Department of the Air Force

Overseas Integrated Natural and Cultural Resources Management Plan

Croughton

Installation Supplement

ABOUT THIS PLAN

This installation-specific Environmental Management Plan (EMP) is based on the United States Air Force's (USAF's) standardized Integrated Natural and Cultural Resources Management Plan (INCRMP) template for installations located outside the United States[1]. This INCRMP has been developed in cooperation with applicable stakeholders, including appropriate Host Nation authorities. The INCRMP documents how natural and cultural resources are managed and the roles and responsibilities of stakeholders in implementing the INCRMP. Overseas installations will comply with the Overseas Environmental Baseline Guidance Document (OEBGD) and applicable Final Governing Standards (FGS). External resources, including Air Force Instructions (AFIs), Air Force Manuals (AFMANs), USAF Playbooks, and Department of Defense (DoD) policy, are referenced where applicable.

Certain sections of this INCRMP begin with standardized, USAF-wide "common text" language that addressees USAF and DoD policy, FGS, and applicable US laws. This common text language is restricted from editing to ensure that it remains standard throughout all plans. The common text language is maintained and updated by the designated Office of Primary Responsibility (OPR) with assistance from the Office of Collateral Responsibility (OCR), as appropriate. Immediately following the USAF-wide common text sections are installation content sections that address installation-specific requirements. Installation sections are unrestricted and are maintained and updated by USAF environmental Sections and/or installation personnel.

NOTE: The terms "Natural Resources Manager," "NRM," "NRM/POC," "Cultural Resources Manager," "CRM," and "CRM/POC" are used throughout this document to refer to the installation person responsible for the natural and cultural resources program, regardless of whether this person meets the qualifications within the definition of a natural and cultural resources management professional in Department of Defense Instruction (DoDI) 4715.03, Natural Resources Conservation Program*, and DoDI 4715.16,* Cultural Resources Management*.*

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[1] *"United States" is defined in AFI 32-7091, Environmental Management Outside the United States, as "The several States, District of Columbia, Commonwealths of Puerto Rico and Northern Mariana Islands, American Samoa, Guam, Midway and Wake Islands, United States Virgin Islands, any other territory or possession of the United States, an associated navigable waters, contiguous zones, and ocean waters of which the natural resources are under the exclusive management authority of the United States." "Overseas" is used interchangeably with "outside the United States" in this document.*

DOCUMENT CONTROL

Standardized INCRMP Template

In accordance with (IAW) the Air Force Civil Engineer Center (AFCEC) Environmental Directorate (CZ) Business Rule (BR) 08, *EMP Review, Update, and Maintenance*, the standard content in this INCRMP template is reviewed periodically, updated as appropriate, and approved by the Natural Resources, Cultural Resources, and Environmental Overseas Subject Matter Experts (SME).

This version of the template is current as of 06/26/2020 and supersedes the 2018 version.

NOTE: Installations are not required to update their INCRMPs every time this template is updated. When it is time for an INCRMP update, installations should adopt the most recent version of this template available in the Plan Tool.

Installation INCRMP

Record of Review – The INCRMP is updated not less than annually, or as changes to natural and cultural resource management and conservation practices occur, including those driven by changes in applicable regulations. IAW DoDI 4715.16; AFI 32-7091, *Environmental Management Outside the United States*; AFMAN 32-7003, *Environmental Conservation* (includes Cultural and Natural Resources management), the INCRMP is required to be revised and approved for operation and effect not less than every five years or as required by an applicable FGS. Annual reviews and updates are accomplished by the installation Natural Resources Manager (NRM), the installation Cultural Resources Manager (CRM), and/or the Section Natural and Cultural Resources Media Managers. At a minimum, the installation NRM or CRM conducts an annual review of the INCRMP in coordination with internal stakeholders, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INCRMP Review Summary. By signature to the Annual INCRMP Review Summary, the Civil Engineering Squadron Commander asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans.

ICRMP APPROVAL/SIGNATURE PAGE

EXECUTIVE SUMMARY

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The INCRMP is a mechanism by which United States Air Force in Europe (USAFE) installations can maintain a sustainable land use through ecosystem management and biodiversity and cultural heritage protection in the context of the installation's operational mission.

The objectives of the plan include the following:

- Ensure compliance with the Final Governing Standards – United Kingdom (FGS – UK) for the natural resources and endangered species at RAF Croughton, RAF Barford St John, RAF Fairford and RAF Welford;
- Create INCRMP for RAF Barford St John;
- Update the 2011 INCRMPs for RAF Croughton, RAF Fairford and RAF Welford;
- Survey, monitor and coordinate natural resources, to be carried out in partnership with the host nation regulatory authorities and in accordance with the INCRMP;
- Assess all ground works for natural resource impacts at the preliminary planning stage of any project;
- Establish measures sufficient to ensure protection of known natural resources within the 422 ABG until appropriate mitigation or preservation recommendations can be completed; and
- Update the Natural Resources Geo-database.

USAFE and the host nation operations comply with relevant UK and US legislation with regards to wildlife and cultural heritage protection. The Base works closely through the host nation agencies to obtain planning consent for building construction and demolition. This includes a search by the host nation of its Site of Special Scientific Interest (SSSI) register which is then coordinated with the Environmental Element (422 CES/CEIE and 420 ABS/CEIE).

Future management goals and objectives will ensure the minimum disturbance of important flora, fauna and cultural heritage when planning new developments and update records of threatened and endangered species across the 422 ABG.

1 OVERVIEW AND SCOPE

This INCRMP was developed to provide for effective management and protection of natural and cultural resources. It summarizes the natural and cultural resources present on the installation and outlines strategies to adequately manage those resources. Natural and cultural resources are valuable assets of the USAF. They provide the infrastructure needed for testing weapons and technology, as well as for training military personnel for deployment. Sound management of natural and cultural resources increases the effectiveness of USAF adaptability in all environments. USAF has stewardship responsibility for the physical lands on which installations are located to ensure all natural and cultural resources are properly conserved, protected, and used in sustainable ways. The primary objective of USAF natural and cultural resources programs is to sustain, restore, and modernize natural and cultural infrastructure to ensure operational capability and no net loss in the capability of USAF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural and cultural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural and cultural resources within the context of the installation's mission. The INCRMP is intended for use by all installation personnel. Applicable FGS, supported by AFI 32-7091; OEBGD (where an FGS does not exist); and Title 54 United States Code (USC) §307101(e) act as the main drivers for the INCRMP.

1.1 Purpose and Scope

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Most actions at Air Force installations impact natural resources and therefore the inherent value of these resources must be considered in all installation plans, decisions, actions and programs. The purpose of the INCRMP is to inform these actions and protect all the known natural resources, cultural heritage and any possible endangered species across the 422 ABG.

The objectives of the plan include the following:

- Ensure compliance with the Final Governing Standards – United Kingdom (FGS – UK) for the natural resources and endangered species;
- Initial survey for RAF Barford St John;
- Update the 2011 INCRMPs for RAF Croughton, RAF Fairford and RAF Welford
- Survey, monitor and coordinate natural and cultural resources, to be carried out in partnership with the host nation regulatory authorities and in accordance with the INCRMP;
- Assess all ground works for natural resource impacts at the preliminary planning stage of any project;
- Establish measures sufficient to ensure protection of known natural and cultural resources, until appropriate mitigation or preservation recommendations can be completed; and
- Update the Natural Resources Geo-database.

1.2 Management Philosophy

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Ecosystem and cultural heritage management provides a means for the United States Air Force in Europe (USAFE) to protect habitats, biodiversity and cultural heritage. The Integrated Natural and Cultural Resources Management Plan (INCRMP) is a mechanism by which USAFE installations can maintain a sustainable land use through ecosystem management and biodiversity and cultural heritage protection in the context of the installation's operational mission.

This INCRMP was prepared to integrate all aspects of the 422 ABG's natural and cultural resources management program and describe how an interdisciplinary approach to management will protect all known natural and cultural resources and any possible endangered species.

All development projects are reviewed under the Environmental Impact Assessment Process (EIAP) prior to coordination through the host nation authorities. Natural and cultural resource investigations are conducted by the host nation on an individual basis for development projects during the planning application review required under the Town and County Planning Act (1990). Investigative reports are held by the host nation with courtesy copies available to the Installation. Improvement, monitoring, and surveying of natural resources are only undertaken with the support and guidance of the host nation statutory authorities.

1.3 Authority

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The DoD Publication 4715.05-G, Overseas Environmental Baseline Guidance Document (OEBGD) 2007, requires the implementation of uniform conservation standards for natural resources and protection and management of historic and cultural resources at DoD installations and facilities in foreign countries. The OEBGD provides criteria, standards, and management practices to be used by DoD environmental Lead Environmental Components in determining FGS in accordance with DoDI 4715.05, *Management of Environmental Compliance at Overseas Installations* (2013).

FGS for each HN requires preparation of integrated natural and cultural resource management plans in Chapter 13 for "Installations with significant land or water areas" See installation and HN specifics listed in the table below.

AF Instruction (AFI) 32-7064, *Integrated Natural and Cultural Resources Management* (18 Nov 14) applies overseas to the extent that it is consistent with applicable international agreements, Unified Combatant Command (UCC) policy, environmental annexes to operational orders or plans, country-specific FGS, or in their absence, the OEBGD.

AFI 32-7001 Environmental Management requires installations to identify processes or activities that include reducing pollution, reduce the use of natural resources, and conserving water. AF Policy Directive (AFPD) 32-70, Environmental Quality, identifies general USAFE requirements for a natural and cultural resources management program.

Installation-Specific Policies (including HN and/or Local Laws and Regulations)	
Final Governing Standards – United Kingdom (FGS-UK)	The FGS-UK contains criteria for required plans and programs needed to ensure proper protection, enhancement, and management of natural resources and any biological species declared endangered or threatened by either the United States or host nation's government. Biological species include all plants and animals existing on properties under US Department of Defense (DoD) / United Kingdom Ministry of Defense (MOD) control. Requirements in the FGS-UK cover experts, inventories, planning and protective action.
Overseas Environmental Baseline Guidance Document (OEBGD)	The primary purpose of the OEBGD is to provide criteria and management practices to be used by DoD Environmental Executive Agents (EEAs) in determining FGS in accordance with DoD Instruction 4715.5G "Management of Environmental Compliance at Overseas Installations".

1.4 Integration with Other Plans

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INCRMP revisions and concurrence with the final plan must be coordinated through the installation chain of command and the ***[Identify internal stakeholders]***. The NRM and CRM must ensure that the INCRMP, ***[List applicable installation plans (i.e., CERCLA/RCRA cleanup plans, BASH plan, IPMP, Grounds Maintenance contract, and AICUZ studies)]*** and any other plans that may affect natural and cultural resources are mutually supportive and not in conflict.

2 INSTALLATION PROFILE

Installation Supplement

OPR	422 CES/CEIE and 420 ABS/CEIE has overall responsibility for implementing the Natural and Cultural Resources Management program and is the lead organization for monitoring compliance with applicable regulations.
Natural and Cultural Resources Managers/POCs	Name: Alex Wilkieson (422 CES/CEI) Phone: 236 - 8766 Email: alex.wilkieson.gb@us.af.nil Name: Keith Cashin (420 ABS/CEI) Phone: 247 - 4970 Email: keith.cashin.gb@us.af.mil
Host Nation POC/local authorities	Contact through DIO Environmental Advisor Tel: 247-4076

Total acreage managed by installation	Croughton: 694 Fairford: 1396 Welford: 806 Barford St John: 476
Total acreage of wetlands	N/A
Total acreage of forested land	N/A
Natural and Cultural Resources Program applicability (Place an X in the brackets "[X]" next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	[ ] Fish and Wildlife Management [ ] Outdoor Recreation and Access to Natural Resources [ ] Conservation and Protection Standards Enforcement [ ] Management of Threatened, Endangered, and Host Nation-Protected Species [ ] Water Resource Protection [ ] Wetland Protection [x] Grounds Maintenance [x] Forest Management [ ] Wildland Fire Management [x] Agricultural Outleasing [x] Integrated Pest Management Program [x] Bird/Wildlife Aircraft Strike Hazard (BASH) [ ] Coastal Zone and Marine Resources Management [ ] Communication, Planning, and EIAP [ ] Cultural Property Review Process [ ] Resources Contracting [ ] Cultural Discoveries [ ] Public Access to Host Nation Sites of Cultural or Traditional Importance [ ] Accidents and Emergencies Affecting Historic Properties [ ] Suspected Vandalism [ ] Curation of Collections and Records [ ] Management and Coordination [ ] Public Outreach [ ] Geographic Information Systems (GIS)
Office of the Secretary of Defense most current "Base Structure Report" notion of the total acres managed by the Installation	Croughton: 694 Fairford: 1396 Welford: 806 Barford St John: 476
Installation's own notion of total acres managed by Installation	Croughton: 694 Fairford: 1396 Welford: 806 Barford St John: 476
Installation surveyable acres (i.e., undisturbed, accessible acres)	Croughton: 694 Fairford: 1396 Welford: 806 Barford St John: 476
Total acres ever surveyed [NR] **Total acres ever surveyed [CR]**	Croughton: 694 Fairford: 1396 Welford: 806 Barford St John: 476
ICRMPs consulted with appropriate Host Nation/local authorities	N/A

Cultural Resources outreach program (e.g., website, welcome package, or brochures)?	N/A
Cumulative number of archaeology sites ever recorded	N/A
Number of known cultural resources to be managed	None
Have historic status codes been updated in the Accountable Property System of Record in FY##.?	N/A
Number of archeology sites mapped into GIS	0
Number of surveyed acres mapped into GIS	Croughton: 694 Fairford: 1396 Welford: 806 Barford St John: 476
Are culturally significant real property assets (buildings/structures) mapped into GIS?	No

NOTE: Parenthetical citations refer to Cultural Resources Program DEPARC questions

2.1 Installation Overview

2.1.1 Location and Area

Installation Supplement

RAF Croughton is located in a rural area of Northamptonshire close to the border of Oxfordshire. It is east of Croughton Village and approximately 5km south west of Brackley, 10km north of Bicester and 13km south east of Banbury. Figures for RAF Croughton are provided in Appendix B. Figure 1 depicts the location of RAF Croughton and Figure 2 is an aerial photograph of the base and surrounding area. RAF Croughton comprises an area of approximately 280 hectares (ha) or 694 acres.

RAF Barford St John is located in a rural area of Oxfordshire close to the border with Northamptonshire, between the villages of Barford St John and Bloxham. It is approximately 4km south of Banbury. Figures for RAF Barford St John are provided in Appendix C. Figure 1 depicts the location of RAF Barford St John and Figure 2 is an aerial photograph of the base and surrounding area. RAF Barford St John comprises an area of approximately 193ha or 476 acres.

RAF Fairford is located approximately 2.2 miles (3.5 kilometers (km)) south of the highway A417, southeast of Fairford village, Gloucestershire, in south west England. The nearest large towns are Cirencester, located 8 miles (13km) to the west and Swindon 10 miles (16km) to the south. RAF Croughton is located approximately 50 miles (80km) to the northeast of RAF Fairford. Figures for RAF Fairford are provided in Appendix D. Figure 1 depicts the location of RAF Fairford and Figure 2 is an aerial photograph of the base and surrounding area. RAF Fairford comprises an area of approximately 564ha or 1,396 acres.

RAF Welford is located approximately 10 miles (16km) north of Newbury, around 10 miles (16km) south of Wantage, and approximately 0.6 miles (1km) northeast of Welford village center, in the Newbury District of Berkshire. The base lies on the high ground of the Berkshire Downs, within the Berkshire and Marlborough Downs Natural Area. Figures for RAF Welford are provided in Appendix E. Figure 1 depicts the location of RAF Welford and Figure 2 is an aerial photograph of the base and surrounding area. RAF Welford covers approximately 326ha or 806 acres with approximately 190 ha used for munitions storage.

