patch connectivity initiatives within Amherst County and Monacan service area	Ongoing

Theme 1 concerns land use, which was identified by both the environmental program manager and the Monacan citizens as a major priority and area of impact. The creation of a land management plan would allow for a higher level of consistency in responding to environmental consultation requests and generally support the development of a management plan (focused on restoration of forest) of the Laurel Cliff property, Bear Mountain parcels, and any additional parcels acquired by the Monacan Indian Nation in the future. Any Land Management Plan created by MIN must center Monacan culture and experiences, support Monacan sovereignty, and improve ecosystem health & carbon sequestration.

The primary inventory sector related to this theme is Land Use, Land Use Change, and Forestry (LULUCF), although it also potentially impacts Water and Agriculture. As confirmed by the GHG Inventory, the Monacan Indian Nation's forests are a major source of ongoing, active carbon sequestration. They completely offset the energy and other GHG emissions generated by Tribal Government activity. This is not to be taken as a pass to pollute more – it only means that the Monacan Nation has been able to reclaim and reserve some of the once vast forests that blanketed central Virginia and the Blue Ridge Mountains. The key role will lie in carefully managing the forests owned by the nation to maximize natural carbon sequestration, ecosystem health, forage and food species, replanting with climate resilient native species, planning for regenerative agriculture and food forestry in service of both the people and the ecosystem, and minimizing development in accordance with forest management protocols established by the Monacan Indian Nation Environmental Department with feedback from citizens.

Forest preservation and ecosystem conservation was a key focus for Monacan Citizens and the Environmental Program. Working together with state and regional agencies to create a Monacan Forestry Policy or similar land use practices guide will be vital to the continued maintenance of the Tribe's negative carbon footprint. The forests of Central Virginia are a vast repository of cultural and spiritual knowledge for the Monacan People, and their protection is of prime importance to both citizens and the Tribal government. The development of a Tribal Forestry Plan that prioritizes carbon sequestration and anticipated climate change factors will allow the Monacan Nation to remain carbon negative and offset the pollutants of surrounding areas as the operator of a regional forestry service.

Food sovereignty was identified as a major area of concern for the Monacan Citizens. As referenced in the TGIT, commercial fertilizer, water importing, and other practices of unsustainable large-scale factory farming result in tremendous carbon emissions. Estimates of greenhouse gas emissions from the global food system vary, from 26% to 33% (IPCC) to as high as 57% (Grain.org). Much of the produce and shelf-stable canned items for the food bank come from farms hundreds or thousands of miles away. These emissions were outside the scope of this inventory, but research has already begun on how to calculate these emissions.

Production of food within Monacan Land would result in a significant reduction of emissions on food transportation and production elsewhere in the world and would improve the quality and quantity of food available, as well as create jobs and management opportunities for Monacan citizens and boost tribal food sovereignty. Carbon sequestration and likely climatic shifts would necessarily be a part of Monacan Land Use Planning. Support and focus for hunting and fishing programs in this plan will also be vital, as a large proportion of Monacan citizens hunt and fish throughout the region for sustenance, recreation, and cultural/spiritual purposes.

Purchase of future parcels for forest conservation and wildlife management purposes is a major focus of the Monacan Nation and will be a large part of decision-making moving forward. Further forested parcels will require the creation of a more robust natural resources and forestry department.

#### Benefits

- Increased carbon sequestration (2.23 MT/year of CO<sub>2</sub>E per acre of forested land)
- Increased air quality
- Reduced urban heat island effects
- Reduced flooding risk and soil erosion
- Increased patch connectivity and wildlife habitat corridors
- Improved water quality and biodiversity
- Increased recreational potential
- Increased cultural and spiritual knowledge
- Decrease of urbanization, logging, and conventional agriculture

#### Metrics

- Total megatons of CO<sub>2</sub>E captured are highly dependent on acreage acquired. Even a modest increase of permanently forested acres into land trust would create massive sequestration and ecosystem health benefits.
- Planning and outreach are to be conducted in the first two years of the program, with a launch date of 2026.
- Milestones for obtaining authority to implement: Tribal Council approval, ground truthing and formal forest inventory, creation of a draft land management and acquisition plan.

## Measure 2 – Evaluate climate risks and anticipate system stressors

MIN CPRG PCAP Measures				
Investing in Clean Energy & Land Reclamation for the Future of the Monacan Indian Nation				
No.	Proposed PCAP Measure	Related Inventory Sector	Project Examples	Status
2	Evaluate climate risks and anticipate system stressors	Land Use, Land Use Change, and Forestry (LULUCF)	Conduct inventory of all potential climate risks for the region, including weather events, disease, crop failures, and other system stressors	Preliminary/Ongoing
			Develop plans to boost Monacan community resilience in the face of climatic and other external stressors	Preliminary
			Map climate resilience and assets to Monacan sovereignty	Preliminary/Ongoing
			Model land use change as needed to anticipate future agricultural viability and potential reforestation patterns, spread of invasives, etc.	Preliminary

### Introduction and discussion of potential projects

Climate change was of at least slight concern to most Monacan citizens polled. As discussed in the survey section, concerns included ecosystem health, extreme weather events, and general human health concerns. All these concerns can be mitigated by climate planning and conducting more granular analysis of climate change’s effects on the region and on tribal citizens specifically. Mapping and modeling will be crucial to this effort, and outreach has begun for GIS support and mapping projects and needs. These programs have the potential to boost efficiency of any land management practices, by identifying key ecosystem corridors, focus species, climate risks, and assets that will uniquely affect the Monacan Nation.

### Benefits

- Major benefits for emergency preparedness and human health outcomes
- Increases efficiency of future efforts to manage land and restore forests, maximizing sequestration and ecosystem services and reducing cost

### Metrics

- Creation of a climate risk assessment for MIN
- Mapping of climate risk for MIN land and interests.
- Introduction of and community discussion of climate concerns and risks
- Milestones for obtaining authority to implement: Tribal Council approval

## Measure 3 – Reduce GHGs from energy production

MIN CPRG PCAP Measures				
Investing in Clean Energy & Land Reclamation for the Future of the Monacan Indian Nation				
No.	Proposed PCAP Measure	Related Inventory Sector	Project Examples	Status
3	Reduce GHGs from energy production	Commercial Energy Residential Energy	Conduct a feasibility study of renewables in tribal area of interest, including environmental priorities, values around location, job creation, determine energy sovereignty's role in tribal environmental policy	Preliminary
			Engage tribal citizens through town halls and other meetings to discuss environmental priorities	Ongoing
			Capacity building and community outreach to establish community energy priorities	Ongoing
			Conduct house assessments and efficiency improvements on tribal housing at no cost to Monacan Citizens	Ongoing
			Create a program to engage tribal youth and other tribal citizens in green energy infrastructure building.	Preliminary
			Boost overall awareness of green measures that can be taken by citizens as part of Monacan HQ Environmental programs.	Ongoing
			Ensure that new construction meets MIN Clean Energy Standards.	Preliminary
			Research feasibility of solar on extant structures and make funding easily available for those who want it.	Preliminary
			Create a workforce engagement plan by working with indigenous sovereignty-focused nonprofit partners	Preliminary
			Improve MIN Govt HQ energy efficiency	Ongoing
			Collaborate with civic partners (school, daycare, places of worship, and other community members) to carbon reduced energy needs in a way that benefits Monacans	Ongoing
			Create credit system for EV purchase and home solar for Monacan Tribal Citizens.	Preliminary
			Build capacity and relationships with civic and regional partners	Ongoing

