PROJECT ID:
612

Investigation of Alternative Plants as a Replacement of Current Airfield Vegetation Regimes

Replacing grass-like vegetation alongside airstrips would enhance safety, lower carbon emissions, and reduce costs. (U.S. Navy photo by Mass Communication Specialist 2nd Class Scott Wood)

OBJECTIVE

The objective of this study is to enhance safety and reduce costs and CO_2 emissions by finding an alternative to the current vegetation standards at airfields.

PROBLEM STATEMENT

The current standard of vegetation management on military airfields is to maintain grass-based vegetated areas around the runway and the taxiways. This approach has significant problems in that it: 1) Contributes to wildlife/bird related strikes that reduce flight safety (damage costs, injury/loss of personnel, mission downtime); 2) Requires costly vegetation management (mowing, herbicides, pesticides, insecticides); 3) Releases greenhouse gases that contribute to climate change (CO_2 emissions from mowing, mineralization of clippings, reduced carbon in soil).

DESCRIPTION

We suggest that a systematic, trait-based selection approach be used to identify candidate plant (non-grass) species that will provide vegetative ground cover, prove less attractive to birds/wildlife, store carbon in roots and soil, and reduce mowing and other maintenance costs.

Using a proprietary algorithm that searches plant databases, the study will identify candidate plant species that meet the criteria to form the initial test group. A maximum of 10 candidate species will be chosen for selective trait testing in a greenhouse setting. The greenhouse experiment will control for temperature, humidity, light, and moisture to best approximate United State Department of Agriculture Plant Hardiness Zones 8 and 9, which aligns to the southeastern U.S. This phase will last for two years, during which data will be collected on: 1) Growth form, method of spread, and height at maturity; 2)

Percent of aerial cover in each season; 3) General health throughout growth year; 4) Ability to provide cover in each season with little or no maintenance (mowing); and, 5) Likelihood that seeds, foliage, and fruits (if applicable) would act as a wildlife attractant. From this pool, up to four species may be designated for field testing (Phase 2) and implementation (Phase 3), both of which would occur under future funding pursuant to approvals.

RETURN ON INVESTMENT

Based on 2020 estimates, each airfield could reduce mowing cost by approximately $79,000 on average if mowing was not a requirement. It is estimated that the Navy expends approximately $2.7 million annually on mowing on these airfields. Regarding greenhouse gas reduction, based on the assumptions of operating one Tier 3 tractor, 40 hours per month, 10-month mowing season, Navy/USMC could reduce carbon emission by nearly 6,000 metric tons CO_2 for all 34 airfields combined annually. Finally, lowering the likelihood of bird strikes would soften the cost impact of these accidents. Since 2011, there were 14,623 Navy/USMC strike reports with damage totaling over $295 million (as of 07/2022).

NAVY BENEFITS

A new vegetation standard will decrease bird and wildlife attractiveness of the airfield and thus reduce aircraft strikes, associated costs, and lost mission time. Maintenance costs could be virtually eliminated and carbon emissions reduced. The phased approach of this project is designed to identify a plant(s) that meet certain traits, followed by a demonstration and implementation phase to ensure that proper contingencies are in place to reduce unintended negative outcomes

TRANSITION DESCRIPTION

Once a plant meets testing criteria (Phase 1) and is justified for broader implementation (Phases 2-3), revision of guidance documents covering airfields can be updated to incorporate this new technology. Some of the guidance documents that will help with implementation include Naval Air Training and Operational Procedures Standardization (NATOPS) Airfield Operations Manual, Bird/Animal Aircraft Strike Hazard (BASH) Program Instruction, Wildlife Hazard Management Plan, and Air Installations Compatible Use Zones Program to name a few.

CONTACT

For more specific information about this project, contact the Principal Investigator at 757-322-8499.

ABOUT THE NESDI PROGRAM

The Navy Environmental Sustainability Development to Integration (NESDI) program is the Navy's environmental research and development demonstration and validation program, sponsored by OPNAV N4I Installations Division and managed by the Naval Facilities Engineering Systems Command from the Engineering and Expeditionary Warfare Center in Port Hueneme, CA. The mission of the program is to provide solutions by demonstrating, validating and integrating innovative technologies, processes and materials and by filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Navy readiness and lethality.

For more information, visit the program's web site at www.navfac.navy.mil/nesdi or contact Ken Kaempffe, the NESDI Program Manager at 805-982-4893, DSN: 551-4893 or kenneth.c.kaempffe.civ@us.navy.mil.