Installation/GSU Location and Area Descriptions

Installation/ Geographically Separated Unit (GSU)	Main Use/Mission	Acreage	Addressed in INCRMP?	Describe Natural and Cultural Resource Implications

RAF Croughton	Communications	694 acres	INCRMP (Cat I) covers entire Base	European Protected Species present on RAF Croughton are bats and potentially white-clawed crayfish. Other protected species at RAF Croughton are birds, reptiles, potentially water vole and badger. The primary cultural constraints at RAF Croughton are the three Type C Fighter Pens.
RAF Barford St John	Communications	476 acres	INCRMP (Cat I) covers entire Base	European Protected Species present on RAF Barford St John are bats. Other protected species at RAF Barford St John are birds and badger.
RAF Fairford	Reserve airfield	1,396 acres	INCRMP (Cat I) covers entire Base	European Protected Species present on RAF Fairford are great crested newts and bats. Other protected species at RAF Fairford are birds, reptiles and badger.
RAF Welford (GSU of RAF Fairford)	Munitions Storage Area (MSA)	806 acres	INCRMP (Cat I) covers entire Base	European Protected Species present on RAF Welford are bats. Other protected species at RAF Welford are birds and badger. The ancient woodlands on the Base are designated as a LWS. The primary cultural constraints at RAF Welford are the numerous military related archaeological sites within the Base and medieval Poughley Priory, its associated features and setting, and the large number of features preserved within woodland in the north of the base.

2.1.2 Installation History

Installation Supplement

RAF Croughton airfield was created from three farms in 1938 and initially called Brackley Landing Ground. The internal hedgerows, trees and all but one of the farm buildings were removed. It was renamed RAF Brackley in 1940 and renamed RAF Croughton a year later. Flying ceased in 1946 and the United States Air Force took up residence in 1951, when the building of communications arrays began. The present security fence was erected in 2001.

RAF Barford St John airfield was created from ridge and furrow grasslands and arable farmland in 1938, when the area was levelled, and trees and hedgerows removed. Personnel were withdrawn at the end of the Second World War and the airfield became a communications base in the 1950s.

RAF Fairford was constructed in 1944 to accommodate British troop carriers, and gliders used during WWII operations including the invasion of Normandy (U.S. Army Corps of Engineers, 2000). In 1950 it was transferred to USAFE for strategic bomber operations and the first USAF contingent arrived. Work commenced immediately to enlarge and extend the runway to approximately 10,000 feet (3,048 m), one of the longest runways in the UK. The runway and hardstands were completed in 1953.

In 1964, the Base was transferred back to RAF control, and the C Flight of the RAF Central Flying School arrived. In addition, during 1965 and 1966 Fairford was home to the "Red Arrows", the RAF aerobatics team.

In 1969 the Base was turned over to civilian use and it became the Concorde Flight Test Centre. Concorde used the airfield until 1977 when RAF Fairford resumed its reserve role. The USAF returned to Fairford in 1979 with squadrons of KC-135 Stratotanker aircraft, which played a major role in supporting the attack on Libya in 1986. KC-135s were withdrawn in 1990 and the Base was reduced to a standby status. RAF Fairford hosted occasional detachments of B-52 Stratofortresses, B-1 Bombers, and tankers for exercise and deployment purposes.

With USAF concurrence, UK MoD makes available the airfield and other areas of the Base to a UK MoD charity fundraiser and one of the largest military air shows, the Royal International Air Tattoo, which takes place annually.

RAF Welford air base was built in 1942 as an operational training unit for 92nd Group Bomber Command and as a satellite airfield for the nearby Membury Airfield. The base was transferred to the United States Air Force (USAF) by September 1943 to initially act as a transport center for Douglas C-47 and Waco and Horsa gliders. Three runways, 50 hard stands, at least four hangars and a bomb dump were constructed. The base delivered troops and material to Western Europe throughout World War II. RAF Welford was heavily involved in D-day and an area near the base was used as a preparatory airborne exercise that was observed by Churchill and Eisenhower. In 1945, after World War II, the base was returned to the RAF. Between 1947 and 1952, the base was the Headquarters of the Southern Signals Area. In 1952 the USAF resumed operation of Welford. In 1955 Welford became a Munitions Storage Area (MSA) for the USAF. In 1992 the western portion of the base became operated by the MOD. In 1999 the Defence Munitions Organization assumed responsibility for RAF Welford. However, in 2000 the Defence Munitions Organization withdrew, and the entire base was converted to USAFE only occupation.

2.1.3 Military Missions

Installation Supplement

RAF Croughton: The current Military Mission remains communications. The grassland within the perimeter road is tenanted by a local farmer and is grazed with sheep. Other land belonging to the base is variously managed as arable, grazing and nature conservation. There are no major changes planned for the mission at RAF Croughton. The impact on natural and cultural resources should be considered if the mission changes.

RAF Barford St John: The current Military Mission at RAF Barford St John remains communications. The grassland within the Base is tenanted by a local farmer and is grazed with sheep. Several large military antennae are housed in the fields. A network of former tracks and runways cross the Base.

RAF Fairford: RAF Fairford comprises: an active airfield with associated fuel storage areas and hangars; recreational areas, sports fields; a constructors' compound (Site 4); and base housing. There are three additional sites outside the main base, including deployment housing, Site 15 and Site 16. There are no tenant farmers on the installation at this time.

The majority of community services and facilities on RAF Fairford have been developed on the north side of the base. The southern portion of RAF Fairford consists of runways taxiways and flight operations. The role of the squadron is to maintain the Air Base infrastructure and mission support capabilities and to support exercises and contingencies as directed by 3rd Air Force (3AF), Headquarters United States Air Forces in Europe (HQ USAFE), and NATO.

There are major changes planned for the mission at RAF Fairford, with approx. 1000 military personnel expected and a flying mission with based aircraft from Air Combat Command (ACC), Air Mobility Command (AMC) and possibly the Royal Air Force (RAF) with a more regular use of the airfield by Air Force Global Weather Information System (AFGSC). If required the base can become fully operational within 48 hours. The impact on natural and cultural resources should be considered when the mission changes.

RAF Welford. This Base is a Geographically Separated Unit (GSU) of RAF Fairford, which is located 35 miles (56km) to the northwest. RAF Welford's Mission is to provide and maintain the MSA and support Air Combat Command heavy bomber operations at RAF Fairford (General Plan Update, 2006). There are no major changes planned for the mission at RAF Welford. If required, the base can become fully operational within 48 hours. The impact on natural and cultural resources should be considered if the mission changes.

Listing of Tenants and Natural and Cultural Resource Responsibility

Tenant Organization	Natural and Cultural Resource Responsibility
RAF Croughton and RAF Barford St John: Local farmer	Defence Infrastructure Organization
RAF Welford: Local Farmer	

2.1.4 Natural and Cultural Resources Needed to Support the Military Mission

Installation Supplement

RAF Croughton: There are no natural resources needed to support the Military Mission.

RAF Barford St John: There are no natural resources needed to support the Military Mission.

RAF Fairford: The base abstracts drinking water from the deep limestone aquifer underlying the Oxford Clay. Drinking water from Groundwater is protected under the provisions of the Water Framework Directive and the Groundwater Directive.

RAF Welford: The base abstracts drinking water. Drinking water from Groundwater is protected under the provisions of the Water Framework Directive and the Groundwater Directive

2.1.5 Surrounding Communities

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RAF Croughton: The surrounding communities are small villages including Croughton, Souldern and Aynho. More sizable communities include Bicester, Banbury and Brackley.

RAF Barford St John: The surrounding communities are villages including Bloxham, Barford St John and Milton.

RAF Fairford: The nearest small towns to RAF Fairford are Fairford, Lechlade-on-Thames, Highworth, and Cricklade. The town of Cirencester is the largest community in the immediate vicinity.

RAF Welford: The largest communities in the area are Wantage to the north and Newbury to the south. There are numerous small villages nearby including Welford, Chaddleworth, Leckhamstead and Great Shefford.

2.1.6 Local and Regional Natural and Cultural Areas

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RAF Croughton is located on the eastern edge of the Cotswold's National Character Area (Number 107). National Character Areas have been defined by Natural England as areas that share similar landscape characteristics, and which follow natural lines in the landscape rather than administrative boundaries, for the purpose of creating a decision-making framework for the natural environment (http://publications.naturalengland.org.uk/category/587130). To the east of the Cotswold's is the Bedfordshire and Cambridge shire Claylands. The area is characterized by gently undulating topography with arable fields, small blocks of woodland in shallow river valleys and attractive stone villages built with Cotswold stone. There are no internationally important sites within 3km of the center of the base, i.e. land supporting protected habitats, birds and wetlands under the European Habitats Directive, the European Birds Directive, the Ramsar Convention and The Conservation of Habitats and Species Regulations 2010 including Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar wetland sites. There are no nationally important sites, such as Sites of Special Scientific Interest (SSSI) within 3km of the center of the base, or non-statutory designated sites such as Local Wildlife Sites (LWS) within 2km of the base.

RAF Barford St John is located within the Natural England defined Cotswolds National Character Area (Number 107) which is characterized by gently undulating topography with arable fields, small blocks of woodland in shallow river valleys and attractive stone villages built with Cotswold stone. There are no statutory designated sites within 3km of the Base. The closest is Bestmoor Site of Special Scientific Interest (SSSIs), which is over 5.5km from the site. There are three non-statutory designated (LWSs with 2km of the Base: Barford Marsh LWS 0.9km from the Base, Deddington Mill LWS 0.9km from the base and South Newington Meadow LWS 2km from the Base.

The Base itself has been proposed as a County Wildlife Site (CWS) – Barford St John Airfield proposed CWS (site code 43M04), and was surveyed in 2008 as part of the assessment process (see BBOWT, (2008), Barford St John Airfield Proposed CWS Draft). The site has not yet been designated as a CWS and therefore there are currently no implications for the management of the site.

RAF Fairford is located at the eastern end of the Upper Thames Clay Vales National Character Area (Number 108). The Upper Thames Clay Vales National Character Area is characterized by gently undulating lowland farming with a variety of contrasting landscapes. The valley bottoms encompass regular and well-ordered field patterns with pollarded willow (Salix sp.) and reed beds along the watercourses. The landscape of the wetter clays in the flood plain is pastoral, dominated by stock rearing with areas of arable on the dryer elevated gravel terraces. Where the fields have not been improved the meadows are species rich. Woodland has been scarce in the Vales for many centuries and many of the fields have been enlarged with the loss of hedgerows. In the past elm trees would have been a prominent feature of the landscape.

There are no internationally important sites within 3km of the center of the site; that is land supporting protected habitats, birds and wetlands under the European Habitats Directive, the European Birds Directive, the RAMSAR Convention and The Conservation of Habitats and Species Regulations 2010 including Special Areas of Conservation (SAC), Special Protection Areas (SPA) and RAMSAR wetland sites.

Nationally important sites, such as SSSI's are protected under Section 28 of the Wildlife and Countryside Act (1981). There are two SSSI's within 3km of the center of the installation, Whelford Meadow SSSI and Cotswold Water Park SSSI. The desk study has confirmed that there are eight non-statutory designated sites with 2km of the site (three Key Wildlife Sites (KWSs), one Gloucestershire Wildlife Trust nature reserve (GWT), one Conservation Road Verge (CRV), and three Potential Key Wildlife Sites (PKWSs)). A management plan for the Cotswold Water Park, located between Cirencester and Swindon and extending east as far as Lechlade-on-Thames, has been developed recommending how the area should be developed to benefit the local residents, the landscape, biodiversity and recreation. This covers the area of lakes not covered by the SSSI.

RAF Welford: The regional land use is rolling farmland, now largely arable, but with extensive chalk down land on the steeper scarp slopes. RAF Welford is located within the Berkshire and Marlborough Downs National Character Area (Number 116), which is characterized by rolling farmland with scattered woods, bisected by the river valleys of the Kennet, Lambourn and Pang. The land use surrounding the base is primarily agricultural and forestry. The area is important for its ancient broad-leaved woodland, chalk grasslands, chalk rivers and Sarsen Stones.

There are two SACs within 3 km of the center of the site, the River Lambourn SAC and the Kennet and Lambourn Flood Plain SAC.

The River Lambourne SAC is located approximately 0.7km south west of the Base, is one of the least modified chalk streams in the UK and discharges into the middle reaches of the Thames system.

The Kennet and Lambourn Flood Plain SAC is approximately 1.5km west of the Base, comprises standing and running water, bogs, marshes, water fringed vegetation, fens, humid grassland and mesophile grassland habitats.

The section of the River Lambourn between Great Shefford west of the base, and Bagnor, south of the base, is designated an SSSI for its chalk river habitat and its associated disused water meadow systems, wet pastures and woodlands that support nationally scarce invertebrate populations.

The Kennet and Lambourn Floodplain SSSI is designated for its nationally rare and declining Desmoulin's whorl snail (Vertigo moulinsiana) that favors long established fen and swamp habitat in river flood plains. The species-rich meadows within the floodplain support uncommon marsh plants only found in calcareous river valleys in southern England.

The Boxford Chalk Pit SSSI is a geological site, located south of the M4 motorway, and one of the few remaining pits in the Upper Chalk (Upper Turonian–Santonian) succession of southern Britain still producing vertebrates. The sites known for its bulk sampling of the unusual phosphatic horizons at the quarry, which has recently revealed a rich micro shark fauna including some extremely rare taxa yet to be described. The Pit is 0.4 hectares.

The Boxford Water Meadows SSSI is within the North Wessex Downs Area of Outstanding beauty and comprises of a series of flood pastures and disused water meadows along the River Lambourn, with patches of alder and sallow scrub occur. The site overlies alluvium and the soils consist of calcareous alluvial gleys. The site is 14 hectares and designated for its traditional water meadows, fen and swamp habitat, located south of the M4 motorway.

Easton Farm Meadow SSSI is a small meadow located south of the M4 motorway with unimproved, herb-rich neutral grassland, a habitat now rare and rapidly declining in Berkshire. Easton Farm Meadow is situated beside the River Lambourn and is bounded by water except on its northern side. The site overlies alluvium and the soils consist of calcareous alluvial gleys. It is designated for its species-rich water meadows. In the past the meadows around Easton Farm, many of which are unimproved, were no doubt managed traditionally as 'floated' water meadows.

There are seven LWSs within 2km of the center of the base, of which three are within the base perimeter. Priority UK BAP habitats represented in these sites include lowland mixed deciduous woodland (Highwood and Scroggin's Copse LWS; Elton Wood LWS; Mantclose Copse and Queen's Plantation LWS; Basdown Copse LWS), wet woodland (Elton Farm Meadows LWS; Welford Park LWS), lowland meadow (Elton Farm Meadows LWS; Easton 1 LWS; Easton 2 LWS) floodplain grazing marsh/ fen (Elton Farm Meadows LWS), and lowland wood pasture and parkland (Welford Park LWS). The lowland mixed deciduous woodland forms a scattered network of ancient woodland.

2.2 Physical Environment

2.2.1 Climate

Installation Supplement

England experiences a temperate maritime climate largely influenced by the North Sea and the North Atlantic Gulf Stream.

The climate at RAF Croughton and RAF Barford St John is moderate, with a wind direction generally from the south-west. Meteorological Office data for the period 1981-2010 at the Oxford weather station, approximately 23 miles to the south, indicates that the average minimum temperature is 1.8°C in February and the average maximum temperature is 22.7°C in July. The average annual sunshine at the weather station 1577.9 hours and average days of rainfall greater than 1mm was 115.5 per annum. Thunderstorms are most likely to occur from May to September, reaching their peak in July and August, with eastern areas among the most prone in the UK. High intensity rainfall is often associated with summer showers and thunderstorms, rates of 100 mm/hr. or more being possible for short periods. An extreme rainfall event at Birmingham, 35 miles northwest of Croughton, on 24 July 1994, received approximately 21 mm of rain in less than 1 hour and 15 mm diameter hailstones. The climate data is taken from the UK Met Office, 2011. Mitigation for weather and climatic conditions do not need to be addressed in the INCRMP as the climatic conditions are moderate.

Weather records for RAF Fairford indicate a maximum temperature of approximately 32°C (90°F) in July and minimum temperature of -15°C (5°F) in January (Cirencester Climate Station 1981- 2010). Summer daily highs average under 21°C (70°F) and the average daily low during January, the coldest month of the year, is approximately 0°C (32°F). The annual rainfall is 620mm (24.4 inches). Mitigation for weather and climatic conditions do not need to be addressed in the INCRMP as the climatic conditions are moderate. Fog during the winter months is a problem; but it does not impact military flying operations because RAF Fairford is in standby mode and flight operations are limited.

The climate at RAF Welford is moderate, with a wind direction generally from the south-west. January is the coldest month with mean daily minimum temperatures of around 0.5 ºC. July is the warmest month with mean daily maximum temperatures of around 20.2 ºC. Extreme data for Heathrow, approximately 50 miles to the east, range from -11.8 ºC to 36.5 ºC (Cirencester Climate Station 1981 - 2010). The average annual sunshine for the Chiltern Hills, approximately 35 miles to the north east, is 1450 hours. Average spring and summer rainfall is in the range 100-140mm, average autumn rainfall is in the range 140-200mm and average winter rainfall is in the range 100-180mm. Southern England is susceptible to summer thunderstorms. An extreme rainfall event at Bracknell, 35 miles east of Welford, recorded 65mm in one hour on 7th May 2000. That is equivalent to one month's rainfall. The climate data is taken from the UK Met Office, 2010. Mitigation for weather and climatic conditions do not need to be addressed in the INCRMP as the climatic conditions are moderate.