### Introduction and discussion of potential projects

The reduction of GHGs from energy production will be accomplished in several ways over the course of the Monacan Indian Nation's CPRG planning period. Energy use was a key concern for citizens, as identified by the survey. MIN's HUD statistics show that home energy inefficiency is a major cause for high heat bills for Monacan Citizens, and the tribal government and general operations uses over 277,000 kWh annually. Energy efficiency issues like drafts, air leaks, and insulation problems account for 10-20% of annual electric bills for homeowners.<sup>5</sup>

Electricity represented the single largest source of CO2 emissions in the Monacan Nation in this preliminary inventory. It is likely that as energy needs are better understood, and as services expand at MIN, the energy production GHG emissions of the MIN will increase. To anticipate and minimize these increases, The Monacan Nation government will make a concerted effort to improve energy efficiency across tribal government buildings and tribal housing within the service area. Preliminary solar estimates indicate that over 25 years, the nation could save 1 million kWh of fossil-fuel generated energy by installing a rooftop panel array. This is the equivalent of roughly 40,000 kWh per year, around 20% of the current annual electric bill.

The simplest method of GHG emissions reduction is to save on electricity bills by improving the energy efficiency and reducing the energy used by tribal government activities. This can be easily accomplished by cultivating relationships with local energy efficiency experts, who can assess and install proactive measures to decrease energy waste and HVAC inefficiencies.

Earth Right Energy Mid Atlantic (ERE) is a Lynchburg-based energy efficiency contractor service that is licensed for all major home repairs and installations involving energy efficiency, from doors, windows, and insulation to solar and other higher-end applications like rooftop solar panels. ERE has offered to work with the Environmental program and HUD to improve the energy efficiency of Monacan office space and homes, funded through a variety of federal and state programs. Funding for repairs and fixes will be discussed prior to installation and approved by Tribal Council, per government policy. Current feasibility on solar on HQ rooftops is being conducted.

<sup>5</sup> <https://www.energy.gov/energysaver/why-energy-efficiency-upgrades>

It is clear from the survey that further discussion with tribal citizens about their interest in and concerns with various methods of renewable energy generation is necessary. The survey mentioned wind, solar, and other green energy sources, but citizen response to these specific measures was polarized and feedback correctly pointed out that hydroelectric was missing from planning. The feasibility of hydroelectric on Monacan land, potentially at the Laurel Cliff site, will have to be assessed, as will the widespread support for and suitability of this and other methods. If it becomes clear that on-site renewable energy is not of interest to citizens, the focus will shift to other energy efficiency methods and other elements of this PCAP.

Benefits

- Reduction of waste energy and carbon footprint in the Monacan Nation and increase of overall renewable energy generated in Virginia.
- Engagement of tribal citizens and tribal youth with work plan.
- Decreased presence of fossil fuels and associated GHGs and co-pollutants.
- Increased opportunity for partnership with energy efficiency stakeholders across Virginia.
- Increased understanding of renewable feasibility on Monacan land, and increased understanding of tribal citizens’ interests and needs with renewables.

Metrics

- Public meetings relating to energy efficiency held.
- Energy efficiency plan established and enacted at Tribal Gov’t HQ.
- Feasibility conducted for solar and other renewable methods at tribal HQ.
- Milestones for obtaining authority to implement: Tribal Council approval.

**Measure 4 – Reduce transportation GHGs**

Investing in Clean Energy & Land Reclamation for the Future of the Monacan Indian Nation				
No.	Proposed PCAP Measure	Related Inventory Sector	Project Examples	Status
4	Reduce Transportation GHGs	Transportation Agriculture	Increase trail capacity of tribal land for Monacan citizens	Preliminary
			Ensure all Monacan vehicles are compliant with CAA regulations and that all new agricultural equipment is as low-impact and carbon neutral as possible	Ongoing
			Build relationships with City of Charlottesville and Lynchburg as well as Amherst County to reduce transportation GHGs on a civic scale	Preliminary
			Arrange EV and ebike credits for Monacan citizens	Preliminary
			Ensure Tribal Government fleet is as carbon neutral as possible by ensuring that all new vehicles are hybrid or Evs, or are equipped with modern emission reduction methods if no other option is available.	Ongoing
			Boost EV interest in Amherst County and among Monacan citizens through tribal town hall and info sessions with experts.	Preliminary

Introduction and discussion of potential projects

The reduction of transportation GHGs could be accomplished by multiple methods. The fleet is primarily electrified or energy efficient, but hybrid or renewable should be prioritized for any new vehicles should be prioritized as well. The COVID-19 pandemic has increased the ease of meeting virtually and working from home, and remote work is often taken advantage of by employees. Employee commute was the second-largest source of GHGs in this inventory, at 36.96 MT of CO2e annually. Company vehicle traffic accounted for another 9.1 MT CO2e in 2023. An estimate of Monacan Citizen commutes to their places of work could be included in a future inventory. Increased support of work-from-home capacity could reduce the GHG emissions from employee commutes, dependent heavily on how widely they are implemented or adopted.

Trail capacity could easily be increased on tribal land, allowing for walkable nature areas that will increase recreational activity, public interaction with natural spaces, and increase connectivity to existing trail infrastructure. Lynchburg City and Amherst County have somewhat extensive trail systems, and the Monacan Nation’s proximity to state and national forests indicates exciting opportunities to work with the forest service and other partners on establishing trail capacity. Further connections with other measures, particularly food sovereignty, are possible if planning includes planting of food forest trails. EV and e-bike credits for Monacan citizens, bike lane planning with Amherst County, and reduction of transportation GHGs at a regional level are some other options that could be explored. Interest in and feasibility of these measures are not currently known.

Benefits

- Reduction of GHG emissions due to transportation activities.
- Increased public health and physical activity.
- Decreased reliance and spending on fossil fuels to power vehicles.
- Improved transportation infrastructure in Amherst County.

Metrics

- Implementation of trail planning and creation.
- Any new vehicles complying with green energy standards and up-to-date emissions tests for the current fleet.
- Milestones for obtaining authority to implement: Tribal Council approval.

