

iHabiMap: Habitat Mapping, Monitoring and Assessment using High-Resolution Imagery

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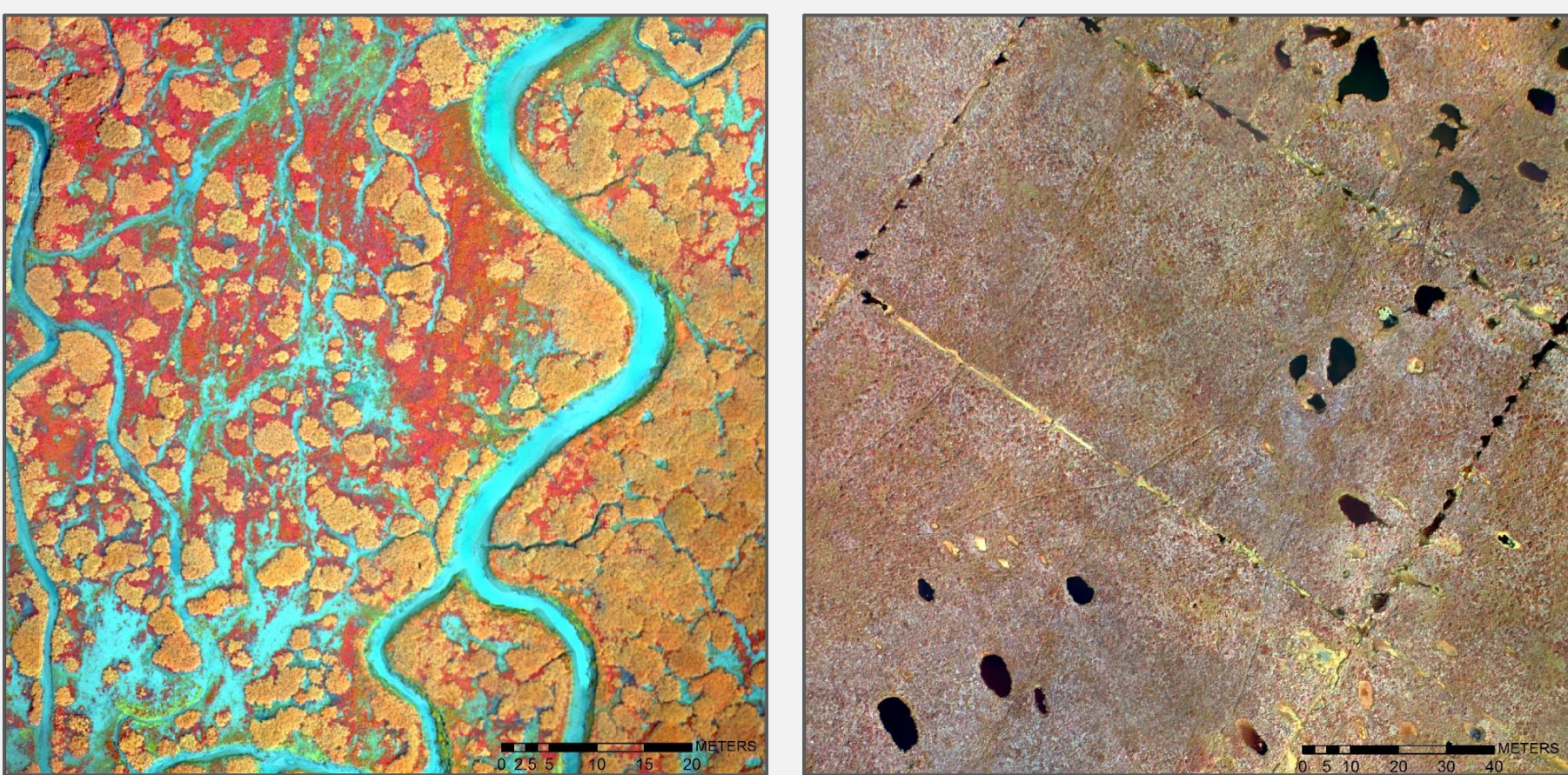
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INTRODUCTION

- Under Habitats Directive, EU countries must map and monitor the condition of Annex I habitats. Ireland reports the conservation status of its Annex 1 habitats based on ecological field data every six years¹. This field-based mapping and assessment methodology, while desirable, is time-consuming and expensive.
- Rapid advances in Unmanned Aerial Vehicles (UAVs) and computer machine learning technologies offer an alternative and complementary approach to map, assess and monitor habitats throughout Ireland.
- UAVs deliver new developments in the field of remote sensing by providing multi-sensor images with centimetre-level resolution.
- The main challenge is to develop an automated and accurate methodology for the assessment and monitoring of habitat change over time.