2.2.2 Landforms

Installation Supplement

RAF Croughton is located on the top of a small hill (maximum elevation 137 m above Ordnance Datum (AOD) bordered to the south by Ockley Brook, to the north by Croughton Brook, to the east by the A43 trunk road and to the west by farmland.

RAF Barford St John is located on the top of an escarpment (maximum elevation 120 m AOD) above the steep valley of the River Swere to the south, dipping north towards a shallow valley of a tributary draining east into the Sor Brook.

RAF Fairford occupies a broad, flat area created by the Thames and Coln Rivers, approximately 80-85m AOD. The elevation of the airfield area varies from 77m (255 feet) AOD at the eastern end and 87m (285 feet) AOD at the western end of the runway (US Army Corps of Engineers, 1998). The base housing, billeting, main gate and commissary are located on Horcott Hill with a gradual slope to an elevation of approximately 15m (50 feet) above the rest of the Base.

RAF Welford is 130m – 160m AOD and gently slopes in an overall south easterly direction towards the River Lambourn. The installation is in an area of rolling or undulating downs cut with dry valleys.

2.2.3 Geology and Soils

Installation Supplement

RAF Croughton: Solid and Drift Geology Map No 219 (BGS 2002) covering the area has been used to determine the site geology.

The four main stratigraphic formations (Hains and Horton, 1969) identified below are consistently present at RAF Croughton:

- The Great Oolite Limestone (Blisworth Limestone);
- Estuarine Series Sediments (comprising the Upper and Lower Estuarine Series);
- The Northampton Sands (Inferior Oolite Formation); and
- The Upper Lias.

This sequence is in turn overlain by topsoil, alluvium and colluvium. The latter forms the superficial cover over most of the site and typically contains Great Oolite limestone blocks.

The regional dip is reportedly 10° to the NNW but locally this would be heavily distorted by local structure.

RAF Barford St John: Similar to nearby RAF Croughton, RAF Barford St John solid geology comprises The Northampton Sands (Inferior Oolite Formation) with Whitby Mudstone Formation (http://mapapps.bgs.ac.uk/geologyofbritain/home.html). Soils are loamy and freely draining, slightly acid but base-rich, with high natural fertility.

RAF Fairford: The area around RAF Fairford is largely composed of drift materials. The Thames and Coln Rivers have deposited layers of gravel and other sediments along the river banks over many millennia forming terraces of different ages. Four river terraces have been identified in the area, three of which occur on the Base. The river terraces overlie the Oxford Clay and Oolitic limestone. The impermeable blue grey Oxford Clay forms a barrier between the water-bearing sand and gravel deposits on the surface and the main aquifer of the Oolitic limestone below. It is important therefore that any borehole drilling through the clay and into the limestone is undertaken with great care to avoid any potential contaminants being carried down into the main underlying limestone aquifer.

RAF Fairford and the surrounding area have been mapped by the British Geological Survey (BGS) on sheets E252 (Swindon) and E235 (Cirencester) of the Solid and Drift Geology Editions (Scale 1:50,000).

The soils in the area of RAF Fairford are generally thin and gravelly, overlying fluvial sands and gravels, although there are some areas with clay soils.

RAF Welford: The soils at RAF Welford are primarily calcareous, free draining and commonly thin. Where clay with flints caps the chalk, areas of damp soils develop which are able to support woodlands such as Lambourn Woodlands east of Great Shefford.

The British Geological Survey (BGS) for the site area (Sheet 267: Hungerford Solid and Drift) shows the site to be underlain by Cretaceous Upper Chalk. This is described as soft white chalk with flint nodules, which gently dips to the south-east. Shallow thicknesses of superficial deposits of clay with flints are indicated to overlie the chalk. The clay is described as a silty, sandy clay matrix with flint gravels that is likely to be of relatively low permeability.

2.2.4 Hydrology

Installation Supplement

RAF Croughton: The nearest surface water feature to RAF Croughton is the Croughton Brook, which runs along the north of the Base boundary. The nearest Environment Agency surface water monitoring point is located approximately 4 km south west of the base, which has been compliant with Environment Agency targets since 1991.

The Groundwater Vulnerability Map (EA 1996) indicates that the Great Oolite Formation is classified as a Principal aquifer (highly permeable), while the underlying sandstones are classified as a Secondary A and Secondary B aquifers. Abstractions from the mudstones and sandstones are variable, as the mudstones can be relatively impermeable. Overlying soils are sandy and thin, and are classified as soils of high leaching potential.

RAF Croughton's potable water is supplied by Anglian Water Services.

The Environment Agency Flood Map does not show RAF Croughton to be at risk from flooding.

RAF Barford St John. The bedrock aquifer designation at the Base is Secondary A which is permeable strata capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The Environment Agency Flood Map does not show RAF Barford St John to be at risk from flooding.

RAF Fairford: The Oolitic limestone is a major groundwater resource in this region of Southern England and is exploited for the public and private water supply. Its vulnerability to surface contamination from diffuse and point source pollution depends on the adequacy of the overlying Oxford Clay to provide an impermeable seal over the aquifer. The Oxford Clay is present beneath the entire area of RAF Fairford.

Potable water for RAF Fairford is supplied by two boreholes, which extract ground water from the limestone aquifer. An emergency supply from Thames Water was connected in 2011.

The small gradients present problems with surface drainage, which has been overcome with the construction of grass drainage ditches around the Base.

The Environment Agency Flood Map shows that Site 16 of RAF Fairford is at risk of flooding (https://flood-map-for-planning.service.gov.uk).

There are three Emergency Water Supply (EWS) tanks at Fairford.

RAF Welford: RAF Welford is located on open rounded chalk downs which form an elevated plateau above the River Lambourn. The River Lambourn flows in a south easterly direction through Great Shefford and Welford Villages south of the installation and drains into the River Kennet at Newbury.

The underlying chalk bedrock is a principal aquifer providing a high level of water storage very susceptible to pollution. The aquifer supports drinking water supply and maintains the base flow of the River Lambourn.

There are 33 EWS tanks within the munitions area. There are no natural ponds in the surrounding area.

Potable water for RAF Welford is supplied by two boreholes, which extract groundwater from the chalk at depth.

The Environment Agency Flood Map does not show RAF Welford to be at risk from flooding.

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

Installation Supplement

The following classification systems will be used in this Management Plan:

- Phase 1 Habitat Surveys (Nature Conservancy Council, 2007);
- the National Vegetation Classification (NVC) System, with cross reference to;
- the Grounds Categories.

Grounds categories are all lands not occupied by buildings, structures, roads, or pavements. This includes all land and water acreage for which an installation commander has responsibility including outlying and satellite areas. Grounds are usually categorized as improved, semi-improved, and unimproved.

Improved Grounds: developed areas that have lawns and landscape plantings that require intensive maintenance. These include areas such as athletic areas, military training areas and housing areas. These areas are equivalent to the British amenity grassland and introduced shrub phase 1 habitats.

Semi-improved Grounds: areas where periodic maintenance is performed primarily for operational and aesthetic reasons, such as erosion and dust control, bird control, and maintaining visual clear zones. These usually include grounds adjacent to runways, taxiways, and aprons; runway clear zones; lateral safety zones; rifle and pistol ranges; picnic areas; ammunition storage areas; antenna facilities; and golf course roughs. These areas are equivalent to the British semi-improved neutral, calcareous or acid grassland, scattered parkland trees and some plantation woodland habitats.

Unimproved Grounds: land areas mowed usually not more than once a year and not included in improved or semi-improved grounds. Unimproved lands usually include weapons ranges, crop and grazing lands or other outlying grasslands, ponds, wetlands, and areas in airfields beyond the safety zones. These areas are equivalent to the British broad-leaved woodlands, scrub, neutral, acid or calcareous grassland, heaths, standing water, running water and hedgerows.

2.3.2 Vegetation

2.3.2.1 Historic Vegetation Cover

Installation Supplement

RAF Croughton: Prior to the construction of the RAF Base in 1938 the landscape would have been arable farming with fields surrounded by hedgerows.

RAF Barford St John: Prior to the construction of the RAF Base in 1938 the landscape was ridge and furrow grasslands and arable farmland with hedgerows.

RAF Fairford: Prior to the construction of the RAF Base in 1944 the landscape would have been arable farming with a well-ordered field pattern defined by thick hedgerows. Woodland would have been scarce.

RAF Welford: Prior to the construction of the RAF Base in 1942 the land use was probably pasture and coppiced woodland. Large areas of pasture were ploughed during the Second World War. The woodland on the base is ancient woodland with nine indicator species (Rose, 1999) present in the ground flora. Past management was hazel coppice with oak standards which was continued but reinstated within the previous INCRMP. An orchard with a variety of fruit trees is located beside the priory. The Priory probably farmed the surrounding area for sheep, which would have maintained a short, grassland sward.

2.3.2.2 Current Vegetation Cover

RAF Croughton

Improved Grounds comprise amenity grassland and recreation areas. The MWH 2011 baseline report described the amenity grassland as moderately diverse but dominated by grasses such as perennial rye-grass (Lolium perenne), red fescue (Festuca rubra), cocksfoot (Dactylis glomerata) and common bent (Agrostis capillaris). The commonest herbs included white clover (Trifolium repens), black medick (Medicago lupulina), bird's-foot trefoil (Lotus corniculatus), lady's bedstraw (Galium verum) and self-heal (Prunella vulgaris). Based on the species present the MWH 2011 report categorized the National Vegetation Classification community as OV23a Lolium perenne – Dactylis glomerata community, typical sub-community which is characteristic of re-sown areas that are regularly mown. There was no evidence of any change detected during the 2017 phase 1 habitat survey. It is considered of ecological value within the immediate zone of influence only.

Landscape trees and shrubs have been planted along roads and in groups within the amenity grassland within the developed part of the site, and are of ecological importance at a local level.

Semi-improved Grounds comprise plantation woodland and semi-improved neutral grassland.

Three areas of plantation woodland are present on the site. The MWH 2011 report labels the small woodland north of the school as W1 and describes it as having a canopy approximately 15m in height comprising cherry (Prunus sp.), crab apple (Malus sylvestris), horse chestnut (Aesculus hippocastanum), Leyland cypress (Cupressocyparis leylandii), silver birch (Betula pendula), Swedish whitebeam (Sorbus intermedia) and Norway maple (Acer platanoides). The under-storey was a mixture of garden and native shrubs. The ground flora was species-poor, including field maple (Acer campestre) and maple seedlings only.

The second area of woodland is within the conservation area to the east of the carparks at the base gate and is labelled in the MWH 2011 report as W2. The MWH report describes this as having a canopy approximately 3m in height covering 30% of the ground and the shrubs were approximately 2m in height covering a further 30% of the ground. The ground flora was poor with large areas that were covered in chipped wood. There was a good mix of native species including pedunculate oak (Quercus robur), hornbeam (Carpinus betulus), hawthorn (Crataegus monogyna), hazel (Corylus avellana), spindle (Euonymus europaeus) and guelder rose (Viburnum opulus).

Both of these woodlands were considered as not having developed any characteristics that can be used to determine the NVC community. A third, young plantation is present in the semi-improved grassland adjacent to the southern boundary fence. They are assessed as being of local ecological value.

The majority of RAF Croughton is sheep-grazed neutral grassland divided into fields. At the time of the survey the grazed areas were very short. The MWH 2011 report notes that the grassland is dominated by grasses such as red fescue, rough meadow-grass (Poa trivialis), cocksfoot and common bent with frequent bird's-foot trefoil, cow parsley (Anthrisus sylvestris), field scabious (Knautia arvensis), lady's bedstraw (Galium verum) and yarrow (Achillea millefolium). The grassland was moderately species-rich. The young plantation is on an area of semi-improved grassland in the southern part of the Base. At the time of the MWH 2011 report the species composition of the grassland aligned with the NVC MG5b Centaureo – Cynosuetum cristaii grassland, Galium verum sub-community. This grassland community is typical of base rich brown-earth soils with a management regime of regular cutting in the summer, and is considered to be of district ecological importance particularly for farmland birds and possibly breeding curlew in the context of the local landscape

During the 2017 phase 1 survey there was no evidence that either of these grasslands had changed composition with no notable changes to grazing management and with the plantation trees yet to create a canopy.

Unimproved Grounds comprise the following habitats: semi-natural woodland, scrub with trees, hedgerows, unimproved neutral grassland, ephemeral/short perennial vegetation, cultivated land, standing water and running water.

A semi-natural woodland with dense understory is present along both banks of Ockley Brook, located on the southern boundary RAF Croughton. This woodland is labelled as W3 in the MWH 2011 report, and described as having a canopy, approximately 18m in height and dominated by pedunculate oak and ash (Fraxinus excelsior). The shrub layer was approximately 3m in height comprising blackthorn (Prunus spinose), bramble (Rubus fruticosus agg.), elder (Sambucus nigra), goat willow (Salix caprea) and hazel. There was a diverse ground flora including several ancient woodland indicator species. The woodland is considered of up to district importance for nature conservation.

The MWH 2011 report description of the southern half of the conservation area was found during the 2017 phase 1 survey to remain accurate. It is described as a mosaic of scrub and trees with open glades. The trees formed an open canopy of variable age approximately 10-15m in height. Species present included ash, field maple and sycamore (Acer pseudoplatanus). The shrub layer was approximately 4-5m in height, comprising hawthorn, elder, blackthorn and goat willow. The shrub layer was closed allowing very little light to reach the ground flora which was sparse and dominated by common nettle (Urtica dioica). The woodland is considered of up to district importance for nature conservation.

Other scrub and scattered trees have developed in the south western part of the unimproved grassland field south of the perimeter fence.

The 2017 phase 1 survey confirmed that boundary feature descriptions within the MWH 2011 report are still accurate, although additional boundaries have been included on Figure 3 (Appendix B). MWH 2011 describes hedgerows on the roadsides (H1, H2, H6 and H7 in that report) located on all sides of RAF Croughton as species rich and important under the Hedgerow Regulations, 1997, and are considered of up to district ecological importance. A strip of scrub with trees, H8, between the arable field and unimproved grassland was species-poor, dominated by hawthorn with field maple, damson (Prunus domestica subsp. Insititia), blackthorn and elder frequent. Recently planted hedgerows (H10 to H12 in that report) located around the fields inside the perimeter fence have been planted with a good selection of native species including wayfaring tree (Viburnum lantana), field maple, guelder rose, hazel and hawthorn. Recently planted hedgerows are not included in the Hedgerow Regulations, 1997. All other hedgerows were species-poor, with few associated features used in the Hedgerow Regulations 1997, and would therefore not be considered 'Important hedgerows' under the Hedgerow Regulations, 1997.

Areas of unimproved neutral grassland are located within a land parcel to the south of the boundary fence and between Croughton Brook and the northern boundary fence. The MWH 2011 survey reported that the grassland was moderately species-rich, with an average of 12 species per quadrat and range of 4 to 29 species per quadrat. Indicator species present included bird's-foot trefoil, lady's bedstraw and field scabious. Based on the species composition the NVC community was MG5b Centaureo – Cynosuetum cristaii grassland, Galium verum sub-community.

The NVC community for the less diverse areas with high cover of false oat-grass (Arrhenatherum elatius) was MG1a Arrhenatherum elatius grassland, Festuca rubra sub-community. This grassland is typical of grassland cut once a year and was still present at the time of the 2017 phase 1 survey.

An area of ephemeral / short perennial pioneer plants, such as knotgrass (Polygonum aviculare), scarlet pimpernel (Anagallis arvensis), and prickly sow-thistle (Sonchus asper) were noted in the MWH report as having colonised the old firing range. Based on the species present, the NVC community was OV18, typical of disturbed and moderately trampled areas on tracks and recreational areas. This area was not indicated on any plans within the 2011 report and was not observed during the 2017 phase 1 survey.

Arable margins were surveyed and described by MWH in the 2011 report. The margins of the arable land varied from 0m to 3m. Arable weeds located along the margins of the arable fields included common poppy (Papaver rhoeas), scentless mayweed (Tripleurospermum inodorum), field forget-me-not (Myosotis arvensis), prickly sow-thistle, parsley-piert (Aphanes arvensis) and common field speedwell (Veronica persica). Based on the species present, the NVC community was OV7 Veronica persica – Veronica polita community, which is typical of cereal and annual field crops in lowland Britain.