## Measure 5 – Manage & improve water quality & waste management

Investing in Clean Energy & Land Reclamation for the Future of the Monacan Indian Nation				
No.	Proposed PCAP Measure	Related Inventory Sector	Project Examples	Status
5	Manage and improve water quality & waste management	Waste/Wastewater Agriculture Forestry/Land Use	Create, maintain, and expand the water and waste management programs as dictated by the terms of the GAP grant	Ongoing
			Install buffer plantings of native species to key waterways to boost soil filtration, moisture retention, and habitat for focus species.	Preliminary
			Monitor all tribal sources of water for quality assurance purposes, and respond quickly to any anomalous readings or major issues impacting water quality	Ongoing

Introduction and discussion of potential projects

Waste management infrastructure and water policy have been a major theme of MIN environmental policy since federal recognition and the establishment of the Environmental Program. The Tribal Integrated Waste Management Plan was established early in 2024, with a water policy to come in spring 2024 as part of the GAP grant from EPA. These programs will establish waste management protocols and water sampling methods that will allow the Monacan Nation to keep more detailed records on waste and water quality, and will also allow for more control over waste disposal and environmental quality. These ecosystem services will improve forestry potential for Monacan Land, in addition to boosting general ecosystem health and by extension, carbon sequestration of the forests.

The inception of the Monacan composting program will allow for greater reuse of inedible produce and other food waste, and improve fertility in Monacan soils. Outreach on compost will be conducted with citizens throughout the implementation of the compost plan. Per the WaRM tool, if MIN is able to compost the majority of its food waste, in conjunction with recycling and other measures, it will reduce GHG emissions from waste into the negative. Buffer plantings of impacted

areas on the Laurel Cliff area will boost total forest area and increase ecosystem diversity in addition to improving soil retention and water quality.

Benefits

- Waste-related GHGs reduced across the board.
- Improved ecosystem health.
- Increased community involvement.
- Decreased food waste and increased on-site fertility.

Metrics

- Implementation of Tribal Integrated Waste Management Plan and Water Testing Program.
- Community outreach and involvement in composting and water quality testing.
- Milestones for obtaining authority to implement: Tribal Council approval.

## Measure 6 – Support pollution reduction and clean air initiatives within Monacan service area

MIN CPRG PCAP Measures				
Investing in Clean Energy & Land Reclamation for the Future of the Monacan Indian Nation				
No.	Proposed PCAP Measure	Related Inventory Sector	Project Examples	Status
6	Support clean air initiatives within Monacan service area	Industry	Partner with state and local organizations to ensure that air, radiation, greenhouse gas, and other standards meet MIN needs and cultural values	Ongoing
			Develop a Tribal Clean Air Plan that at minimum meets state/county requirements, but also centers Monacan indigenous knowledge and bolsters indigenous sovereignty.	Ongoing
			Support tribal citizens in receiving and installing home air sensors	Preliminary
			Assessment of regional threats to air quality, industrial projects focused on oil and gas, reduce vehicles on road, etc.	Preliminary

Introduction & Discussion of potential projects

Measure 6 describes Monacan support of clean air and environmental initiatives outside of its service area and building and maintaining relationships with other groups and agencies in the area and region at large. Responses to the open-ended questions of the survey strongly referenced clean air initiatives, and this will be a major theme of Monacan outreach to state, local, and federal entities moving forward. Because of the Monacan Nation’s new federal recognition status, these interactions will have a vital role in shaping tribal relationships within the community and establishing the Monacan Nation’s sovereignty as a tribal nation. Multiple offsite, large-scale polluters over which the Monacan Nation has no direct oversight were identified as major points of concern by Monacan citizens.

To this end, it will be important for the Monacan Indian Nation Environmental Program to continue its function as a tribal consultation vehicle for new development. It will also be crucial to begin partnering with external organizations with shared goals of environmental health. By providing feedback and tribal perspectives on proposed projects, the Nation can start to affect change at the regional level. A regional threat to air quality assessment would assist in these efforts and should be conducted as soon as possible to get more information on the key focus areas for resistance efforts. Partnering with DEQ or a similar state or regional air quality assessment facility will facilitate the creation of this document.

Home air sensors for Monacan Indian Nation citizens who want them are a key component of the GAP grant funding for Fiscal Year 2024. These sensors are available for free through an EPA program and should result in better home air quality data for tribal citizens, which will benefit

future inventories by providing a better picture of home air quality in the nation. Pending the findings of this study, home air quality improvement infrastructure (workshops, handouts, walkthroughs, filter or air quality fittings, etc.) will be a major next step in this project.

The development of a general Tribal Clean Air Plan is another project that will hopefully result in greater consistency and an overall improved management structure of regional air quality. By developing this plan, the Monacan Nation will identify itself as a key regional player whose support or resistance to a project can have concrete effects on viability and outcomes. This plan will necessarily center Monacan indigenous knowledge and experience and will bolster indigenous sovereignty by continuing to reinforce not only Monacan presence, but Monacan engagement with regional powers.

#### Benefits

- Improvement of air quality by supporting carbon sequestration and renewable energy projects regionally (where appropriate)
- Decrease in GHG emissions and co-pollutants and improved overall ecosystem health.
- Increases Monacan presence in local and regional development and reinforces indigenous sovereignty.

#### Metrics

- Increased engagement and response from MIN to tribal consultations.
- Conduction of a regional air quality assessment from a Monacan perspective.
- Improved health and increased understanding of home air quality for Monacan citizens.
- Milestones for obtaining authority to implement: Tribal Council approval, initial contact with external stakeholders, ongoing program support for Environmental Program.

### **3.3 – Review of Authority to Implement**

As a sovereign Indian Nation as established by Title V of the Thomasina E. Jordan Indian Tribes of Virginia Federal Recognition Act of 2017, the Monacan Indian Nation was extended federal recognition, along with six other Virginia tribes, signed into law in January of 2018. This establishment of sovereignty was the result of tireless work of tribal citizens since state recognition in 1989.

As a federally recognized tribe and sovereign nation, the Monacan Indian Nation has the authority to implement measures and establish contact with government and private entities as required by its governmental needs, so long as they do not violate the statute or law of the United States of America. All projects within this plan were created to fall within the authority of the tribal nation. All potential projects are to be implemented at the express approval of the Tribal Council, the governing body that represents Monacan Citizens' interests. Their approval is needed for any large undertaking of this nature. Constant engagement with Tribal Council will be vital for the items in this PCAP to be implemented.

Legal basis and further description of the Monacan Indian Nation's federal recognition in the context of the Thomasina E. Jordan Act can be viewed at [congress.gov](https://www.congress.gov)'s listing for H.R.984.

### 3.4 – Next Steps

There is much work to do in the next steps of this climate action plan. Increased engagement with all aspects of civic life in Amherst County, in addition to increased outreach to Monacan citizens using tribal meetings and online resources will be key to establishing next steps in the actioning of the PCAP and creation of the CCAP. This greenhouse gas inventory and preliminary discussion of potential climate measures will serve as a springboard for greater community investment and involvement.