RESEARCH AIM

To develop and test analytical approaches to map, assess, and monitor three Annex 1 habitats in Ireland - upland, grasslands, and coastal zones, by utilizing UAV-acquired data and machine learning algorithms



Mosaicked false-color images for coastal (left) and upland (right) sites

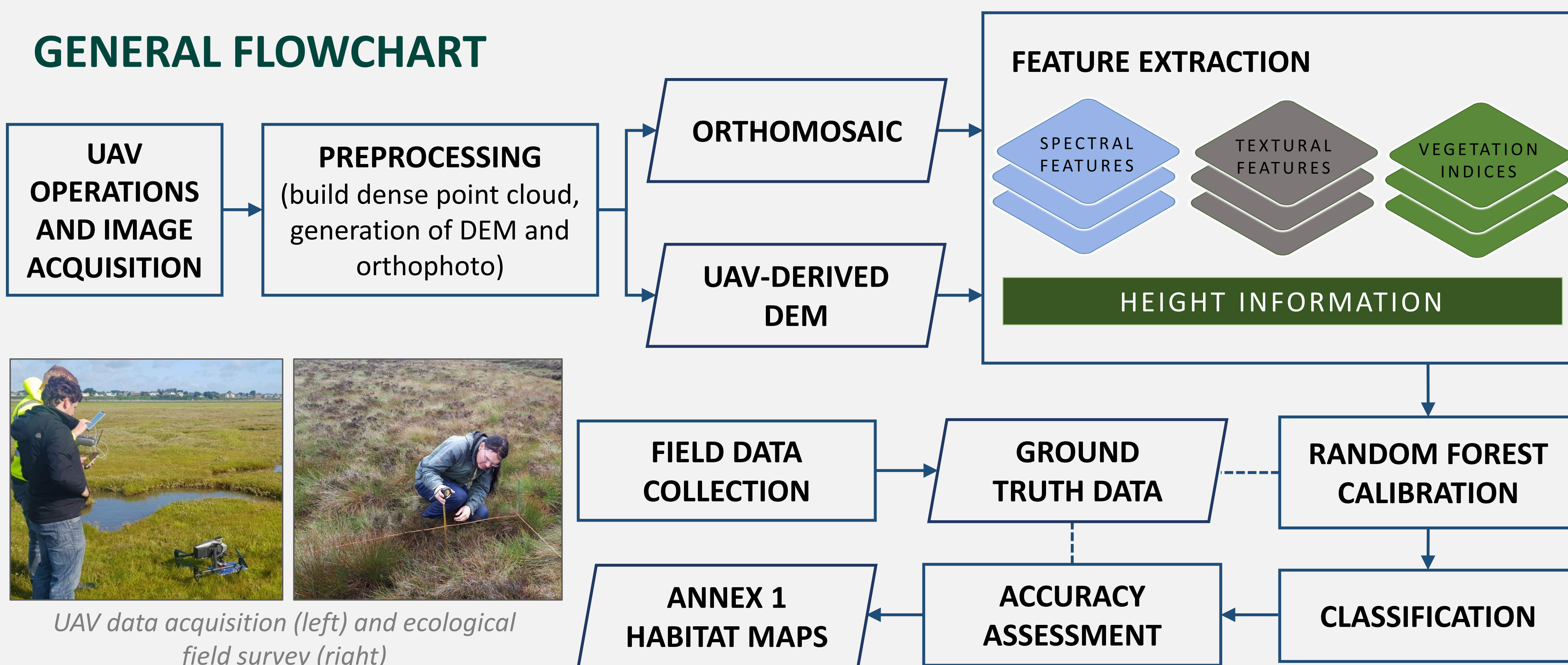
METHODOLOGY

- The iHabiMap Project takes a multidisciplinary approach to achieve the research goal.
- In-situ and UAV data will be acquired concurrently over a 3 / 4-year period.
 - this aims to capture the intra- and inter-annual variability