Ponds are present within the Conservation area however these were dry at the time of the 2017 phase 1 survey. The vegetation was dominated by common reedmace (Typha latifolia) with a mixture of branched bur-reed (Sparganium erectum), water plantain (Alisma plantago-aquatica) and water mint (Mentha aquatica). The MWH 2011 reports notes that the NVC community is therefore S12c Typha latifolia swamp Alisma plantago-aquatica sub-community. The area has potential to support a diverse array of wetland species and is therefore considered to be of district value for nature conservation.

One stream, Croughton Brook, flows west within the boundary of the base. Flow was low at the time of the 2017 Phase 1 survey and 2018 water vole surveys. Bank vegetation is dominated by false oat-grass and great willowherb (Epilobium hirsutum) with locally abundant fool's water-cress (Apium nodiflorum) in the channel. The flowing water habitat is considered to be of district value for nature conservation.

Management recommendations are within Section 8 of the INCRMP.

RAF Barford St John

Improved Grounds: Phase 1 habitats present within the Base include amenity grassland (improved grounds), and scrub, neutral grassland, ephemeral/short perennial, broadleaved woodland, scattered trees, running water and hedgerows (unimproved grounds). The amenity grassland was species-poor and maintained regularly by cutting. It has very little value for invertebrates or larger animals and can easily be replaced. Therefore, is of ecological value within the immediate zone of influence only.

Un-improved Grounds: The majority of RAF Barford St John comprises sheep-grazed grassland. The grasslands are improved, with a range of grass species present, but few herbs - typical of re-seeded grasslands. Species present include; crested dog's-tail (Cynosurus cristatus), false oat-grass, perennial rye-grass, common bent, common mouse-ear (Cerastium fontanum), daisy (Bellis perennis), creeping buttercup (Ranunculus repens), white clover and creeping cinquefoil (Potentilla reptans). Patches of tall ruderal vegetation are present within some of the fields, dominated by common nettle but with creeping thistle (Cirsium arvense) also present. Within fenced-off areas around the aerials the grassland is not grazed and has grown rank. Neutral grassland had low botanical species diversity but was used by a variety of bird species including corn bunting. It is considered to be of local ecological importance.

Scattered scrub is present within and adjacent to the disused tracks and runways throughout the Base. Small areas of dense/continuous scrub are present along the boundary. Species present include elder, hawthorn, grey willow (Salix cinerea), rose (Rosa sp.), bramble and blackthorn.

Hedgerows are present along sections of the boundary. Many are defunct, some are intact, and some have mature trees. Woody species present include; hawthorn, blackthorn, elder, ash, sycamore and apple (Malus sp.).

Scattered trees are present within areas of scrub and hedgerows, and groups of scattered trees are present within the south-western corner of the Base. Species present include ash, oak (Quercus sp.), apple, sycamore, lime (Tilia sp.) and horse-chestnut.

Areas of scrub, scattered trees and hedgerows comprised common species with little ground flora, but provided habitat for foraging/commuting bats, badger setts and bird species. Some of the trees had potential to support roosting bats. These habitats were therefore considered to be of up to district ecological importance.

The disused tracks and runways have become colonized by ephemeral/short perennial vegetation. A mixture of annual species, tall ruderal vegetation, grasses, moss and lichen are present, including; stonecrop (Sedum sp.), common sorrel (Rumex acetosa), cat's-ear (Hypochaeris sp.), shepherd's purse (Capsella bursa-pastoris), yarrow (Achillea millefolium), self-heal (Prunella vulgaris) and ragwort (Senecio sp). The disused runways supported moderately diverse communities of ephemeral/short perennial vegetation, which have the potential to support notable species. They are therefore considered to be of local ecological value.

A couple of small areas of mature semi-natural broadleaved woodland are present within the north-western part of the Base and along the south eastern boundary. A section of linear plantation woodland is present along the western boundary. Species present include ash and sycamore. Broadleaved woodland had low species diversity and lacked any ancient woodland ground flora indicator species. However, the woodland edges were used by breeding tree sparrows and commuting/foraging bats and so were considered to be of up to district ecological value. An active badger sett and trees with bat roost potential were present within the area of woodland in the north western part of the Base. This area was therefore considered to be of district ecological value.

A brook runs along a small section of the northern boundary. It is approximately 1m wide and was silted up and had very little flow at the time of survey. The brook along the northern boundary had no marginal or aquatic vegetation, was unsuitable for water vole, otter and white-clawed crayfish, and was unlikely to support high value populations of fish or aquatic invertebrates. It was therefore considered to be importance within the immediate zone of influence only.

Management recommendations are within Section 8 of the INCRMP.

RAF Fairford

Phase 1 habitats present on site included amenity grassland and introduced shrubs (improved grounds), plantation woodland, scattered parkland trees and neutral grassland (semi-improved grounds) and scrub, standing water, running water and hedgerows (unimproved ground). The locations of the habitats are shown in Appendix D, Figure 3.

Improved Grounds: The MWH 2011 survey describes the amenity grassland as generally species-poor dominated by grasses such as perennial rye-grass, red fescue, cock's-foot, common bent and Yorkshire fog (Holcus lanatus). The commonest herbs included white clover, bulbous buttercup (Ranunculus bulbosus), bird's-foot trefoil, dandelion (Taraxacum officinale agg.), ribwort plantain (Plantago lanceolata) and yarrow. Based on the species present the NVC category was OV23a Lolium perenne – Dactylis glomerata community, typical sub-community which is characteristic of re-sown areas that are regularly mown. A variety of introduced shrubs have been planted around the buildings and were still present during the 2017 Phase 1 survey.

There was no evidence of any change recorded in the 2017 phase 1 survey. The improved grounds were species-poor with no associated protected species and could easily be replaced. Therefore, they were considered to be of low local ecological importance.

Semi-improved Grounds: Three plantation woodlands are present, as recorded by the MWH 2011 survey. One is located adjacent to the sports area (W1) and another is in the North East Loop adjacent to the eastern perimeter fence (W2). These were described as not a good fit to any of the NVC communities based on the composition of the flora. The natural woodland in this area would be W10a Quercus robur – Pteridium aquilinum – Rubus fruticosus woodland, typical sub-community. The canopy of these plantations was of variable age, approximately 15m in height and cover of 75% allowing light to penetrate to the ground layer. Species present included ash (Fraxinus excelsior) and pedunculate oak (Quercus robur). There was no under-storey and the ground flora was species-poor, dominated by grasses with no notable ancient woodland indicator species (Rose, 1999) present. A few bluebells were present in spring. Regeneration was poor with the presence of few ash seedlings and it is unlikely that the number of seedlings present would improve the age structure over a 10-year period. The woodland is managed with no standing or fallen dead wood. Woodlands W1 and W2 and the adjacent recreational area were used by foraging bats and birds including lesser-spotted woodpeckers (Birds of Conservation Concern 4 (BOCC4) BOCC4 Red-listed species). Bluebells were present in the ground flora and therefore the woodland habitats were considered to be of Local ecological importance.

The canopy of the third plantation woodland (W3) was described by MWH (2011) as approximately 16m high comprising white poplar (Populus alba), Lombardy poplar (Populus nigra 'Italica'), Leyland cypress, rowan (Sorbus aucuparia) and pedunculate oak. The sparse under-storey consisted of hawthorn and elder, and the ground flora was poor as very little light reached the ground. There were no notable species present although lords and ladies (Arum maculatum) was present in the adjacent hedgerow. There was one fallen dead tree left to rot. The woodland species are not native but have the potential to provide shelter and foraging opportunities for fauna and nesting birds, and the woodland is therefore classed as being of moderate local ecological importance. Woodland W3 was species-poor and the extent to which it was used by foraging bats was limited. Therefore, it was considered to be of Local ecological value.

Scattered parkland trees located in the residential areas and between many of the buildings include silver birch (Betula pendula), wild cherry (Prunus avium), Norway maple, Swedish whitebeam (Sorbus intermedia), field maple and laburnum (Laburnum anagyroides). Parkland and scattered trees were important feeding areas for birds including song thrush and starling (BOCC4 Red-listed species) and therefore were considered to be of Local ecological importance.

The MWH 2011 survey found that the majority of the neutral grassland across the airfield was moderately species rich with an average of 12 species per 2x2m quadrat, and range of 8 to 16 species. Species present included common bent, perennial rye-grass, crested dog's-tail (Cynosurus cristatus), red fescue, cock's-foot, bulbous buttercup, bird's-foot trefoil, ribwort plantain, lady's bedstraw, red clover (Trifolium pretense), black knapweed (Centaurea nigra), meadow vetchling (Lathyrus pratensis) and field scabious. There were no negative indicator species present such as creeping thistle and rank grasses such as false oat-grass were rare. Large numbers of bee orchid (Ophrys apifera) are present to the south of Base Lake. Based on the species composition the NVC community for was MG5b Centaureo – Cynosuetum cristaii grassland, Galium verum sub-community. This grassland community is typical of base rich brown earth soils with a management regime of regular cutting in the summer.

No evidence of any change was noted during the 2017 phase 1 survey. Areas of semi-improved neutral grassland were moderately species-rich and used by brown hare (Lepus europaeus) and were considered to be of local ecological value. Grassland within 250m of Ponds 1, 2, 3 and 4 was considered to be of District ecological value due to the presence of great crested newts (Triturus cristatus).

Unimproved Grounds: Scrub was described in the MWH 2011 report as follows: The area of dense scrub with trees around the Base Lake was of variable height comprising ash, silver birch, hornbeam, crack willow (Salix fragilis), grey willow, blackthorn, hawthorn, buckthorn (Rhamnus catharticus), dog rose (Rosa canina), bramble and wild privet (Ligustrum vulgare). Based on the species composition no NVC category was attributed to this community as it was an intermediate stage between the succession from scrub to woodland.

Scattered scrub and immature trees to the south of South East Loop is mostly of low height (<5m) and comprises a variety of species with hawthorn, rose and ash most abundant.

No evidence of any change was noted during the 2017 phase 1 survey. The dense scrub was widely used by small birds for feeding and for singing perches, and was used by various protected species including great crested newt, grass snake, badger and foraging bats. Therefore, it was considered to be of District conservation value.

Botanical surveys reported in MWH 2011 noted that the fields west and north west of the Base Lake and the area south of South East Loop are not managed by cutting or grazing and rank grassland community, MG1a Arrhenatherum elatius grassland, Festuca rubra sub-community has developed. The areas were dominated by coarse grasses including false oat-grass and cocksfoot, with other species including red fescue, great burnet (Sanguisorba officinalis), lady's bedstraw, pyramidal orchid (Anacamptis pyramidalis), fairy flax (Linum catharticum), lady's mantle (Alchemilla mollis), meadow vetchling (Lathyrus pratensis) and creeping cinquefoil (Potentilla reptans). Weedy species present included dock (Rumex obtusifolius) and creeping thistle. The composition of the flora was less species rich than the MG5 grassland with an average of 7 species per 2x2m quadrat and a range of 4 to 11 species.

No evidence of any change was noted during the 2017 phase 1 survey. The neutral grassland around the Base Lake and in the adjacent field was important for birds, grass snake and great crested newts. The neutral grassland south of South East Loop contained a badger sett and could potentially be used by reptiles. These areas were therefore considered to be of District ecological importance.

Standing water comprised three EWS tanks, three ponds (located in South West Loop, contractors' compound and field adjacent to the Base Lake), the Base Lake and the overflow pond adjacent to the Base Lake. The EWS tanks were lined concrete "ponds". Only one (Pond 3) had any aquatic vegetation.

Wetland vegetation has colonized the margins of the ponds in the South West Loop. Species recorded by the 2011 MWH report included hard rush (Juncus inflexus), false fox sedge (Carex otrubae), lesser reedmace (Typha angustifolia), water plantain (Alisma plantago-aquatica) and a stonewort (Chara globularis). Based on the limited number of species present the NVC community for the submerged community was A11 Potamogeton pectinatus - Myriophyllum spicatum sub community.

The pond in the constructors' compound is well vegetated with marginal vegetation comprising hard rush, false fox sedge, common spike rush (Eleocharis palustris), water mint and yellow flag (Iris pseudacorus). Himalayan balsam (Impatiens glandulifera), an invasive species listed on Schedule 9 of the Wildlife and Countryside Act, was present nearby. The MWH 2011 report assessed the NVC community to be S12 Typha latifolia swamp, with two sub-communities; S12a pure stand, and S12b Mentha aquatica sub-community.

The margins of the pond in the field adjacent to the Base Lake were well-vegetated. Species present around the margins of the lake included hard rush, common spike-rush, water mint, reedmace and greater pond sedge (Carex riparia). White water-lily (Nymphaea alba) was present within the pond The MWH 2011 report assessed the NVC community to be S12 Typha latifolia swamp, with two sub communities; S12a pure stand, and S12b Mentha aquatica sub-community. The area of white water-lily was NVC community A7a Nymphaea alba community, species-poor sub community.

Approximately 70% of the Base Lake margins were covered with scrub and trees, marginal vegetation was locally abundant and submerged vegetation was frequent. The trees and scrub are described in the scrub section above. The marginal vegetation comprised hard rush, false fox-sedge, water mint, reedmace, glaucous sedge (Carex flacca), meadowsweet (Filipendula ulmaria), purple loosestrife (Lythrum salicaria) and soft rush (Juncus effusus). In summer, the overflow pond dries to a narrow strip of water adjacent to the path. Marginal vegetation comprises water mint, gypsywort (Lycopus europaeus), meadowsweet and soft rush. Submerged and floating species included water milfoil (Myriophylum spicata) and white water-lily. The MWH 2011 report assessed the NVC communities to be the submerged community A11 Potamogeton pectinatus - Myriophyllum spicatum sub-community and the marginal NVC community was S12 Typha latifolia swamp with two sub communities S12a pure stand and S12b Mentha aquatic sub-community. The area of white water-lily in the overflow pond was NVC community A7a Nymphaea alba community, species-poor sub community.

Ponds 1, 2, 3, 4 and 6 were used by great crested newts and important for the metapopulation. They were therefore considered to be of District ecological value. The Base Lake and its overflow pond contained diverse communities of aquatic invertebrates (in terms of habitat suitability for great crested newts) and were used by other wildlife including birds, fish and smooth newts, and were therefore considered to be of district ecological value. Pond 5 supported a population of smooth newts but contained little aquatic flora and invertebrates, and was therefore considered to be of Local ecological importance.

Wash pool Lane Drain flows into RAF Fairford along the boundary fence in the North East Loop, is culverted under the runway and flows off base at Gate 7 interceptor. The bank sides are steep and vegetated with grassland species. In-channel vegetation comprised branched bur-reed, floating sweet-grass (Glyceria fluitans), fool's watercress (Apium nodiflorum) and meadowsweet. The MWH 2011 report assessed the NVC community to be S26b Phragmites australis - Urtica dioica community Arrhenatherum elatius sub-community. There is anecdotal evidence of water vole in Wash pool Lane Drain (access to survey has not been possible due to water depth and security fencing), and therefore it was considered to be of moderate to District ecological importance.

Himalayan Balsam, an invasive species listed on Schedule 9 of the Wildlife and Countryside Act, was located in the section of drain beside woodland W3, at the eastern end of the runway.

MWH (2011) reports hedgerow surveys as follows:

Hedgerow H1 was unmanaged, approximately 4m in height by 4m wide and comprised ash, crab apple (Malus sylvestris) and damson trees, hawthorn, hazel, and elder woody species. Hedgerow H1 contained 7 woody species with no associated features and would be considered Important under the Hedgerow Regulations.

Hedgerow H2 was unmanaged approximately 4m in height by 4m wide and comprised hawthorn, blackthorn, elder, buckthorn and guelder rose.

Hedgerow H3 along Wash pool Lane Drain in the North East Loop was unmanaged, approximately 4m in height by 4m wide and comprised crab apple trees, wych elm (Ulmus glabra), hawthorn, elder and guelder rose woody species. Some of the dead elm trees have been left standing and two woodland species, lords and ladies and wood false-brome (Brachypodium sylvaticum) were present within 1m of the base of the hedgerow.

Species-poor hawthorn hedgerows, approximately 1m high by 1m wide, were located adjacent to the access road (H6) and around the recreational area south of the residential area (H7).