Development of Environmental Program capacity will be vital to the generation of a more in-depth inventory for the CCAP. Gaps in data and more exact information on many of the inventory items will be identified and remedied in the comprehensive climate action plan. HUD data from tribal citizen homes will be included, to create a GHG inventory that more accurately reflects the MIN's structure and day to day activities. Additionally, tribal meetings and discussions with leadership and citizens will be vital to identify and action specific reductions that the Monacan Indian Nation can make over the next decade.

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# Appendices

## Appendix A – Tree coverage Carbon Sequestration resources

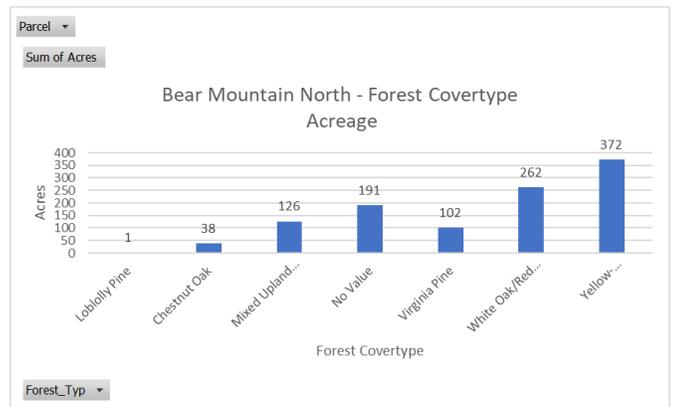
### 1. By-property breakdown of covertypes

Row Labels	Sum of Acres
<b>[-] Bear Mountain North</b>	<b>94.1075239</b>
Chestnut Oak	10.5726004
Mixed Upland Hardwoods	7.9883699
Yellow-poplar/White Oak/Northern Red Oak	75.5465536
<b>[-] Bear Mountain South</b>	<b>89.6386995</b>
Chestnut Oak	6.3593001
Mixed Upland Hardwoods	4.8079891
Yellow-poplar/White Oak/Northern Red Oak	78.4714103
<b>[-] Laurel Cliff</b>	<b>899.2357338</b>
Chestnut Oak	21.4550405
Mixed Upland Hardwoods	113.6383072
No Value	189.1492599
Virginia Pine	102.091987
White Oak/Red Oak/Hickory	255.3038869
Yellow-poplar/White Oak/Northern Red Oak	217.5972523
<b>[-] Museum Parcel</b>	<b>9.1450488</b>
No Value	2.0243299
White Oak/Red Oak/Hickory	6.8617299
Yellow-poplar/White Oak/Northern Red Oak	0.258989
<b>[-] Tribal Offices Parcel</b>	<b>1.7182241</b>
Loblolly Pine	1.0145
No Value	0.0523769
White Oak/Red Oak/Hickory	0.0585592
Yellow-poplar/White Oak/Northern Red Oak	0.592788
<b>Grand Total</b>	<b>1093.84523</b>

2. Table 2 from Hoover & Smith, 2021

**Table 2** Average carbon stock per area (tC/ha) for aboveground live tree carbon by region (refer to Fig. 1 for regions) and forest type group

Region	Type group <sup>a</sup>	Average C stock (tC/ha)	SEM
Northeast	White/red/jack pine	81.7	1.27
	Spruce/fir	42.3	0.60
	Oak/hickory	82.8	0.57
Northern Lake States	Maple/beech/birch	72.6	0.44
	White/red/jack pine	47.9	0.85
	Spruce/fir	29.3	0.44
	Oak/hickory	55.7	0.63
	Elm/ash/cottonwood	43.0	0.82
South Central	Maple/beech/birch	59.7	0.54
	Aspen/birch	31.9	0.36
	Loblolly/shortleaf pine	53.7	0.41
	Oak/pine	51.0	0.72
	Oak/hickory	58.4	0.37
Southeast	Oak/gum/cypress	68.5	0.93
	Elm/ash/cottonwood	47.4	0.96
	Longleaf/slash pine	42.5	0.71
	Loblolly/shortleaf pine	57.3	0.55
	Oak/pine	54.6	0.90
Central States	Oak/hickory	69.8	0.57
	Oak/gum/cypress	67.9	1.06
	Oak/hickory	58.4	0.42
	Elm/ash/cottonwood	59.5	1.27
	Maple/beech/birch	69.6	1.68



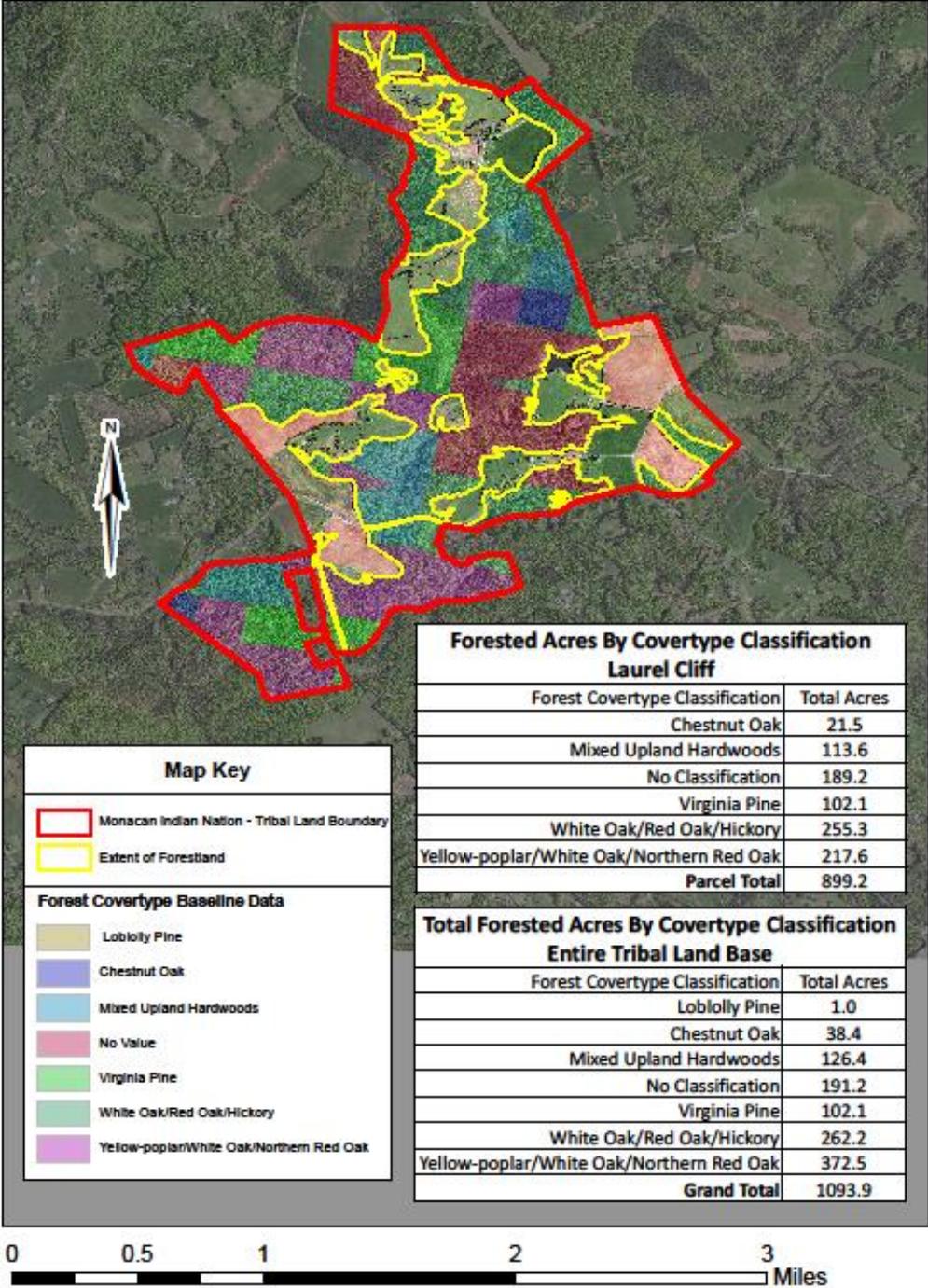
3. Calculations from Carbon stock per hectare