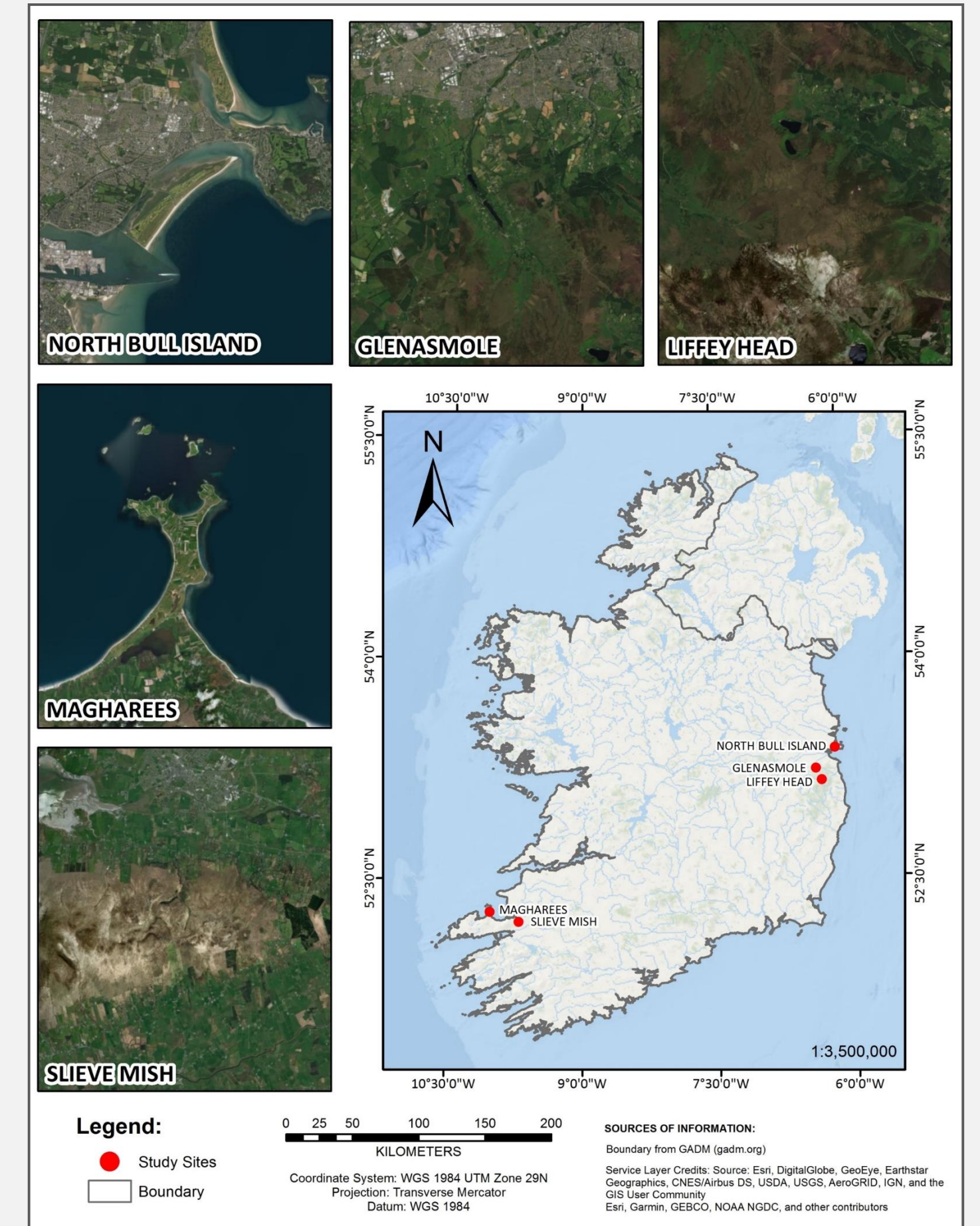
Field and UAV Surveys throughout the Project

SITE NAME	Y1	Y2	Y3	Y4
Slieve Mish	0	4	1	0*
Magharees	0	4	1	0*
Bull Island	1	1	0	0*
Glenasmole	0	4	1	0*
Liffey Head	1	1	0	0*
Total				19

GENERAL FLOWCHART



STUDY SITES



Map showing the project sites for three Annex 1 habitats. These sites were selected in discussions with the ecologists from BEC



Sample images of the habitats – peatland (left), grasslands (middle), dunes (right)

PRELIMINARY WORK

- UAV and ecological data were initially acquired for two sites (i.e., Bull Island and Liffey Head).
- These datasets will be processed using machine learning techniques.

EXPECTED OUTPUTS

- a hierarchical Random Forest algorithm (via Python) developed to classify habitat data
- accurate Annex 1 habitat maps for the study sites

REFERENCE

¹NPWS (2013). The Status of Protected EU Habitats and Species in Ireland. Overview Volume 1. Unpublished Report, National Parks & Wildlife Services.

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