Hedgerow H2 contained 4 woody species with no associated features and hedgerow H3 contained 5 woody species with no associated features. Hedgerows H6 and H7 were species-poor hawthorn hedgerows, located adjacent to the access road and around the recreational area south of the residential area. They had no associated features as listed in the Hedgerow Regulations. Therefore, these hedgerows would not be considered Important under the Hedgerow Regulations.

Ephemeral/short perennial habitat is located in the South East Loop and South West Loop. Species present include stonecrop. Undeveloped Land is a pioneer community on disturbed ground and very quickly develops into grassland and scrub, therefore considered to be of ecological importance within the immediate zone of influence.

Management recommendations are within Section 8 of the INCRMP.

RAF Welford: RAF Welford comprises three areas of ancient woodland, an extensive munitions storage area with short managed grassland, two grassland fields and one arable field, a sports area and short-mown amenity grassland with scattered trees around the buildings.

Improved Grounds. The amenity grassland was generally species-poor dominated by grasses such as perennial rye-grass, red fescue, creeping bent, cock's-foot and Yorkshire fog. The commonest herbs included bird's-foot trefoil, creeping buttercup, dandelion, common cat's-ear, white clover and ribwort plantain.

Based on the species present the NVC category is OV23a Lolium perenne – Dactylis glomerata community, typical sub-community, which is characteristic of re-sown areas that are regularly mown. The amenity grasslands were species-poor with no associated protected species and could easily be replaced. Therefore, considered to be of ecological importance within the immediate zone of influence.

A variety of introduced shrubs have been planted around the buildings and were non-native landscape features of ecological value within the immediate zone of influence.

Semi-improved Grounds. Parkland has a mixture of woodland and grassland attributes.

The ground flora in the parkland areas labelled P1 and P2 in Appendix E Figure 3, within the munitions area, did not include any ancient woodland indicator species. The trees included mature pedunculate oak approximately 20m in height with trunk diameters of 950mm and young field maple approximately 5m in height and trunk diameter 100mm.

Parkland P3 and P4, within the munitions area, had many of the characteristics of ancient woodland including ancient woodland indicator plants such as pignut (Conopodium majus), primroses (Primula vulgaris) and bluebells in the ground flora. The canopy, approximately 20m high, comprised pedunculate oak and silver birch.

Parkland P5, outside and adjacent to the entrance gate and P6 inside and near the entrance gate comprised a variety of native and non-native trees scattered in amenity grassland. There was a good age-structure including large mature and young oak trees. The ground flora was similar to the amenity grassland elsewhere on the base.

Parkland P7 and P8, within the ancient woodland (W1) comprised wild cherry, sycamore and horse chestnut in moderately species-rich grassland. Ground flora species included; tufted hair-grass (Deschampsia cespitosa), cock's-foot, red fescue, Dyer's greenweed (Genista tinctoria), bracken (Pteridium aquilinum) and germander speedwell (Veronica chamaedrys).

The parkland (P3 and P4, Munitions area) with ancient woodland indicator species in the flora, including bluebells, would be difficult to replace. Several of the trees in parkland P7 were large mature oaks which would also be difficult to replace. Therefore, areas P3, P4 and P7 they were considered to be of District ecological value. The remaining parkland could easily be replaced but was utilized by feeding and breeding birds and foraging bats. Therefore, they were considered to be of Local ecological importance

The majority of the neutral grassland was moderately species rich with an average of 10 species per 2x2m quadrat, and range of 4 to 21 species. Species present included creeping bent, perennial rye-grass, crested dog's-tail, red fescue, bird's-foot trefoil, field scabious, eyebright (Euphrasia officinalis agg.), pepper saxifrage (Silaum silaus), mouse-ear hawkweed (Hieracium pilosella), black medick, cowslip, sheep's sorrel (Rumex acetosella), ribwort plantain, lady's bedstraw and red clover. There were no negative indicator species present such as creeping thistle, and rank grasses such as false oat-grass were rare. Based on the species composition the NVC community for was MG5b Centaureo – Cynosuetum cristaii grassland, Galium verum sub-community. This grassland community is typical of base rich brown earth soils with a management regime of regular cutting in the summer.

The field between woodland W1 and the munitions area is cut less frequently and contains more rank grasses such as cock's-foot and false oat-grass. Based on the species composition the NVC community for was MG1a Arrhenatherum elatius grassland – Festuca rubra sub community.

The neutral grassland in the munitions area was utilized by breeding birds of Conservation Concern (BOCC4 Red and Amber-listed) including curlew and skylark. The area used for breeding may be different each year and therefore all the grassland in the munitions area was considered local ecological importance.

Hedgerow H1, located around the Priory grounds, was approximately 1.5m high and 0.5m wide. It was species-poor with no gaps, comprising beech, cotoneaster (Cotoneaster sp.) and laurel (Prunus laurocerasus). There were no standard trees within the hedgerow.

Hedgerow H2, located around the orchard adjacent to the Priory, was approximately 2m high and 1m wide, comprising hawthorn and damson. It was species-poor with no gaps, and had no standard trees associated with it.

Hedgerow H3, located along the boundary of the field adjacent to the access gate, was approximately 2m high and 1m wide. It was dominated by hawthorn with no gaps.

The short laurel hedgerow (H4) adjacent to the old housing area was approximately 2.5m high and 1m wide. There were no gaps or standard trees associated with it.

No hedgerows would be classed as important under the hedgerow regulations and very little bird activity was associated with them. They could easily be replaced and therefore were considered of ecological importance within the immediate zone of influence.

The orchard comprised old apple, plum (Prunus sp.), pear (Pyrus sp.) and cherry trees that were healthy and structurally sound. The ground flora was similar to the amenity grassland flora. The orchard adjacent to the priory may have rare varieties of fruit trees and was therefore considered to be of Local ecological importance.

Unimproved Grounds

The woodland's open canopy was approximately 20m in height and comprised field maple, pedunculate oak and ash Fraxinus excelsior. The under-storey was dominated by hazel which has been coppiced in the past, but now is unmanaged with a height of approximately 8m and cover of 50-80% of the total stand. Bluebells were constant, dog's mercury (Mercurialis perennis) frequent and wood sorrel (Oxalis acetosella) occasional components of the ground flora. There were at least two notable species present at each stop and six within the stand as a whole. The notable species list was derived from the ancient woodland indicator species list described by Rose (1999).

Based on the composition of the flora, the NVC community was W10 Quercus robur – Pteridium aquilinum – Rubus fruticosus woodland, typical sub-community.

The woodland is not intrusively managed or disturbed on a regular basis and brashings / felled trees have been left on site to give fallen dead wood. There were also several dead trees left standing. Regeneration potential was poor. Ash, silver birch and hawthorn seedlings were locally abundant and several saplings were present. Oak seedlings were present in the adjacent grassland but not seen in the woodland.

The canopy, under-storey and ground flora comprised native species that was healthy and not excessively browsed by the deer. The woodland is on the Ancient Woodland Register and is designated as a non-statutory LWS. It is therefore of county importance for nature conservation. Ancient woodland is defined as woodland that has been woodland since AD1600, which is the time the first reasonably accurate estate maps were drawn.

Active summer bat roosts have been recorded in the priory and building 39. The hibernation bunker (air raid shelter 8) has also been recorded as an active bat roost (MWH, 2011). Therefore, the buildings with bat roosts were considered to be of district ecological importance.

A population of smooth newts has previously been recorded within the EWS tanks (MWH, 2011). Therefore, the waterbodies were considered to be of Local ecological value.

Management recommendations are within Section 8 of the INCRMP.

2.3.2.3 Future Vegetation Cover

2.3.2.4 Turf and Landscaped Areas

Installation Supplement

Developed areas on the bases are typically landscaped with a variety of turf grasses, ground covers, shrubs and tree species. Most of these vegetative types are non- native horticultural species that are used for ornamental purposes.

2.3.3 Fish and Wildlife

Installation Supplement

The locations of individuals, signs and activity of protected species seen are shown on the Protected Species Map, Figure 5 for each of the Bases (Appendices B, C, D and E).

RAF Croughton

Amphibians: There are no historical amphibian records within 2km of the Base. MWH did not undertake great crested newt surveys for ponds on adjacent properties in 2010, but noted the potential for them to be present. The ponds on the adjacent properties were not surveyed in 2018 but may support great crested newts.

Badger: Northamptonshire Biological Records Centre (NBRC) provided three badger records within 2km of the Base, including a record at the Base entrance, recorded in 2005, and a record within the Base, recorded in 2001. Surveys undertaken by MWH in 2010, showed large active badger setts were located in the scrub south of the perimeter fence and on the footpath north of the perimeter fence. A small, active, annex sett was located in the conservation area. Feeding signs were seen in the adjacent scrub and grassland. Latrines were only seen near the badger sett south of the Base.

The 2017 survey confirmed that an active badger sett is located in the conservation area north of the perimeter fence, shown on the Protected Species Map, Appendix B Figure 5. The area of scrub and rough grassland south of the perimeter fence could not be accessed at the time of the survey.

Bats: NBRC do not provide data for bats. Bat records from Northamptonshire Bat Group were obtained by MWH in 2010. Twelve species of bats have been recorded in the county of Northamptonshire. One of the largest Natterer's bat roosts in the UK is located near Brackley. Several pipistrelle bat roosts are known to be present in Croughton and Evenley Villages. Other species with roosts in Croughton Village include brown long-eared bats, whiskered bats, barbastelle bats and lesser horseshoe bats.

Surveys undertaken by MWH in 2010 recorded a small pipistrelle roost (2 bats) within a tree on the northern boundary of the Base, and commuting routes along the roads adjacent to the boundary of the Base.

Activity surveys and automated detector surveys in 2017-2018 recorded a total of at least 6 species using the site including common Pipistrelle bat, Noctule, Leisler's bat, soprano pipistrelle, Myotis species and brown long-eared bat.

The six species recorded on the base in 2017/2018 are widespread and occurred in typical abundance for the type of habitat present. There was no evidence of large or particularly important roosts or feeding areas. The bat population here is considered to be of Local importance for bats.

Birds (breeding): The survey site provides a variety of nesting opportunities and foraging habitat for breeding bird species. The field boundary habitats provide forage and shelter, while the open fields/ grassland are a source of soil invertebrate prey. Forty-six species were recorded using the site's fields and boundary habitats.

In terms of distribution of bird populations, the breeding birds recorded were spread fairly evenly around the site, although as would be expected, there were concentrations of woodland bird species within the blocks of woodland, scrub and hedgerow habitats along the northern and western site boundaries, and farmland bird species such as skylark, linnet and curlew spread across the grassland present throughout the central and southern parts of the site.

None of the bird species recorded are considered to be uncommon or rare in the county, but 15 species considered to be 'notable' were recorded – ten of these are considered to 'probably breed', and four to 'possibly breed' on the site.

The notable species records considered of greatest importance are as follows:

- Curlew (BOCC4 Red-listed species/ Species of Principal Importance (SPI))
- House martin (BOCC4 Amber-listed species)
- Linnet (BOCC4 Red-listed species/ SPI)
- Red kite (WCA Schedule 1 species)
- Skylark (BOCC4 Red-listed species/SPI)
- Song thrush (BOCC4 Red-listed species/SPI)
- Starling (BOCC4 Red-listed species/SPI)
- Bullfinch (BOCC4 Amber-listed species/SPI)
- Stock dove (BOCC4 Amber-listed species)
- Yellowhammer (BOCC4 Red-listed species/SPI)

Other species of interest included the following:

- Presence of barn owls (WCA Schedule 1 species) on site – four/five birds had reportedly been observed in 2018 by the Fireman hunting across the open grassland areas in the vicinity of the Fire Department building.
- Wheatear possibly breeding on site.
- A buzzard nest was also reported as occurring within mature trees along the southern site boundary.

Overall the breeding bird surveys did not record any species which are very unusual in a National context, and did not observe any exceptionally high species counts, however good counts of a reasonable diversity of notable species were recorded, and a moderately high diversity of species was recorded overall. The survey results therefore suggest that although the site is only currently of value at the Local level of importance (i.e. below County level) for breeding birds, it is a good example of this category which is likely to be of importance to breeding birds in the surrounding area; especially if curlew manage to successfully breed on site.

Considering the size of the data set and broad similarity in the numbers of species recorded, numbers of notable species and changes in numbers, a greater number of species have increased in numbers since 2011 than have decreased and a greater diversity of species overall was recorded in 2018 perhaps indicating that conditions on site are more favorable for breeding birds than in the years leading up to 2011 (caution must be exercised when concluding this however as a more robust body of bird survey data would generally be required to give a conclusive account of this situation).

Birds (wintering): The survey site provides a variety of suitable foraging habitat for wintering bird species. The field boundary habitats provide forage and shelter, while the open fields are a source of soil invertebrate prey. Twenty-nine species were recorded in 2017 using the site fields and boundary habitats.

In terms of distribution of bird populations, the wintering birds recorded were spread fairly evenly around the site, with no sectors of the overall site obvious 'hot-spots' for birds. In terms of habitats, birds were concentrated within boundary features such as hedgerows and scrub/ trees along the site perimeter boundary.

None of the bird species recorded are considered to be uncommon or rare in the county, but 13 species considered to be 'notable' were recorded. Some wintering species recorded are notable because of their conservation status as rare breeding species (fieldfare and redwing). The notable species records considered of greatest importance are as follows:

- Bullfinch (BOCC4 Amber-listed species/SPI).
- Dunnock (BOCC4 Amber-listed species/SPI).
- Mistle thrush (BOCC4 Red-listed species).
- Red kite (WCA Schedule 1 species).
- Skylark (BOCC4 Red-listed species/SPI).
- Song thrush (BOCC4 Red-listed species/SPI).
- Starling (BOCC4 Red-listed species/SPI).

Overall the wintering bird surveys did not record any unusual species and did not observe any exceptionally high species counts. The survey results, including the relatively low number of species recorded, suggest that the site is only currently of Local value for wintering birds.

A total of 25 species of bird seen on RAF Croughton during a previous winter bird survey undertaken in 2011 (MWH, 2011). Of these 5 were BOCC4 Red-listed species (house sparrow, tree sparrow, yellowhammer, fieldfare, and redwing), 4 were BOCC4 Amber-listed (black-headed gull, kestrel, lesser black-backed gull and mallard) birds of conservation concern, and 3 were NERC S.41 SPI.

The current 2017 survey recorded 29 species of which 13 were notable (7 red-listed, 5 amber-listed BOCC4 species, one WCA Schedule 1 species and 6 NERC S.41 SPI). Comparing the numbers recorded for all species between the two years, 13 species show decreased numbers, 17 show an increase and 2 had the same numbers recorded.

Considering the size of the data set and broad similarity in the numbers of species recorded, numbers of notable species and changes in numbers, there is no evidence of any significant change in bird diversity and level of conservation value between the two years.

Dormouse: No dormouse records were provided by NBRC within 2km of the Base and no surveys have been undertaken.

Fish: NBRC provided no records of fish within 2km of the Base and no surveys have been undertaken.

Invertebrates: Numerous records of notable invertebrates within 2km of the Base were provided by NBRC, including a record of the beetle (Harpalus schaubergerianus) within the Base, recorded in 2001. Six-spot burnet moths (Zygaena filipendulae) and brimstone (Gonepteryx rhamni), marbled white (Melanargia galathea), large white (Pieris brassicae), small white (Pieris rapae), meadow brown (Maniola jurtina), small skipper (Thymelicus sylvestris), peacock (Aglais io), small heath (Coenonympha pamphilus), small tortoiseshell (Aglais urticae) and common blue (Polyommatus Icarus) butterflies were recorded within the Base during surveys undertaken by MWH in 2010. No surveys were undertaken in 2017/2018.

Invasive Species: NBRC provided records of rhododendron (Rhododendron sp.), signal crayfish and American mink within 2km of the Base, the most recent recorded in 2008, the nearest approximately 1.1km from the Base. No invasive species have been recorded within the Base during surveys undertaken in 2010 or 2017/2018.

Otter: No otter records were provided by NBRC within 2km of the Base and no evidence of the species has been recorded.

Reptiles: NBRC provided one record of grass snake within 2km of the Base, recorded approximately 1km from the Base in 2007. No reptiles were recorded within the Base during surveys undertaken by MWH in 2010. Low numbers of grass snake were observed during the 2018 survey visits. As such the reptile population is considered of Local value.

Water Voles: Three water vole records within 2km of the Base were provided by NBRC, including two records within the Base, recorded in 2001 and 2004. MWH recorded water vole latrines within Croughton Brook within the Base during surveys undertaken in 2010.