Coverage Type	Coverage (ac)	Coverage (ha)	Average C stock (tC/ha) [1]	tonnes of C (t)
Loblolly Pine	1.0145	0.410553584	57.3	23.52472
Chestnut Oak	38.386941	15.53464387	69.8	1084.3181
Mixed Upland Hardwoods	126.4346662	51.16629409	69.8	3571.4073
No Value	191.2259667	77.38640314	--	
Virginia Pine	102.091987	41.31516132	57.3	2367.3587
White Oak/Red Oak/Hickory	262.224176	106.1183591	69.8	7407.0615
Yellow-poplar/White Oak/Northern Red Oak	372.4669932	150.7320443	69.8	10521.097
<b>Total Forested</b>	<b>1093.84523</b>	<b>442.6634594</b>		<b>24974.767</b>
<b>Total MIN Acreage</b>	<b>1496</b>		estimated from Hoover	
<b>Percent Forested</b>	0.731179967			

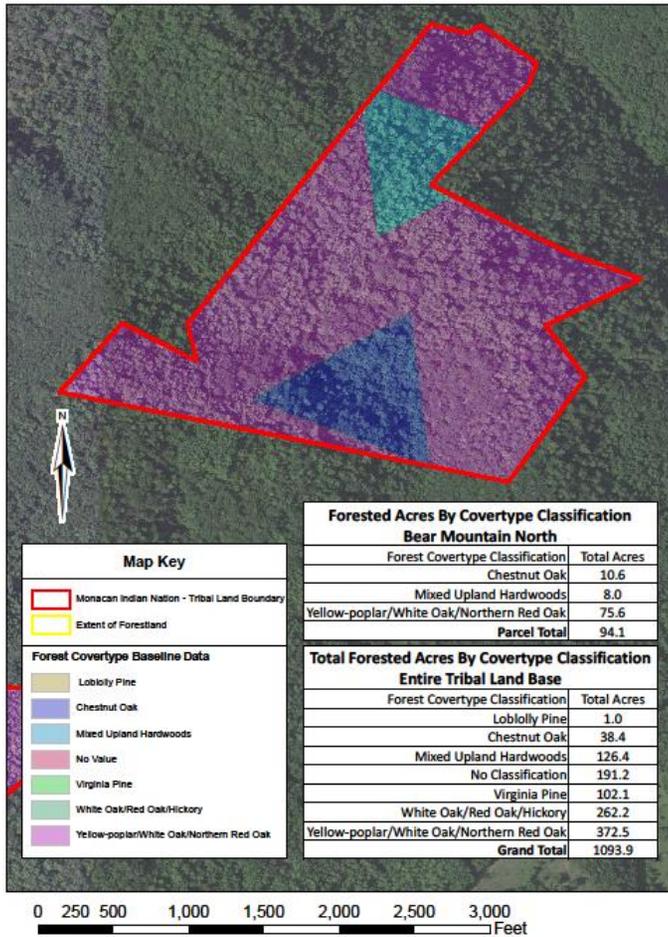
Covertypes maps as generated by Forest Adaptation Technical Assistant Tyler Everett

