

## *A Century Old Technique: Sheep in the Landscape*

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In the age of climate action, people everywhere are dedicated to finding new tools and strategies to combat our heating world. One centuries-old technique has fostered more benefits than expected. Reaching a more sustainable future might be answered through... sheep lawn maintenance! Several colleges including U.C Davis<sup>1</sup> have already begun to research the effects sheep grazing can have on mental and environmental health. UMass Amherst is perceptively following in their footsteps, since sheep have been a historical component of the campus dating back to the 1860's. Included in this paper are a site analysis of the existing land fourteen sheep will graze upon, an overview of the benefits 'eco-mowing' can provide, and the damaging environmental effects modern lawn maintenance creates as a result of societal American norms. To begin, the location of the site is between the Fine Arts Center and the Isenberg Innovation Hub, (fig. 1)

both of which remain close to the Campus Center. Although the site is small-scale (roughly 250x350 feet), the proximity to Campus Center and the amenities that surround the



areas provide visibility and access, including ADA accessibility, from almost every direction

<sup>1</sup> More information can be found at <https://arboretum.ucdavis.edu/sheep-mowers>

whether traveling by foot or vehicle. Currently, the site is primarily unused grassland, with little vegetation and direct sunlight throughout the year, it is not suitable for relaxation yet continues to be mowed through the use of lawn equipment.

In one case-study done in Tokyo, a construction company- Kajima Corporation- developed areas where humans and sheep can thrive together while reducing the negative impacts of urban living. They called these sites, "Kajima Biophilic Cities" (Tokyo eco-mowing, 2016). Just three animals mowed 1,000 square meters of lawn surrounding an apartment, while various events simultaneously provided residents the ability to interact with the animals, thus leading to a connection and awareness of the mission Corporation set out to complete.

The Kajima trial found constant "ecomowing" reduced the need for machine mowing while minimizing nutrient transfer to the roots of unwanted vegetations which halted weed-overgrowth. Biomass flourished and zero CO<sub>2</sub> emissions were maintained. Likewise surveyors found, "an increase in the residents' conversations regarding nature, and more than 70% of the dwellers said that the presence of mammals made the landscape more natural and also gave a relaxing effect" (Tokyo eco-mowing, 2016) Sheep mowing can allow humans to interact with the natural environment in urban areas where such experiences are not normally had, improving the emotional well-being of citizens. Furthermore, Tokyo is not the only geographical locale to employ sheep and goats for eco-mowing, Paris and New Zealand among many others-are all on their way to supporting unconventional mowing practices.

With a looming global climate crisis, individuals, governments, and companies

alike are aiming to become more sustainable for a livable future. Lawns, with their lush, green grass and trimmed hedges may seem harmless, but are actually dramatically affecting the world we live in. Research suggests turf grass impacts the environment directly through chemical and technological use, however, there are sustainable solutions to the 'ideal' American lawn.

Turf grass is the number one irrigated crop in the United States, surpassing corn and wheat. Excess water used to care for this grass has caused immense climate destruction. To be precise, forty million acres of land across the United States consists of turf grass or lawn. In 2005, a NASA-led study found that 63,000 square miles covered the U.S. In order to keep all that grass alive, watering can account for fifty to seventy-five percent of a resident's water (Holthaus, 2021). With mega droughts occurring more often, cities have begun to offer buy-outs to homeowners as an incentive to transition from lawns to native-plant or pollinator gardens, thus ensuring less water use and a more environmentally and efficient approach to lawn maintenance. Furthermore, water runoff and the pumping of groundwater forces pollutants and bacteria into wetlands and waterways. As a result, "dead zones" from toxic algae are inevitable due to extreme weather and rainfall mixed with water pollutants (Sohn, 2020). Research shows that the pumping of groundwater and wastewater account for roughly twenty-five percent of the rise in sea levels (Moir, 2020). Despite the aesthetic look of lawns, the amount of water used to care for them is diminishing the environment with overconsumption and pollutants.

While the amount of carbon in the atmosphere has increased drastically over the

years, nitrogen-containing fertilizers continue to be bought and sold as a way to maintain green color in landscapes. Americans use around three million tons of fertilizer a year with one ton of nitrogen approximately equivalent to five tons of carbon. As a result, the more nitrogen used, the more carbon released into the atmosphere. Furthermore, because grass is unable to contain such high levels of carbon, greenhouse gasses form and create hazardous pollutants (Sohn, 2020). According to a study by the EPA, forty to sixty percent of nitrogen ends up in surfaces or groundwater. Likewise, the more fertilizer that is used, the more the grass needs thus forming a harmful cycle. Surface-feeding grass with fertilizer also causes shallow roots which breeds dry soil, weeds, and bare spaces in lawns. As a result of shallow roots, extra water is needed because the ground is unable to absorb any nutrients. The impact nitrogen-based fertilizers have on American people maintaining their lawns has forced more carbon into the atmosphere than necessary.

Aside from the chemical impact synthetic fertilizers have on the environment, outdated technology is just as easily to blame for atmospheric deterioration. Landscaping tools have been a common factor in contributing to the high levels of greenhouse gasses and other pollutants. Gas-powered lawn equipment takes about eight-hundred million gallons of gas annually, spilling seventeen million additional gallons in the process (Sohn, 2020). Two stroke-engines cause even greater harm. Because both oil and fuel are used, thirty percent of fuel is not able to combust creating toxic chemicals that are released into the air. A 2014 study found that a two-stroke lawnmower releases emissions one-hundred-twenty-four times more than an idling car

or truck. Despite four-stroke engines being slightly more environmentally friendly, they are responsible for releasing 26.7 million tons of pollutants in 2011. These gas-powered lawn mowers make up five percent of total air pollution in the United States.

Although these statistics are outstanding, there are several solutions to synthetic fertilizers and gas-powered landscaping tools. For starters, slow release fertilizer, although still containing nitrogen, is composed of small coated pellets that feed grass over the course of six months. Because the pellets are absorbed into the soil and ground little to no runoff water is available to travel into waterways and cause harmful effects (Moir, 2020). Other alternatives would be to use native grasses that maintain deeper roots and can store carbon more effectively. Natural lawns that use native plants provide habitats for animals and insects, and open soil to fungi, bacteria, and microbes that protect minerals and help fix nitrogen contamination. With careful consideration to overgrazing, external factors, and site specificity, sheep can be “an important land use with marked effects on biodiversity, ecosystem function, plant biomass quantity and quality and soil stability” (Ross, 2016) while simultaneously benefiting the economy through agricultural production.

Vast green lawns have been idealized and looked at as a point of status for decades. However, it is time to become aware of the harsh relationship between these seemingly beautiful lawns and the decline of a healthy environment. While lawns might create a visual aesthetic, they do not benefit the environment positively. Through chemicals and technology aimed at maintaining such lawns, the environment is disproportionately harmed. Not all hope is lost though, more sustainable and softer

solutions are on the rise and anyone can help participate in dismantling climate change- even our wooly friends.

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