No evidence of water vole was observed during either 2018 survey visit. However, it is possible that signs were washed away by high water levels prior to the April survey visit. The majority of the brook could not be surveyed due to thick vegetation during the June survey visit. The species will be resurveyed in 2019.

White-clawed Crayfish: No records of white-clawed crayfish within 2km of the Base were provided by NBRC. MWH recorded white-clawed crayfish within Croughton Brook within the Base in 2010. The species will be resurveyed in 2019.

Other Species. NBRC provided three records of NERC S.41 SPI brown hare within 2km of the Base, including a record within the Base recorded in 2001. This species was not recorded within the Base during surveys undertaken by MWH in 2010. Roe deer were frequently observed within the Base during 2017-2018 ecological surveys. Brown hare were not observed within the Base during 2017-2018 ecological surveys.

Management recommendations are within Section 8 of the INCRMP.

RAF Barford St John

Amphibians: Thames Valley Environmental Records Centre (TVERC) provided records of great crested newt within 2km of the Base, the nearest approximately 480m from the Base, recorded in 2015. Records of smooth newt, common frog and common toad were also provided within 2km of Base. The ponds on the adjacent properties were not surveyed but may support great crested newts.

Badger: A few badger records were provided by TVERC within 2km of the Base, the nearest approximately 1.3km from the Base, the most recent recorded in 2003. Three large, active, probable main badger setts are present within the Base, one under the hedgerow along the south eastern boundary, one in an area of tall ruderal and scrub vegetation in the north western part of the Base and one under the edge of a former runway/road in the center east of the Base. A smaller active sett is present within a small area of woodland in the north western part of the Base.

Bats: Records of the following bat species within 2km of the Base were provided by TVERC, the most recent recorded in 2014, the nearest approximately 400m from the Base; common pipistrelle, soprano pipistrelle, Daubenton's bat, whiskered bat, Natterer's bat and Leisler's bat. Common pipistrelle was the only species of bat recorded during the 2017/2018 activity surveys on the base. A total of 985 bat passes were recorded by the Anabat automated detectors over 23 nights between 20th-25th September 2017, 14th- 22nd May and 18th – 25th June 2018. Automated detector surveys revealed a total of at least 5 species across the Base. The static detector recorded passes by all bat species detected during transect surveys as well as calls from at least 5 other species: Leisler's bat, noctule, soprano pipistrelle, Myotis (Brandt's bat/whiskered/Bechstein's bats). This level of species richness is considered typical within the moderately diverse woodland, scrub, hedgerow and grassland habitat on and around site. The bat population here is considered to be of Local importance.

Birds (breeding): Bird records provided by TVERC and BBOWT (2008), including records of the following species within the Base, mostly recorded in 2006 and 2008; corn bunting, yellowhammer, linnet, starling, whitethroat, mistle thrush, fieldfare, wheatear, whinchat, dunnock, yellow wagtail, meadow pipit, swallow, skylark, green woodpecker, swift, stock dove, curlew, snipe, lapwing, golden plover, kestrel and grey partridge.

The survey site provides a variety of nesting opportunities and foraging habitat for breeding bird species. The field boundary habitats provide forage and shelter, while the open fields and grassland are a source of soil invertebrate prey.

Thirty-three species were recorded using the site's fields and boundary habitats in 2018. Based on the survey information obtained 15 of these species were considered to be 'probably breeding' on site, 18 were 'possibly breeding' and no species regarded as 'non-breeding'. Two of the species however, are migrant species (swallow and wheatear) which are perhaps less likely to be breeding on site than the other species listed, and which may have just been passing through on passage when recorded on site.

In terms of distribution of bird populations, the breeding birds recorded were spread fairly evenly around the site, although as would be expected, there were concentrations of woodland bird species within the blocks of woodland, scrub and hedgerow habitats around the site boundaries, and farmland bird species such as skylark, linnet and curlew spread across the grassland present throughout the central and southern parts of the site.

None of the bird species recorded are considered to be uncommon or rare in the county, but ten species considered to be 'notable' were recorded – six of these are considered to probably breed, and four to possibly breed on the site.

The notable species records considered of greatest importance are as follows:

- Corn bunting (BOCC4 Red-listed species/SPI): two birds; comprising a singing male and presumed to be a breeding pair were recorded on the southern site boundary on the second visit. This farmland species is very scarce and declining in much of the country, and is a high conservation priority. Providing conditions suitable for successful breeding should be considered a key management objective.
- Linnet (BOCC4 Red-listed species/SPI): This species was recorded in small groups across the southern part of the site, with a peak count of 18 birds recorded on the second visit. This is another declining species of farmland birds which probably breeds on site.
- Peregrine (WCA Schedule 1 species): one individual of this raptor species was observed on both visits. The bird was seen on each occasion sitting on one of the aerial mast structures, and flying across the site periodically, and extensive evidence was seen of hunting/ feeding activities (dismembered pigeon corpses were spread along the main track in the site near the central building compound).
- Skylark (BOCC4 Red-listed species/SPI): numerous birds were seen on both visits; spread widely across the open grassland habitats covering the site, and a peak count of 19 birds was recorded. This declining farmland species almost certainly breeds on site - providing conditions suitable for successful breeding (this omnivorous ground-nesting bird requires open grassland areas rich in invertebrates, seeds and grains) should be considered a key management objective.
- Song thrush (BOCC4 Red-listed species/SPI): A single bird was seen in hedgerow habitat along the northern site boundary on both visits. This declining farmland bird species is likely to breed on site.
- Starling (BOCC4 Red-listed species/SPI): 30 of these birds were recorded on the second visit; including young fledged birds. This declining farmland bird species may possibly breed on site or nearby.
- Tree sparrow (BOCC4 Red-listed species/SPI): seven individuals were recorded within mature hedgerow habitat on the first survey visit. Territorial behavior and adults carrying food were observed at that time confirming breeding occurring on site. On the

second survey visit, nine birds in total were recorded and included birds assumed to be fledglings within small groups in scrub patches, on that visit they were spread quite widely around the site. This species has become rare in recent decades and this small population may be of high significance locally and should be reported to the local ornithological group. Providing conditions suitable for successful breeding should be considered a key management objective.

- Yellowhammer (BOCC4 Red-listed species/SPI): Three and then two individuals were recorded within scattered scrub close to the southern/ eastern site boundaries – this involved singing territorial males and breeding is assumed to have occurred on site.

Other species of interest:

Wheatear possibly breeding on site - this bird is mainly a transient migrant species across lowland/ southern England but does breed in small numbers in certain areas where there is an adequate area of suitable rough grassland habitat for them. The 2018 breeding bird survey recorded only three birds on the first visit, suggesting these may have just been passage birds stopping over on migration, but it is possible that they did/do stay on and breed on site, but there was no definitive evidence of this. Breeding wheatear occurring at Barford should therefore be considered a possibility (and measures put in place to encourage this, see Section 8).

Generally the breeding bird surveys did not observe any exceptionally high species counts or high species diversity, however good counts of a reasonable diversity of notable species were recorded; including breeding high conservation status species tree sparrow and (probably) breeding corn bunting. The survey results therefore suggest that although the site is only currently of value at the Local level of importance (i.e. below County level) for breeding birds, it is a good example of this category which is likely to be of importance to breeding birds in the surrounding area; especially assuming successful corn bunting and tree sparrow breeding on site.

In summary, the open grassland habitat together with the associated patches of scrub and mature hedgerows supports possible/ probable breeding bird species which are of elevated conservation status such as tree sparrow and corn bunting. These habitats should therefore be managed so as to optimize conditions for the notable breeding bird species which occur here.

Birds (wintering): The survey site provides a variety of suitable foraging habitat for wintering bird species. The field boundary habitats provide forage and shelter, while the open fields are a source of soil invertebrate prey. Twenty-eight species were recorded using the site fields and boundary habitats in 2017.

In terms of distribution of bird populations, the wintering birds recorded were mainly located around the perimeter zone of the site, with the raptor species kestrel, peregrine and buzzard recorded in the central area together with the corvid species carrion crow, jackdaw and magpie and a number of skylarks. The peregrine was seen throughout a large part of the survey visit sitting on aerial masts and moving around the site. Evidence of predation on pigeon species (several remnant carcasses) was found on hard standing areas.

None of the bird species recorded are considered to be uncommon or rare in the county, but 12 species considered to be 'notable' were recorded. Some wintering species recorded are notable because of their conservation status as rare breeding species (fieldfare and redwing). As breeding of these species does not occur in this part of the UK, and the birds recorded are purely winter visitors to the area, the notable status is therefore not directly relevant to this assessment.

The notable species records considered of greatest importance are as follows:

- Linnet (BOCC4 Red-listed species/SPI): This species was recorded in single group located close to the southern site boundary. This is one of a number of declining species of farmland birds present here.
- Meadow pipit (BOCC4 Amber-listed species): 25 meadow pipits were recorded across the site, mainly in two small flocks mixed with other bird species (e.g. pied wagtail, starling). This declining farmland bird species was present in good numbers here in habitat typical for both wintering and breeding meadow pipits.
- Skylark (BOCC4 Red-listed species/SPI): 10 birds were seen, mainly in a small flock in the central part of the site. This declining farmland bird species may potentially remain to breed on site.
- Song thrush (BOCC4 Red-listed species/SPI): A single bird was seen in hedgerow habitat along the northern site boundary. This declining farmland bird species may potentially remain to breed on site.
- Starling (BOCC4 Red-listed species/SPI): 70 of these birds were recorded, mainly in two groups within trees at either end of the site. This declining farmland bird species may potentially remain to breed on site.
- Woodcock (BOCC4 Red-listed species): an unexpected sighting; one individual of this species was observed flying out of scrub cover in the north-west part of the site.
- Yellowhammer (BOCC4 Red-listed species/SPI): Two individuals were recorded within scattered scrub close to the southern site boundary. This declining farmland bird species may potentially remain to breed on site.

Overall the wintering bird surveys did not record any unusual species and did not observe any exceptionally high species counts. The survey results, including the relatively low number of species recorded, suggest that the site is only currently of value at the Local level of importance for wintering birds.

Dormouse: No records of dormouse within 2km of the Base were provided by TVERC and the species was not surveyed.

Fish: TVERC provided records of brown/sea trout and bullhead along the River Swere and Bloxham Brook within 2km of the Base, the most recent recorded in 2014.

Invertebrates: Records of the following invertebrate species within 2km of the Base were provided by TVERC, the most recent recorded in 2004, the nearest approximately 750m from the Base; small heath (Coenonympha pamphilus), wall (Lasiommata megera), variable damselfly (Coenagrion pulchellum), scarce chaser (Libellula fulva), ghost moth (Hepialus humuli), oak hook-tip (Watsonalla binaria), September thorn (Ennomos erosaria), small phoenix (Ecliptopera silaceata), blood-vein (Timandra comae), grey dagger (Acronicta psi), mouse moth (Amphipyra tragopoginis), figure of eight (Diloba caeruleocephala), dot moth (Melanchra persicariae), rosy rustic (Hydraecia micacea), mottled rustic (Caradrina morpheus), buff ermine (Spilarctia luteum), cinnabar (Tyria jacobaeae), the beetle (Hydraena pulchella) and the caddis fly (Hydropsyche saxonica). No surveys were undertaken in 2017/2018.

Invasive Species: TVERC provided records of Canadian waterweed (Elodea canadensis), signal crayfish and the crustacean (Crangonyx pseudogracilis) within 2km of the Base, the most recent recorded in 2016, approximately 1.1km from the Base.

Otter: A few records of otter within 2km of the Base were provided by TVERC, the most recent recorded in 2014, the nearest approximately 700m from the Base. No evidence of otters was observed.

Reptiles: Two records of grass snake within 2km of the Base were provided by TVERC, the most recent recorded in 2008, the nearest approximately 1.1km from the Base. No reptiles were found during any of the 2018 survey visits.

Water Vole: TVERC provided three records of water vole within 2km of the Base, all recorded in 1986, the nearest approximately 700m from the base. No habitat suitable for water vole is present on the site.

White-clawed Crayfish: No records of white-clawed crayfish within 2km of the Base were provided by TVERC and no habitat suitable for this species is present on the site.

Other NERC Act Section 41 Species: TVERC provided records of brown hare, harvest mouse, hedgehog and polecat within 2km of the Base, including a record of brown hare within the Base recorded in 2008. Brown hare were observed in the sheep grazed fields in the middle of the Base in 2017 and 2018 and are of local importance. Harvest mouse, hedgehog and polecat were not observed at the Base in 2017 and 2018.

Management recommendations are within Section 8 of the INCRMP.

RAF Fairford

Amphibians: Gloucestershire Centre for Environmental Records (GCER) provided records of great crested newt within RAF Fairford, the most recent recorded in 2008. Records of smooth newt within RAF Fairford, and records of common frog and common toad within 2km of RAF Fairford, were also provided by GCER. Surveys undertaken by MWH in 2011 found two medium and one large population class sizes of great crested newt within RAF Fairford, as well as five small and one medium population class sizes of smooth newt and presence of common frog.

In 2018 great crested newts were surveyed in eight ponds (locations shown on Figure 4, Appendix D) and recorded in Ponds 1, 2, 3, 4 and 6. Pond 4 had a small population (peak count of individual adult great crested newts on a single survey visit using a single survey method of 1). Ponds 1, 2 and 6 had medium populations (peak counts of 35, 14 and 16 adult great crested newts respectively) and Pond 3 had a large population (peak count of >100 adult great crested newts). The eDNA test results for Ponds 7 and 8 came back negative.

Badger: Four badger records within 2km of RAF Fairford were provided by GCER, the most recent recorded in 2015. Surveys undertaken by MWH in 2011 found active badger setts located on the adjacent property west of the Base Lake, at the southern tip of the South East Loop and in the south west corner of Site 16 (artificial sett). Feeding signs were seen in the adjacent grassland areas. Latrines were located near the entrance to the field adjacent to the Base Lake and along the fence line between Sites 15 and 16.

Surveys in 2017 confirmed two active badger setts are located along the boundary fence-line near North East Loop. Another active sett is located within the area of scrub to the south of South East Loop. The artificial sett within Area 15 did not show any evidence of recent use by badgers at the time of the 2017 surveys, however a small sett with at least three active entrances was present within Area 16.

Bats: Records of common pipistrelle, soprano pipistrelle, brown long-eared bat, noctule, serotine, natterer's bat, barbastelle, greater horseshoe and Daubenton's bat within 2km of RAF Fairford were provided by GCER, the nearest along the boundary of the constructor's compound, and the most recent recorded in 2016. Surveys undertaken by MWH in 2011 found that the important features on site used by bats for foraging are the woodland around the tennis courts, the Base Lake and the constructors' area. They were also using the hedgerows between Fairford Village and the base as commuting routes. There are numerous water filled gravel pits in the area which will also be used by foraging bats.

The results of the 2017-2018 bat activity surveys recorded common and soprano pipistrelle bats foraging along trees and hedgerow south west of South East Loop, in woodland north of hangars, around the Constructors Compound, east of South West Loop, north of Base Lake, foraging along hedgerows and along the drain east of North East Loop. Automated detector surveys revealed a total of at least five species across the Base. The static detector recorded passes by all bat species detected during transect surveys as well as additional species: Noctule, serotine, Leisler's group (likely Leisler's bat, noctule, and Serotine or an unusual call of Leisler's bat), Brandt's and Barbastelle. This level of species richness is considered low within the moderately diverse grassland, woodland, scrub, hedgerow and wetland habitat on and around site.

Birds (breeding): GCER provided roughly 2000 bird records within 2km of RAF Fairford, including records of starling, mistle thrush, mallard, cuckoo, turtle dove, hobby, red kite and tree sparrow within RAF Fairford, the most recent record dating from 2015. A large nest present in a water tower on the Base is reported to be that of raven (Corvus corax).

Breeding bird survey 2018 - The Base was found to provide a variety of nesting opportunities and foraging habitat for breeding bird species. The field boundary woodland and scrub habitats provide forage and shelter, the open fields and grassland are a source of soil invertebrate prey, and the wetland habitats provide habitat resources for water bird species.

Fifty-eight species were recorded using the site's various habitats. In terms of distribution of bird populations, the breeding birds recorded were spread fairly evenly around the site, although as would be expected, there were concentrations of woodland bird species within the blocks of woodland, scrub and hedgerow habitats (mainly around the Base Lake area, in landscaped ornamental planting and gardens around buildings east of here and up to Site 14 in the north-eastern corner of the site, and in outlying areas at the South West Loop and Site 16 along the southern site boundary), and farmland bird species such as skylark, linnet and curlew mainly spread across the grassland present around the airstrip and throughout the central and southern parts of the site. Water birds tended to be largely located in the Base Lake area.