# Monacan Indian Nation - Forestland Covertyping Acreage Report

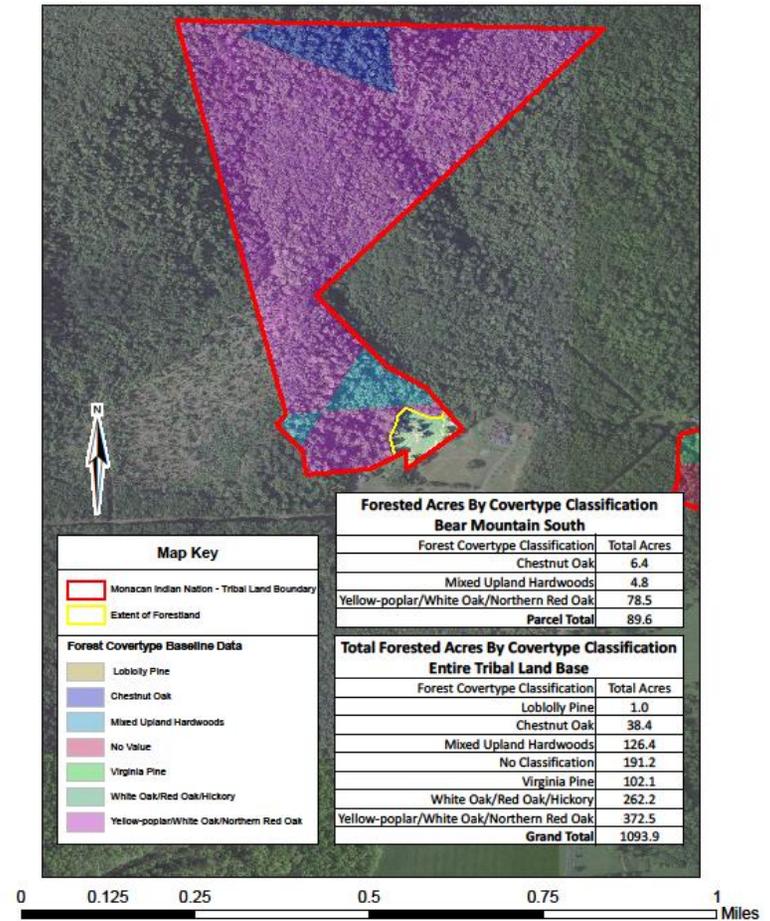
## Laurel Cliff



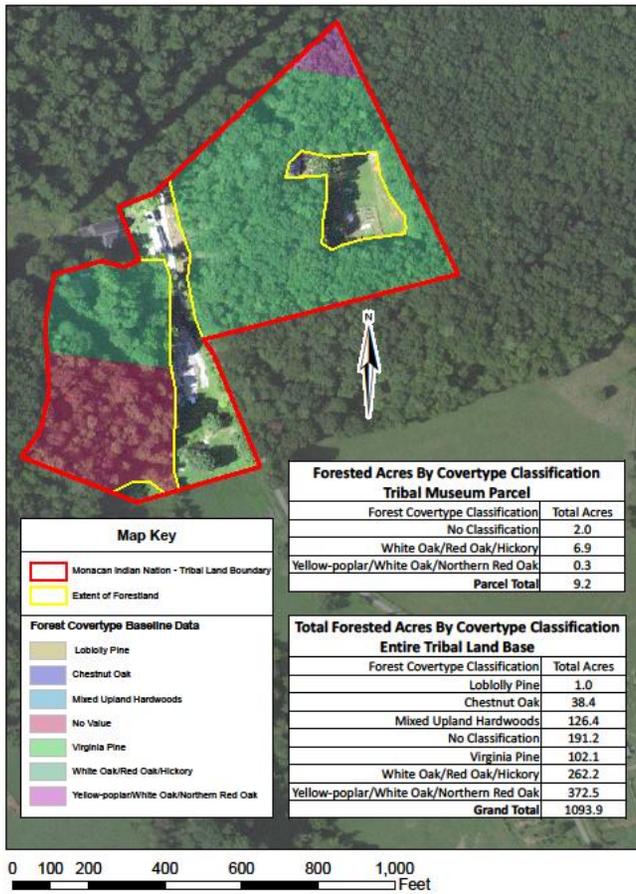
Monacan Indian Nation - Forestland Covertyping Acreage Report  
Bear Mountain North



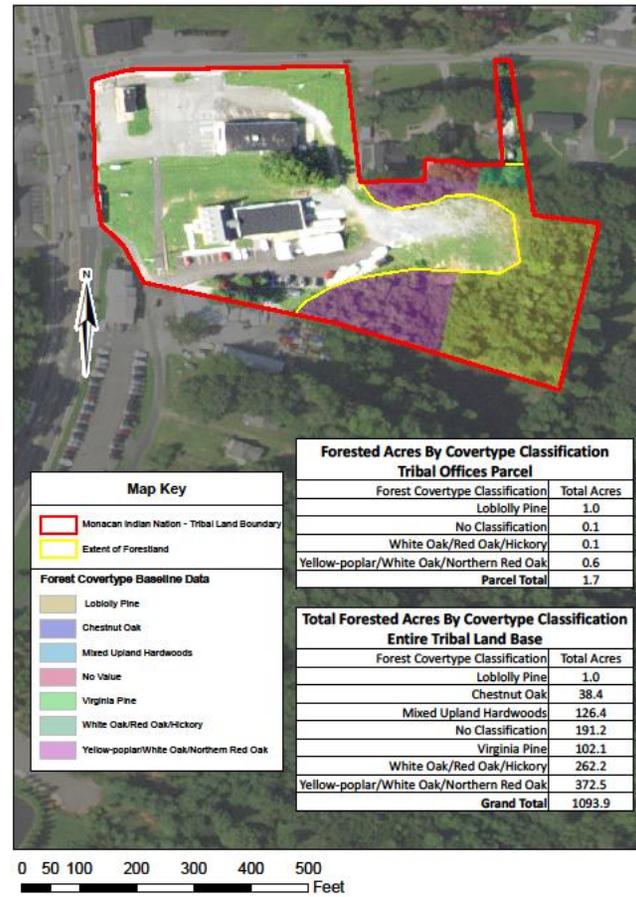
Monacan Indian Nation - Forestland Covertyping Acreage Report  
Bear Mountain South



Monacan Indian Nation - Forestland Covertyping Acreage Report  
Tribal Museum Parcel



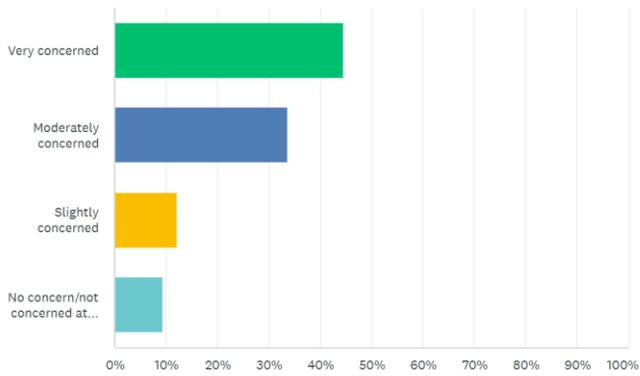
Monacan Indian Nation - Forestland Covertyping Acreage Report  
Tribal Offices Parcel



## Appendix B – Public Outreach PCAP survey results and blank survey template

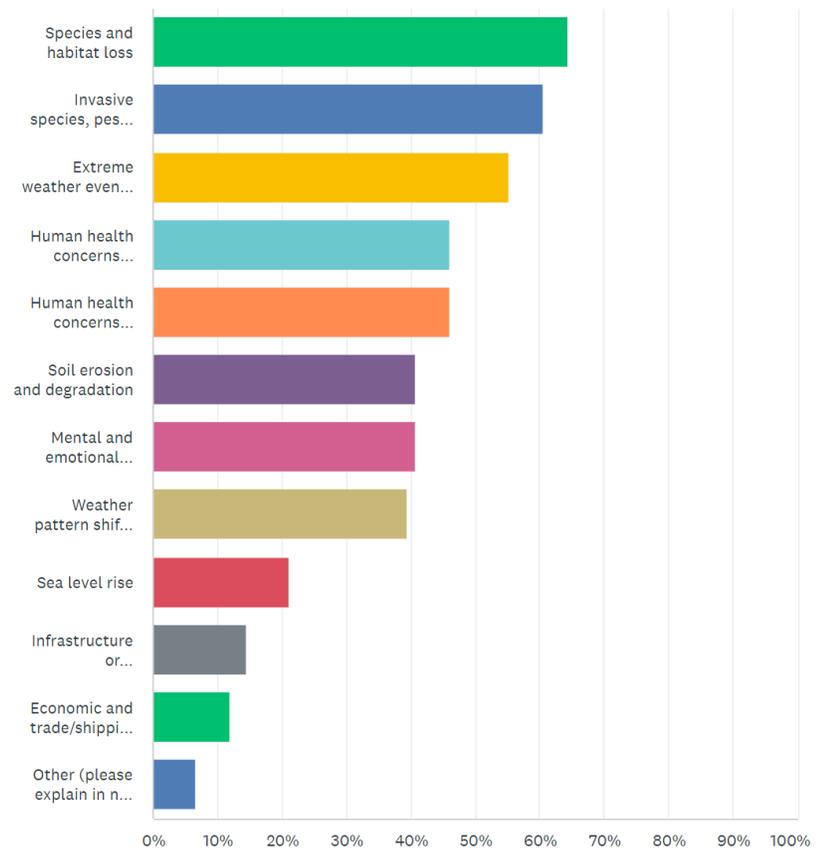
How concerned are you about climate change in general?

