

NORTH DAKOTA TREE PLANTING INITIATIVE

BACKGROUND

NDASCD has been implementing the ND Statewide Tree Planting Initiative since 2017, assisting producers with planting trees and shrubs to reduce erosion and improve soil health, water quality, livestock protection, highway and road safety and wildlife habitat protection. With additional funding, NDASCD will expand this program from 2025-2028, planting additional trees and shrubs across nearly 2,500 acres, and reducing GHG emissions through stored carbon from additional planting for years to come. These plantings are a conservation practice supported by the NRCS¹ to address soil health, enhance local water quality, protect livestock, restore native plant communities, reduce soil erosion, in addition to sequestering and storing GHGs. These plantings are also used to reduce snow capacity on county and state roads to assist the ND Department of Transportation in road clearing reductions. The methodology for the resulting GHG emissions reductions of this program expansion is described in the following sections.

Expanding the program will also result in increased funding available to support energy efficiency upgrades to tree seedling storage coolers across North Dakota's 54 counties. Energy efficiency upgrades for cold storage facilities will include improved insulation, LED lighting and more efficient compressors. Each of these actions would reduce electricity consumption and avoid emissions from North Dakota's grid. However, without knowing the specifics of the facilities that may apply for this funding or the types of energy efficiency improvement actions they may seek to take, it is difficult to quantify the GHG emissions reduction benefits with certainty at this time.

SUMMARY OF GHG EMISSION REDUCTION RESULTS

Table 1 summarizes total GHG emissions reduced from the expansion of the North Dakota Tree Planting Initiative. Total cumulative emissions reduced were estimated to be 19,400 MT CO₂e from 2025-2030, and 105,622 MT CO₂e from 2025-2050. Through the 2025-2028 growing years of the program, GHG emission reductions accumulate as more acres of trees and shrubs are planted over time.

Table 1. GHG Emission Reductions – Tree Planting Initiative

MT CO ₂ e	Cumulative 2025-2030	Cumulative 2025-2050
Tree Planting Initiative	19,400	105,622

See Table 2 for GHG emissions reductions by year.

¹ USDA Natural Resources Conservation Service. 2022. "Tree-Shrub Establishment." Accessed February 2024. Retrieved from: <https://www.nrcs.usda.gov/sites/default/files/2022-12/612-NHCP-CPS-Tree-Shrub-Establishment-2022.pdf>

Table 2. Annual GHG Emission Reductions – Tree Planting Initiative

MT CO₂e	Annual Program	Cumulative Program
2025	1,078	1,078
2026	2,156	3,233
2027	3,233	6,467
2028	4,311	10,778
2029	4,311	15,089
2030	4,311	19,400
2031	4,311	23,711
2032	4,311	28,022
2033	4,311	32,333
2034	4,311	36,644
2035	4,311	40,956
2036	4,311	45,267
2037	4,311	49,578
2038	4,311	53,889
2039	4,311	58,200
2040	4,311	62,511
2041	4,311	66,822
2042	4,311	71,133
2043	4,311	75,444
2044	4,311	79,756
2045	4,311	84,067
2046	4,311	88,378
2047	4,311	92,689
2048	4,311	97,000
2049	4,311	101,311
2050	4,311	105,622

GHG EMISSION REDUCTION ANALYSIS METHODOLOGY

This analysis assumed that landowners would not have established tree and shrub cover without the existence of this expanded program funding and would have otherwise utilized conventional cropland or grassland management practices, therefore assuming baseline GHG emissions reductions of zero.

For the plantings, emission reduction coefficients from COMET-Planner were used due to the transparency and robustness of the analyses that informed their development. This platform was created by the Natural Resources Conservation Service (NRCS) and Colorado State University to calculate GHG emission reductions from stored carbon dioxide (CO₂) in soil and avoided N₂O emissions from various agricultural practices, including tree and shrub.² Emission reduction coefficients within COMET-Planner are calculated using a sample-based

² USDA Natural Resources Conservation Service. N.d. "COMET-Planner." Accessed February 2024. Retrieved from: [COMET-Planner](#)

approach and USDA entity-scale GHG inventory methods. They do not include emissions associated with off-site operations, including but not limited to transportation, manufacturing, or processing. The ND Tree Planting Initiative is available across the entire state of North Dakota, therefore the CO₂ and N₂O emission reduction coefficients used for this GHG reduction analysis are assumed to represent an average across all counties in the state and land use types. This is a simplified approach as actual emissions savings in the future will depend on uncertainties such as when and where plantings occur, including variations by region, farm, soil, weather, and other factors. The emission reduction factors used in this analysis are summarized in Table 3 below. There is some uncertainty associated with these emissions factors and resulting GHG emissions reductions as these factors represent a statewide average, though actual emissions savings will vary depending on location of plantings, time of year, growth, and more.

Table 3. GHG Emission Reduction Coefficients - Tree and Shrub Establishment

Emission Reduction Coefficients for Tree & Shrub	MT of CO₂e per Acre
CO ₂	1.7062
N ₂ O	0.0997
CO₂e	1.8059

Funds were assumed to be dispensed to support tree and shrub establishment plantings on working lands across four years from 2025 through 2028, planting nearly 597 acres in each year for a total of 2,387 new acres of trees and shrubs. For each of the four planting years, emission reduction coefficients were multiplied by the 597 acres and summed for total emission reductions for that year of planting:

$$1,078 \text{ MT CO}_2\text{e reduced per year} = 596.8 \text{ acres} \times 1.8059 \text{ MT CO}_2\text{e per acre}$$

GHG emissions reductions from previous years' plantings accumulate over time as the plants are assumed to remain in place. Therefore, once all funds have been dispensed, after 2028, roughly 4,311 MT of CO₂e are reduced in each year through 2050.

There is some uncertainty in the resulting GHG emissions reductions estimated here as in reality, the emissions savings will depend on the health and types of plantings and could be greater or lower than this estimate.

Further, this analysis assumed that the GHG emissions that may result from the planting activities are insignificant and considered de minimis compared to the emissions reductions of the entire program. Additionally, these plantings are also used to reduce snow capacity on county and state roads to assist the ND Department of Transportation in road clearing reductions, though there are many factors that may contribute to this potential reduced fuel use benefit. Relatedly, it is possible that additional tree cover might result in additional clearing requirements due to fallen branches and trunks in stormy weather. Therefore, potential GHG emissions added or reduced from changes to road clearing activities were not estimated in this analysis.

COST-EFFECTIVENESS OF GHG EMISSIONS REDUCTIONS

Table 4 below includes information regarding the cost-effectiveness of the Program's GHG reductions. These dollar per MT CO_{2e} values were calculated based on the additional funds requested divided by the cumulative GHG emissions reduced from 2025-2030 and 2025-2050.

Table 4. Cost Effectiveness Results – Tree Planting Initiative

Funds Requested	\$/MT CO_{2e} for GHG Reductions 2025-2030	\$/MT CO_{2e} for GHG Reductions 2025-2050
Program Total (\$33,885,000)	\$1,747	\$321