21 species considered to be 'notable' were recorded – 13 of these were considered to probably breed, and five to possibly breed on the site. Five species considered likely just to be on passage/ migration were also recorded: common tern, little ringed plover, ring ouzel, sand martin, hobby and wheatear (although it is possible that the latter two species may possibly remain on site to breed). Bittern, bullfinch, linnet, reed bunting, skylark and song thrush are all species of elevated conservation status in the county, and are included within Gloucester Species Action Plans (GSAP).

The notable species records considered of greatest importance are as follows:

- Bittern (BOCC4 Amber-listed species/SPI and GSAP species): 'booming' was heard on both survey visits, seemingly emanating from the waterbody/ gravel pit immediately to the north-eastern side of the Base Lakes area. This water bird species is unlikely to breed within the site due to a lack of suitable reed bed habitat, but is noteworthy nonetheless as it is a localized and relatively uncommon species. Other water bird species present include: black-headed gull, Canada goose, common tern, coot, graylag goose, herring gull, little ringed plover, mallard, tufted duck (and sand martin, reed bunting and reed and sedge warbler which breed/ occur within wetland habitats).
- House sparrow (BOCC4 Red-listed species/SPI): this declining species was observed around homes and gardens in the north-east part of the site.
- Linnet (BOCC4 Red-listed species): 15 birds were seen in open grassland locations across the site. This declining farmland species almost certainly breeds on site - providing conditions suitable for successful breeding should be considered a key management objective. It appears from the data gathered that numbers of this species may have increased since the last survey in 2011.
- Red kite (WCA Schedule 1 species): this reintroduced raptor species is increasing in numbers and spreading its range nationally, but is still subject to a raised level of legal protection at its nest site under WCA Schedule 1. A single bird was recorded within the site, on only one survey visit – red kite typically nest in trees and forage for carrion on open ground nearby. This species possibly breeds on site or in the near vicinity of the site, although no definitive nest site was identified.
- Skylark (BOCC4 Red-listed species/SPI): 14 birds were seen all across the open grassland habitats in the central/ southern part of the site. This declining farmland species almost certainly breeds on site - providing conditions suitable for successful breeding should be considered a key management objective. It appears from the data gathered that as with other farmland bird species;

linnet, song thrush, starling and stock dove, numbers of this species may have increased since the last survey in 2011 (n.b. yellowhammer numbers down from 7 to 2 birds in this period).

Other non-notable species:

- Hobby/ wheatear (both Green Listed but very localized/ rare as breeding species) – these migrant species may possibly stay on to breed at RAF Fairford. Indeed, evidence of this was observed for hobby adjacent to the South West Loop; with a displaying/ calling male and another bird (together presumed to be a breeding pair) present in and around a large mature oak tree there. No evidence of wheatear breeding was observed, but this is possible (although uncommon in areas of rough grassland in southern England).
- Little ringed plover (Green Listed species, but a relatively localized migrant species which breeds in gravel pits in the nearby Cotswold Water Park) was observed as a flock of ten birds which alighted on the airstrip runway (before being chased off by the BASH contractors).
- Tawny owl and barn owl (both Green Listed, but barn owl is a WCA Schedule 1 species) – these species were not actually observed during the survey visits, but calling by both species was heard by ecological surveyors present on site at night indicating that this species currently occurs at RAF Fairford and may possibly breed here or nearby.

Although the breeding bird surveys did not record any exceptionally high species counts, the diversity of species recorded was high and included a large number of notable species; some of which are uncommon in a Local context. Overall the site may be of value at a level greater than Local Level of Importance; possibly at the District Level of Importance.

Key Bird Habitats include:

- The open grassland present across most of the site is important as breeding habitat for declining farmland ground-nesting bird species such as skylark and linnet (and possibly wheatear), and is an important foraging resource for other farmland birds which nest in associated scattered scrub and trees such as linnets, stock dove and yellowhammer.
- A rookery estimated to support c.8 nests is located in trees close to the South West Loop (Hobby may possibly have bred in a large mature oak tree close to here also). Another large nest is present in the water tower in the north-east corner of the site – presumed to be used by ravens (based on conversations with site staff, although evidence of this not seen during the survey visits).
- Water bird habitat supporting a wide diversity of species located at Base Lake, with probable breeding bittern in the adjacent flooded gravel pit habitat.
- House sparrows nest in and around residential housing on the base.

In 2011 - There was a total of 37 species of bird seen on RAF Fairford during the breeding bird survey; of which 17 were notable species. Of these eight were Red List species (house sparrow, lapwing, linnet, redstart, skylark, song thrush, starling and yellowhammer), nine were Amber List species of conservation concern (black-headed gull, bullfinch, dunnock, mallard, meadow pipit, oystercatcher, reed bunting, shelduck and willow warbler), one was a WCA Schedule 1 species (red kite), four were NERC S.41 species (bullfinch, dunnock, house sparrow, reed bunting, skylark, song thrush, starling and yellowhammer), and six were GSAP species.

The current 2018 survey recorded 58 species of which 21 were notable (eight Red-listed, 12 Amber-listed BOCC4 species, one WCA Schedule 1 species, and 11 NERC S.41 species). Comparing the numbers recorded for all species between the two years, 18 species show decreased numbers (or absence where present before), 41 show an increase (or presence) and fours species show no change in numbers.

Overall considering the size of the dataset and broad similarity in then numbers of species recorded, numbers of notable species and changes in numbers, there is much greater number of species which have increased in numbers since 2011 than species which have decreased, and there is a greater number of notable species and much greater diversity of species recorded overall. This is of interest and may indicate some sort of trend in numbers possibly in relation to improved quality of habitats for birds on the site, but this data alone should not be considered to be sufficient evidence to show any significant objective change in bird diversity and level of conservation value between the two years.

Birds (wintering): There were a total of 37 species of bird seen on RAF Fairford during the winter bird survey undertaken by MWH in 2011, and an additional 6 species were observed on the adjacent wetlands which may visit the Base Lake. Of these seven were BOCC4 Red-listed species, and 11 were BOCC4 Amber-listed species of conservation concern.

The survey site provides a variety of suitable foraging habitat for wintering bird species. The field boundary habitats provide forage and shelter, while the open fields are a source of soil invertebrate prey.

Forty-two species were recorded using the site's infield, wetland and boundary habitats or were flying over in the 2017 survey. In terms of distribution of bird populations, the wintering birds recorded were generally concentrated away from the central/ open part of the site, but specific locations were as follows:

- Concentration of birds in/ around Base Lake, and habitat surrounding this feature and north east up to the Constructors Compound; including some water bird species such as mallard, grey heron and mute swan. Wildfowl were also heard and sighted flying over from here using the gravel pits/ lakes to the north of here.
- The Memorial Garden located towards the lower end of Maine Street contained a wide range of passerine (perching) birds on and around the mixed amenity shrubs and trees here; including notable species such as a single hawfinch among a mixed finch flock, four thrush species (mistle thrush, song thrush, redwing and fieldfare) and six yellowhammers.
- The woodland at the south end of Maine Street contained numerous semi-mature trees with woodpecker holes. A tawny owl has been reported by site staff as occurring here in 2017 (although the woodland currently appears to lack any suitably-sized nesting/ roosting locations for this species). Site staff also indicated that a nearby water tower is frequently used by a kestrel and has been used variously by rook and raven in previous years, although that species was not recorded during the site survey.
- Site 14 on the northern edge of the overall site had various typical garden birds including numbers of house sparrows.
- Concentrations of garden bird species occurred in/around Site 15/16, buildings on the edge of the South East Loop and the South West Loop along the southern site perimeter.
- The open grassland area and runway in the central part of the site were relatively lacking in birdlife (stiff/ spiky grasses are planted here specifically to deter use by birds which could be a hazard to aircraft using the runway). Six buzzards and a number of pheasants were recorded here in the vicinity of the security fence surrounding the runway.

None of the bird species recorded are considered to be uncommon or rare in the county, but 18 species considered to be 'notable' were recorded. Some wintering species recorded are notable because of their conservation status as rare breeding species (fieldfare and redwing). As breeding of these species does not occur in this part of the UK, and the birds recorded are purely winter visitors to the area, the notable status is therefore not directly relevant to this assessment.

The notable species records considered of greatest importance are as follows:

- Bullfinch (BOCC4 Amber-listed species/SPI): Five birds recorded at several locations; largely along site boundary hedgerows/ trees. It can be sedentary in habit, and could potentially stay on site to breed in favored nesting habitats such as thicker hedgerows and dense scrub.
- Dunnock (BOCC4 Amber-listed species/SPI): Ten birds recorded at a several locations around the site. This species may also remain to breed on site, and it nests in a range of habitats including scrub, woodland edge, hedgerows and low vegetation.
- Mistle thrush (BOCC4 Red-listed species): Two birds recorded within the Memorial Gardens. It can be sedentary habit, and could potentially stay on site to breed in favored nesting habitats such as thick hedgerows and dense scrub. This species may potentially remain to breed on site.
- Skylark (BOCC4 Red-listed species/SPI): 26 skylark were recorded; all but one in a single flock in the South West Loop. This species may potentially remain to breed on site.
- Song thrush (BOCC4 Red-listed species/SPI): four birds were recorded in field boundary hedgerows/ trees. This species may potentially remain to breed on site.
- Starling (BOCC4 Red-listed species/SPI): 30 of these birds were recorded in a range of habitats including open grassland and field boundary hedgerows/ trees across the site. This species may potentially remain to breed on site.
- Yellowhammer (BOCC4 Red-listed species/SPI): eight birds recorded; six in the Memorial Gardens, and the remaining two along the northern site boundary.

In addition to the above, evidence was obtained of the use of the site by certain other bird species:

- Tawny owl (BOCC4 Amber-listed species) – reported in woodland habitat in central part of the site in previous years. Little owl was reported in the South West Loop in 2017.
- Raven and kestrel (BOCC4 Amber-listed species) - both reported using water towers on site for roosting/ nesting in previous years.

Overall the wintering bird surveys did not record any unusual species except for a single hawfinch within a finch flock in the Memorial Gardens, and did not observe any exceptionally high species counts. Although generally uncommon, this species was widespread across the U.K. in the winter 2017/18, having spread in (irrupted) from continental Europe, and likely to occur in a wide variety of locations, so its presence on site does not give any specific indications regarding the quality of habitat present. The survey results, including the relatively low number of species recorded, suggest that the site is only currently of Local value for wintering birds.

There were a total of 37 species of bird seen on RAF Fairford during the winter bird survey undertaken in October 2010 (MWH, 2011). Of these 14 were notable species seven were BOCC4 Red-listed species (fieldfare, house sparrow, mistle thrush, redwing, song thrush, starling, yellowhammer) and seven were BOCC4 Amber-listed species (black-headed gull, bullfinch, dunnock, grey wagtail, mallard, mute swan and wigeon) and 9 were NERC S.41 SPI (bullfinch, dunnock, hawfinch, house sparrow, skylark, song thrush, starling, white-fronted goose and yellowhammer). An additional 6 species were observed in 2011 on the adjacent wetlands which may visit the Base Lake.

The current 2017 survey recorded 42 species of which 18 were notable (10 red-listed, 8 amber-listed BOCC4 species, 2 WCA Schedule 1 species and 9 NERC S.41 SPI). Comparing the numbers recorded for all species between the two years, 17 species show decreased numbers, 27 show an increase and 4 had the same numbers recorded. Overall considering the size of the data set and broad similarity in then numbers of species recorded, numbers of notable species and changes in numbers, there is no evidence of any significant change in bird diversity and level of conservation value between the two years.

Dormouse: No records of dormouse within 2km of RAF Fairford were provided by GCER, and no surveys were undertaken for this species in 2011 or 2018.

Fish: Records of brown trout, wels catfish, bullhead, grayling and brook lamprey within 2km of RAF Fairford were provided by GCER, mostly in the River Coln, the most recent recorded in 2014. No surveys for fish were undertaken by in 2011 or 2018.

Invertebrates: GCER provided records of small heath (Coenonympha pamphilus), white admiral (Limenitis camilla), hill cuckoo bee (Bombus rupestris), small eggar (Eriogaster lanestris), cinnabar (Tyria jacobaeae) and garden tiger (Arctia caja) within 2km of RAF Fairford, including a record within RAF Fairford, recorded in 1992. MWH recorded small blue (Polyommatus coridon), large white (Pieris brassica), small tortoiseshell (Aglais urticae), meadow brown (Maniola jurtina), large skipper (Ochlodes Sylvanus) and six-spot burnet moth (Zygaena filipendulae) during surveys undertaken in 2011. No surveys were undertaken for invertebrates in 2018.

Invasive Species: No records of invasive species within 2km of RAF Fairford were provided by GCER. MWH recorded grey squirrels and muntjack deer during surveys undertaken in 2011, and Himalayan balsam (Impatiens glandulifera) was recorded along a section of Wash pool Lane Drain. Squirrels and muntjac were not observed during 2017/2018 surveys. Signal crayfish were observed in Wash Pool Lane Drain near the Gate 7 Interceptor.

Otter: GCER provided numerous records of otter within 2km of RAF Fairford, including a record within Site 16, recorded in 2007. MWH reported anecdotal evidence of otters feeding on the fish in the Base Lake in 2011. No surveys for otter have been undertaken and no evidence of otter was observed during surveys for other species undertaken in 2017/2018.

Reptiles: GCER provided records of grass snake within 2km of RAF Fairford, mostly within the vicinity of Cotswold Water Park, the most recent recorded in 2016. A record of slow worm was also provided, recorded in Cotswold Water Park in 2005. Grass snakes were seen between the overflow pond and the Base Lake and in the new pond adjacent to the Base Lake during surveys undertaken by MWH in 2011, and one slow worm was seen near the new pond. Low numbers of juvenile grass snake were observed within the grassland around Base Lake and the Constructors Compound during 2018 surveys (survey locations shown in Appendix D, figure 4).

Water Vole: GCER provided numerous records of water vole within 2km of RAF Fairford, mostly along the River Coln, the most recent recorded in 2016. Surveys undertaken by MWH in 2011 found no evidence of water voles along the watercourses within RAF Fairford. No evidence of water vole was observed during either 2018 survey visit. The section of Wash pool Lane Drain at Gate 7 Interceptor was too deep to survey within the channel during the April survey visit, and was fenced-off in preparation for RIAT during the July survey visit and couldn't be accessed. A live water vole sighting has been reported along this section of watercourse by a member of the grounds maintenance team. Due to limited access, it is possible that water vole signs could have been missed along this section.

White-clawed Crayfish: One record of white-clawed crayfish within 2km of RAF Fairford was provided by GCER, recorded in 1999 in the Cotswold Water Park. Surveys undertaken by MWH in 2011 found white-clawed crayfish present in Wash pool Lane Drain adjacent to the Gate 7 interceptor. Signal crayfish were observed in Wash pool Lane Drain in 2017 and there is anecdotal evidence of their presence in interceptors.

Other NERC Act Section 41 Species: GCER provided records of brown hare, harvest mouse, polecat and hedgehog within 2km of RAF Fairford, including a record of brown hare within RAF Fairford recorded in 2012. MWH recorded a small population of brown hares on RAF Fairford during surveys undertaken in 2011, mainly seen on the airfield. Brown hare were observed within the airfield during 2017-2018 ecological surveys. Harvest mouse, polecat and hedgehog were not observed within the airfield during 2017-2018 ecological surveys.

Management recommendations are within Section 8 of the INCRMP.

RAF Welford

Amphibians: TVERC provided no amphibian records within 2km of the Base. MWH recorded smooth newt and common frog within the Base during surveys undertaken in 2010. The 2018 eDNA test results came back negative for all 26 of the EWS tanks which samples were taken from. Common toads were observed during some of the reptile survey visits. Smooth newts have previously been recorded within the EWS tanks (MWH, 2011).

Badger: TVERC provided 23 badger records within 2km of the Base, the nearest approximately 300m from the Base, the most recent recorded in 2015. Two active badger setts were recorded within the Base during surveys undertaken by MWH in 2010. Two outlier badger setts with partially active or disused holes were present within Rooksnest Copse in 2017.