Answered: 74 Skipped: 2



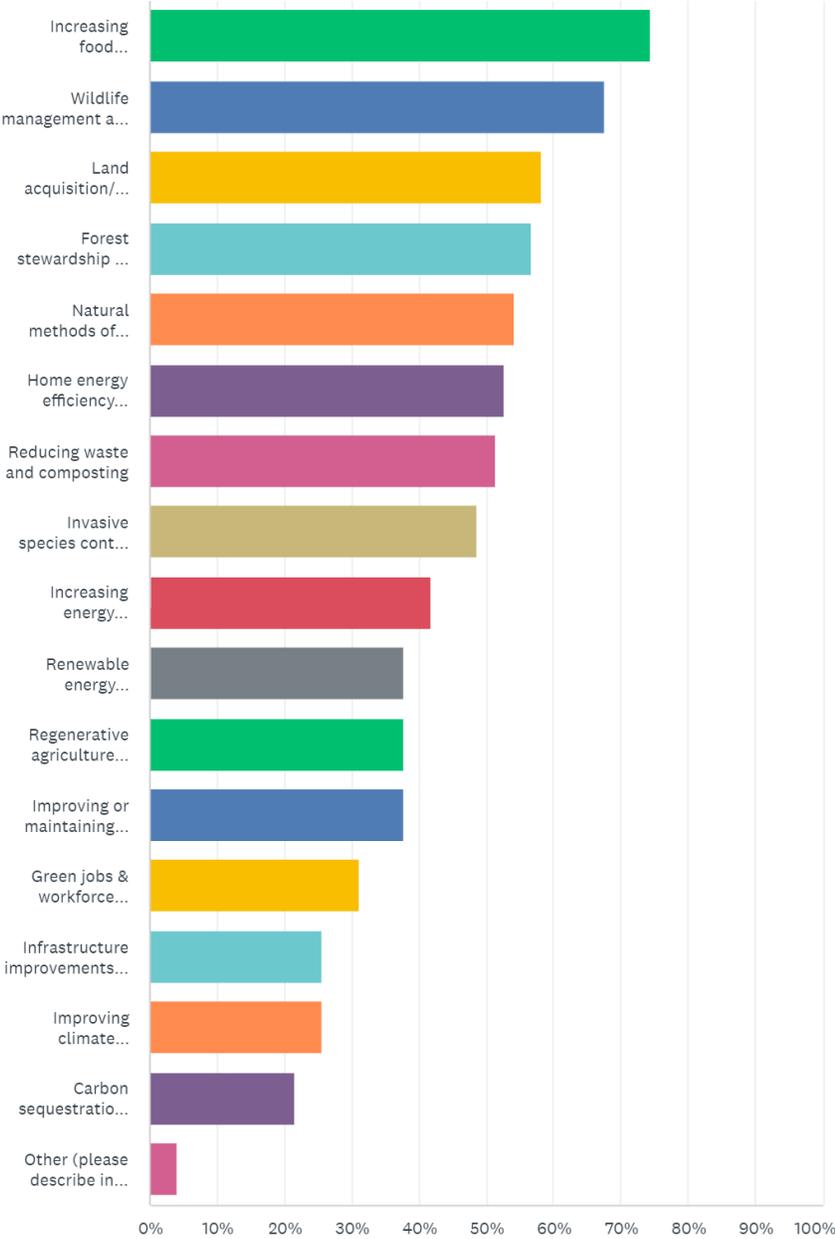
Which are the most pressing climate concerns to you (select all that apply):

Answered: 76 Skipped: 0



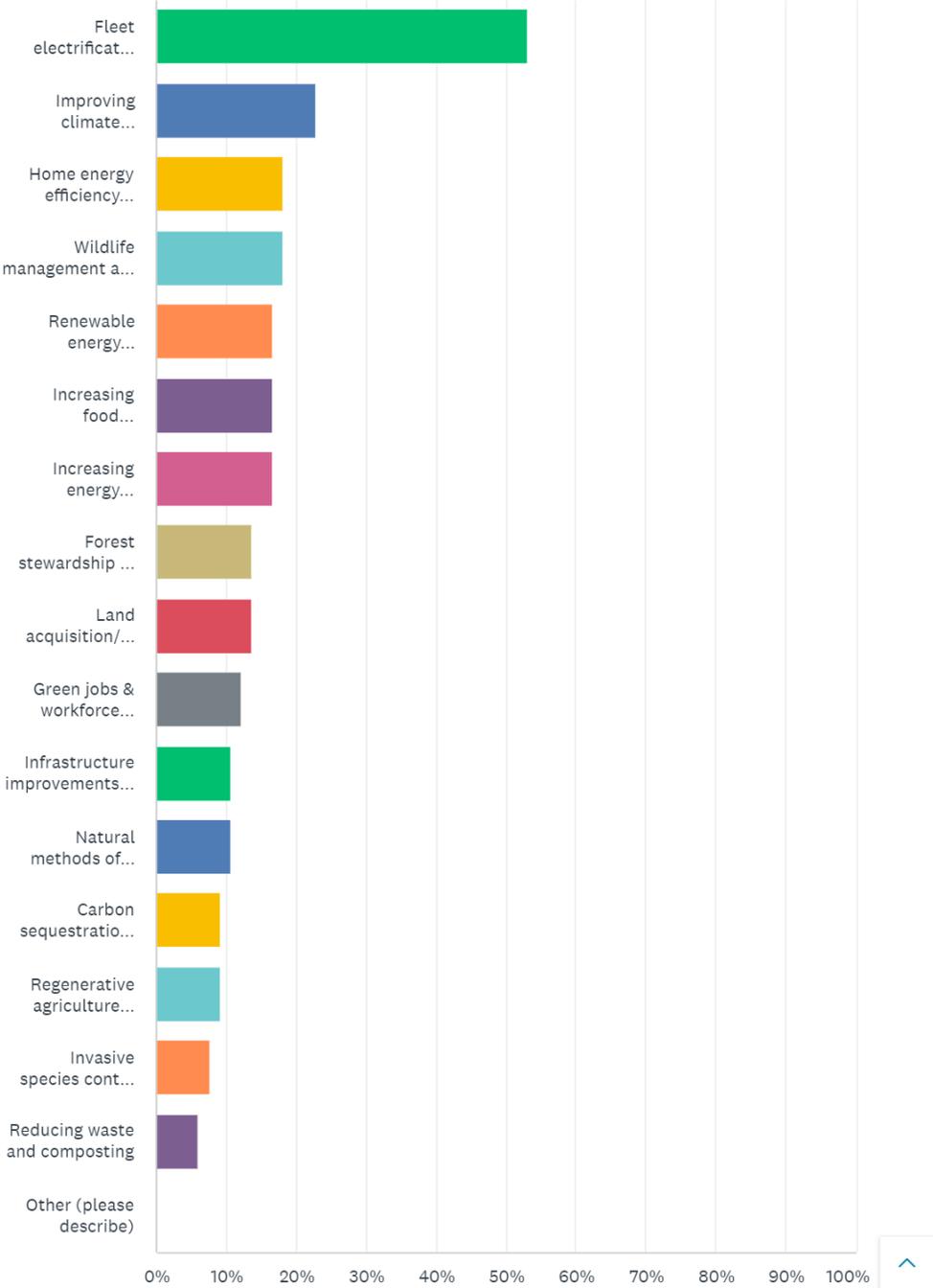
# What are some of the MOST appropriate ways to mitigate climatic factors, from a Monacan perspective:

Answered: 74 Skipped: 2



# What are LESS interesting or LESS appropriate methods of climate mitigation, from a Monacan perspective?

Answered: 66 Skipped: 10



# Monacan Indian Nation Priority Climate Action Plan Public Survey

## Monacan Indian Nation Climate Plan

Hi, I'm John Pierce, Environmental Program Manager for the Monacan Indian Nation. If we haven't met, I look forward to getting the opportunity soon!

In 2023, we were awarded the Climate Pollution Reduction Grant (CPRG), an EPA grant focused on pollution reduction (mainly focusing on greenhouse gases) and climate change planning. There are many possible ways to center Monacan needs, values, and attitudes as we build a long-term climate plan. The CPRG focuses on utilities, energy efficiency, transportation, sources of pollution like factories, waste sites, and power plants, and land use/land use change. As the nation does not currently control any major sources of pollution like these, the Monacan Climate Action plan will focus on land use, conservation of forests, and home & transportation energy efficiency - as well as the information I get from this survey.

This planning grant will allow MIN to build a land use plan centered on Monacan values and needs. We can then apply for the implementation grant, which will create further funding opportunities for the Monacan Nation's climate and environmental needs. Through this program, we can create a land management plan that honors traditional knowledge and reinforces Monacan sovereignty, while also using modern methods that are in alignment with our shared commitments to conservation and land stewardship.

To this end, I need your input. Please take the time to answer this brief survey and add any additional comments as well. A printed or verbal/over the phone version is available on request - just call me at 434-649-1049. I look forward to receiving your input and including it in the Monacan Nation's climate plan.

After I get the results of this survey, I hope to have the plan ready to share with you for public comment and feedback in mid-March.

Many thanks,  
John Pierce  
Environmental Program Manager

1. Are you a currently enrolled Monacan Indian Nation Tribal Citizen?

- Yes
- No

2. What is your current level of outdoor activity?

- Constant - Nearly every day is spent partially or mostly outside
- Frequent - outside for over 1 hour every day or so
- Moderate - outside for over 1 hour at least once or twice a week
- Infrequent - outside for over 1 hour at least once a month
- Rare - Outside only when I have to be or unable to spend long amount of time outdoors.

3. How important is outdoor activity and preserving outdoor spaces to you and your family?

- Very
- Somewhat
- Not really

4. How concerned are you about climate change in general?

- Very concerned
- Moderately concerned
- Slightly concerned
- No concern/not concerned at all

5. Which are the most pressing climate concerns to you (select all that apply):

- Extreme weather events (flooding, storms, wildfires, etc)
- Weather pattern shifts (periods of drought followed by intense downpours)
- Soil erosion and degradation
- Species and habitat loss
- Infrastructure or transportation interruptions
- Economic and trade/shipping disruptions
- Sea level rise
- Invasive species, pests, and diseases
- Human health concerns (direct, like pollution and smog)
- Human health concerns (indirect, like heat stroke from warmer summer conditions, droughts affecting agriculture, spread of disease)
- Mental and emotional health implications (loss of green space, anxiety over impacts to future generations)
- Other (please explain in next answer)

6. What are some climate change factors that are not on this list, but are important to you?

7. What are some of the MOST appropriate ways to mitigate climatic factors, from a Monacan perspective:

- Infrastructure improvements (flood barriers, civic planning, etc)
- Renewable energy (biofuel, solar, wind and other non-fossil fuel methods of energy generation)
- Carbon sequestration (capturing carbon in biological material like forests and healthy soil)
- Home energy efficiency (reducing energy waste, solar or other home energy saving methods)
- Forest stewardship and management
- Regenerative agriculture (low-impact methods of food production, no-till, silvopasture, etc)
- Improving climate literacy (inviting speakers to tribal meetings and hosting events to answer questions and concerns about climate change)
- Reducing waste and composting
- Increasing food sovereignty for Monacan Citizens (community canning/food preservation resources, food forests, additional food bank resources)
- Increasing energy sovereignty for Monacan Citizens
- Improving or maintaining community resources
- Natural methods of disturbed land remediation (buffer planting along rivers, restoration of soil biomes and healthy forests with native species)
- Wildlife management and fishing/hunting infrastructure improvements
- Invasive species control and other environmental tactics
- Green jobs & workforce planning
- Land acquisition/rematriation of historical territory for conservation (including for land trust)
- Other (please describe in next question)

8. What are some mitigation factors that are not on this list but are important to you?

9. What are LESS interesting or LESS appropriate methods of climate mitigation, from a Monacan perspective?

- Infrastructure improvements (flood barriers, civic planning, etc)
- Renewable energy (biofuel, solar, wind and other non-fossil fuel methods of energy generation)
- Carbon sequestration (capturing carbon in biological material like forests and healthy soil)
- Home energy efficiency (reducing energy waste, solar or other home energy saving methods)
- Forest stewardship and management
- Regenerative agriculture (low-impact methods of food production, no-till, silvopasture, etc)
- Improving climate literacy (inviting speakers to tribal meetings and hosting events to answer questions and concerns about climate change)
- Green jobs & workforce planning
- Reducing waste and composting
- Increasing food sovereignty for Monacan Citizens (community canning/food preservation resources, food forests, additional food bank resources)
- Increasing energy sovereignty for Monacan Citizens (developing energy resources within the Monacan Indian Nation)
- Fleet electrification and electric vehicle programs for Monacan Citizens
- Natural methods of disturbed land remediation (buffer planting along rivers, restoration of soil biomes and healthy forests with native species)
- Wildlife management and fishing/hunting infrastructure improvements
- Invasive species control and other environmental protection tactics
- Land acquisition/rematriation of historical territory for conservation (including for land trust)
- Other (please describe)

10. What are some mitigation methods that are not included above, but are wholly INAPPROPRIATE for land management from a Monacan perspective?

11. List any major pollution or greenhouse gas emitters that are not located on Monacan Land, but are likely to affect Monacan air, water, and soil quality?