Bats: Records of a number of bat species were provided by TVERC within 2km of the Base, including the following species recorded within the Base in 2007; serotine, soprano pipistrelle and brown long-eared bat. Surveys undertaken by MWH in 2010 recorded 30 brown long-eared bats roosting in building 39 and a pipistrelle roost in the priory building. Active summer bat roosts have been recorded in the priory and building 39. The hibernation bunker (air raid shelter 8) has also been recorded as an active bat roost (MWH, 2011).

Common pipistrelle, soprano pipistrelle and Eptesicus-Nyctalus sp. group were recorded foraging on the base during 2017-2018 activity surveys. Automated detector surveys revealed a total of at least 6 species across the Base. The static detector recorded passes by all bat species detected during transect surveys as well as likely calls from: Leisler's bat, noctule, serotine (analysis was inconclusive and could be Leisler's bat as well), Brandt's bat, Natterer's bat and brown long-eared bat. A number of unidentified calls consisted of partial recordings, mostly belonging to (probably) pipistrelle social calls, although they couldn't be fully confirmed as such. This level of species richness is considered typical within the moderately diverse woodland, scrub, hedgerow and grassland habitat on and around site.

Birds (breeding): Numerous bird records within 2km of the Base were provided by TVERC, the most recent recorded in 2016, the nearest approximately 700m from the Base. The following species have been recorded within the search area; mallard, grey partridge, red kite, kestrel, lapwing, snipe, green sandpiper, herring gull, kingfisher, green woodpecker, wood warbler, willow warbler, skylark, swallow, house martin, song thrush, mistle thrush, whitethroat and reed bunting. MWH recorded 22 species of bird within the Base, including four BOCC4 Red-listed and two BOCC4 Amber-listed species of conservation concern during a wintering bird survey undertaken in 2011. During a breeding bird survey undertaken the same year, 36 species were recorded within the base, including 8 BOCC4 Red-listed and 9 BOCC4 Amber-listed species.

The survey site provides a variety of nesting opportunities and foraging habitat for breeding bird species. The field boundary habitats provide forage and shelter, while the open fields are a source of soil invertebrate prey.

Forty species were recorded during the 2018 survey using the site fields and boundary. In terms of distribution of bird populations, the breeding birds recorded were spread fairly evenly around the site, although as would be expected, there were concentrations of woodland bird species within the block of ancient woodland habitat at the northern end of the site, and farmland bird species such as skylark, linnet and curlew spread across the grassland present throughout the central and southern parts of the site.

None of the bird species recorded are considered to be uncommon or rare in the county, but 15 species considered to be 'notable' were recorded – six of these are considered to probably breed, and eight to possibly breed on the site. The notable species records considered of greatest importance are as follows:

- Curlew (BOCC4 Red-listed species): up to three pairs of this declining species have been recorded breeding within the munitions area of the site in previous years, and may possibly also visit during the winter. A single bird was recorded during the survey. No reports were received from site staff of evidence of breeding (presence of young, feeding behavior etc.) to substantiate the idea that the species bred at Welford, but it must be considered to be possibility. Curlew is a species of key conservation importance and efforts should be made to make conditions favorable for them to breed here.
- Red kite (WCA Schedule 1 species): this reintroduced raptor species is increasing in numbers and spreading its range nationally, but is still subject to a raised level of legal protection at its nest site under WCA Schedule 1. Two birds were recorded within the site, and the species was recorded on both visits – red kite typically nest in trees and forage for carrion on open ground nearby. This species probably breeds on site or in the near vicinity of the site, although no definitive nest site was identified.
- Linnet (BOCC4 Red-listed species): seven birds were seen in open grassland locations in the southern part of the site. This declining farmland species almost certainly breeds on site - providing conditions suitable for successful breeding should be considered a key management objective. It appears from the data gathered that numbers of this species may have increased since the last survey in 2011.
- Skylark (BOCC4 Red-listed species/SPI): 15 birds were seen in open grassland locations in the southern part of the site. This declining farmland species almost certainly breeds on site - providing conditions suitable for successful breeding should be

considered a key management objective. It appears from the data gathered that as with linnets, numbers of this species may have increased since the last survey in 2011.
- Tawny owl – this species was not actually observed during the survey visits, but an egg presumed to be tawny owl was found along a woodland edge on the eastern side of the site, and tawny owl calling was heard by ecological surveyors present on site at night indicating that this species currently breeds at RAF Welford.

Overall the breeding bird surveys did not record any unusual species and did not observe any exceptionally high species counts. The survey results, including the relatively low number of species recorded, suggest that the site is only currently of value at the Local level of importance for breeding birds.

However, the open grassland habitat supports possible/ probable breeding important species such as curlew, linnet and skylark, and the ancient woodland supports a suite of bird species, some of which are of elevated conservation status such as marsh tit – both habitats should be managed so as to optimize conditions for the notable breeding bird species which occur here.

Appendix E Figure 5 shows locations of key bird habitats within the site area. These include:

- Bassdown and Down Copses – the ancient, semi-natural broad-leaved woodland habitat; important for a suite of woodland bird species, including marsh tit and tawny owl.
- The open grassland in the southern part of the site including the munitions area is important as breeding habitat for declining farmland bird species such as curlew, linnet and skylark.
- A rookery estimated to support 20-30 birds is located in woodland habitat surrounding the buildings in the central northern part of the site. A jackdaw was recorded as breeding in a hollow tree in the eastern part of the site.

In 2011 there was a total of 29 species of bird seen on RAF Welford during the breeding bird survey; of which 11 were notable species. Of these six were BOCC4 Red-listed species (curlew, lapwing, linnet, skylark, song thrush and starling), five were BOCC4 Amber-listed species of conservation concern (black-headed gull, bullfinch, dunnock, mallard and willow warbler), one was a WCA Schedule 1 species (red kite), and 4 were NERC S.41 SPI (bullfinch, curlew, dunnock, lapwing, marsh tit, skylark, song thrush and starling).

The current 2017 survey recorded 40 species of which 15 were notable (7 Red-listed, 7 Amber-listed BOCC4 species, one WCA Schedule 1 species, and seven NERC S.41 SPI). Comparing the numbers recorded for all species between the two years, 16 species show decreased numbers (or absence where present before) and 27 show an increase (or presence).

Overall considering the size of the data set and broad similarity in then numbers of species recorded, numbers of notable species and changes in numbers, although a greater number of species have increased in numbers since 2011, there is not considered to be sufficient evidence to show any significant change in bird diversity and level of conservation value between the two years.

Birds (wintering): The survey site provides a variety of suitable foraging habitat for wintering bird species. The field boundary habitats provide forage and shelter, while the open fields are a source of soil invertebrate prey. Thirty-six species were recorded using the site fields and boundary habitats in the 2017 survey. In terms of distribution of bird populations, the wintering birds recorded were spread fairly evenly around the site, although there were concentrations of woodland bird species within the block of ancient woodland habitat at the northern end of the site, a mixed flock of gulls/ waders on arable land just outside of the eastern site boundary, and farmland bird species such as skylark, meadow pipit and yellowhammer spread across the grassland present throughout the central and southern parts of the site.

None of the bird species recorded are considered to be uncommon or rare in the county, but 14 species considered to be 'notable' were recorded. Some wintering species recorded are notable because of their conservation status as rare breeding species (fieldfare and redwing). As breeding of these species does not occur in this part of the UK, and the birds recorded are purely winter visitors to the area, the notable status is therefore not directly relevant to this assessment.

The notable species records considered of greatest importance are as follows:

- Meadow pipit: 45 meadow pipits were recorded across the site. This is one of a number of declining species of farmland birds, present in good numbers here in habitat typical for both wintering and breeding meadow pipits, especially within the munitions storage area.
- Red kite (WCA Schedule 1 species): this reintroduced raptor species is increasing in numbers and spreading its range nationally, but is still subject to a raised level of legal protection at its nest site under WCA Schedule 1. One individual bird was recorded within the site. This species may potentially remain to breed on site.
- Skylark (BOCC4 Red-listed species/SPI): two birds were seen in open grassland locations in the southern part of the site. This species may potentially remain to breed on site.
- Starling (BOCC4 Red-listed species/SPI): 5 of these birds were recorded within trees in the central part of the site. This species may potentially remain to breed on site.

In addition to the above, evidence was obtained of the use of the site by certain other bird species:

- Curlew (BOCC4 Red-listed species): a couple of pairs of this species have been recorded breeding within the site in previous years, and may possibly also visit during the winter.
- Swallow (Green-listed species): nests this migrant summer visitor species were observed in a building close to the eastern site boundary in the munitions storage area.

Overall the wintering bird surveys did not record any unusual species and did not observe any exceptionally high species counts. The survey results, including the relatively low number of species recorded, suggest that the site is only currently of value at the Local level of importance for wintering birds.

In 2011 there was a total of 22 species of bird seen on RAF Welford during the winter bird survey. Of these six were BOCC4 Red-listed species (fieldfare, lesser-spotted woodpecker, song thrush, starling and tree sparrow), one was a BOCC4 Amber-listed species of conservation concern (bullfinch), one was a WCA Schedule 1 species (fieldfare), and four were NERC S.41 SPI (lesser-spotted woodpecker, song thrush, starling and tree sparrow).

The current 2017 survey recorded 36 species of which 14 were notable (7 red-listed, 5 amber-listed BOCC4 species, four WCA Schedule 1 species, and six NERC S.41 SPI). Comparing the numbers recorded for all species between the two years, 18 species show decreased numbers (or absence where present before) and 23 show an increase (or presence).

Overall considering the size of the data set and broad similarity in then numbers of species recorded, numbers of notable species and changes in numbers, there is no evidence of any significant change in bird diversity and level of conservation value between the two years.

Dormouse: No dormouse records were provided by TVERC within 2km of the Base. No evidence of dormouse was found within the Base during surveys undertaken by MWH in 2010 and no evidence of dormouse was observed during a nut search undertaken within areas of hazel coppice in 2017.

Fish: Records of the following notable fish species within 2km of the Base were provided by TVERC, all within the River Lambourn, the most recent recorded in 2014; Atlantic salmon (Salmo salar), brown/sea trout (Salmo trutta), grayling (Thymallus thymallus), bullhead and brook lamprey. No notable fish species were recorded by MWH as there is no suitable habitat within the Base and so surveys were not undertaken.

Invertebrates: Records of the following invertebrate species within 2km of the Base were provided by TVERC, the nearest approximately 200m from the Base, the most recent recorded in 2015; black-headed cardinal beetle (Pyrochroa coccinea), wood white (Leptidea sinapis), purple emperor (Apatura iris), white admiral (Limenitis camilla), small heath (Coenonympha pamphilus), wall (Lasiommata megera), Desmoulin's whorl snail, shaded broad-bar (Scotopteryx chenopodiata), cinnabar (Tyria jacobaeae) and the true flies (Oxycera morrisii), (Hilara quadriseta), (Pherbellia griseola) and (Psacadina verbekei).

Marbled white (Melanargia galathea), meadow brown (Maniola jurtina), small skipper (Thymelicus sylvestris), peacock (Aglais io) and common blue (Polyommatus Icarus) butterflies were recorded within the Base during surveys undertaken by MWH in 2010. Invertebrate surveys were not undertaken in 2017/2018.

Invasive Species: TVERC provided records of the following invasive species within 2km of the base, the most recent recorded in 2015, the nearest recorded approximately 1.1km from the Base; water fern (Azolla filiculoides), least duckweed (Lemna minuta), Himalayan balsam (Impatiens glandulifera), rhododendron, buddleia (Buddleja sp.), monkeyflower (Mimulus guttatus), giant-rhubarb (Gunnera manicata), giant butterbur (Petasites japonicus) and northern river crangonyctid (Crangonyx pseudogracilis). No invasive species were recorded by MWH within the Base during surveys undertaken in 2010.

Otter: Records of otter along the River Lambourn within 2km of the Base were provided by TVERC, the most recent recorded in 2015. There is no suitable habitat for otter within the Base, therefore no surveys for otter were undertaken in 2017/2018.

Reptiles: TVERC provided one record of grass snake within 2km of the Base, recorded approximately 1.2km from the Base in 2016. No reptiles were recorded within the Base during surveys undertaken by MWH in 2011 or by Jacobs in 2018.

Water Vole: Water vole have been recorded along the River Lambourn (records provided by TVERC), but the most recent record was recorded in 1995. There is no suitable habitat for water vole within the Base, therefore no surveys for water vole have been undertaken.

White-clawed Crayfish: No records of white-clawed crayfish within 2km of the Base were provided by TVERC. There is no suitable habitat for white-clawed crayfish within the Base, therefore no surveys for white-clawed crayfish have been undertaken.

Other NERC Act Section 41 Species: TVERC provided records of polecat (Mustela putorius), hedgehog (Erinaceus europaeus) and brown hare (Lepus europaeus) within 2km of the Base, including records of hedgehog along the boundary of the Base, the most recent recorded in 2014. None of these species were recorded within the Base during surveys undertaken by MWH in 2010. Brown hare were observed within the MUNZ area during the 2017 Phase 1 survey.

Management recommendations are within Section 8 of the INCRMP.

2.3.5 Threatened, Endangered, and Host Nation-Protected Species

Installation Supplement

Botanical surveys at RAF Croughton, RAF Barford St John, RAF Fairford and RAF Welford will be updated in 2019.

RAF Croughton. Numerous records of notable plants within 2km of the RAF Croughton were provided by Northamptonshire Biological Records Centre, including records of basil thyme (Acinos arvensis), dwarf spurge (Euphorbia exigua), field scabious (Knautia arvensis), corn mint (Mentha arvensis), prickly poppy (Papaver argemone) and night-flowering catchfly (Silene noctiflora) within the Base, the most recent recorded in 2001. No protected plants were recorded by MWH within RAF Croughton in 2010.

RAF Barford St John. TVERC provided historical records of notable species bluebell (Hyacinthoides non-scripta) within 2km of RAF Barford St John, and a record of henbane (Hyoscyamus niger) within the Base, recorded in 2008.

RAF Fairford. GCER provided the following historical records of notable species within 2km of RAF Fairford: bluebell (Hyacinthoides non-scripta), round-leaved mint (Mentha suaveolens), hoary plantain (Plantago media), box (Buxus sempervirens), black poplar (Populus nigra), fritillary (Fritillaria meleagris), downy-fruited sedge (Carex filiformis), rock stonecrop (Sedum forsterianum), dwarf spurge (Euphorbia exigua), eyebright (Euphrasia officinalis agg.), stinking hellebore (Helleborus foetidus), ragged-robin (Lychnis flos-cuculi), flat-stalked pondweed (Potamogeton friesii), lesser bearded stonewort (Chara curta) and shepherd's needle (Scandix pecten-veneris) the most recent records dating from 2015. Surveys at RAF Fairford undertaken by MWH in 2011 recorded bluebells in woodland adjacent to the sports area.

RAF Welford. TVERC provided historical records of bluebell RAF Welford, the most recent recorded in 2005. Other notable species recorded within 2km of the Base are: wall-germander (Teucrium chamaedrys), flat-sedge (Blysmus compressus) and wild pansy (Viola tricolor).

2.3.6 Other Natural and Cultural Resource Information

Installation Supplement

Heritage and Conservation

In addition to the environmental natural resources across the 422 ABG the heritage and conservation aspects of the installations have been considered.

RAF Croughton: There are no sites of international cultural heritage significance (World Heritage Sites) within the vicinity of the base. The National Heritage List for England (NHLE) indicates that there are no Scheduled Monuments, Registered Battlefields or Registered Parks or Gardens within the site. There is one Listed Building within RAF Croughton, the Grade II Type C Fighter Pens (NHLE 1403308) which comprises three fighter pens constructed during 1940-41. The Northamptonshire Historic Environment Record (HER) identifies five non-designated cultural heritage assets within the site which relate to the development and use of the base (HER MNN16824) during World War II (WWII) including the base itself. These comprise: a mushroom pillbox (HER MNN34586); seagull trenches (HER MNN34588); grass runways (HER MNN34602); and T2 Hangars (HER MNN34603). A Nissen hut is also present within the base, however there has been significant alterations made to the hut.

RAF Barford St John: There are no sites of international cultural heritage significance (World Heritage Sites) within the vicinity of the base. The National Heritage List for England (NHLE) indicates that there are no designated cultural heritage assets (Scheduled Monuments, Listed Buildings, Registered Battlefields or Registered Parks or Gardens) within the site. The base also does not lie within a designated Conservation Area. The Oxfordshire Historic Environment Record (HER) identifies three non-designated cultural heritage assets within the site which include; the site of a possible prehistoric barrow identified from aerial photographs (HER MOX3725); the site of the underground WWII battle headquarters (HER MOX24670); and RAF Barford St John itself (HER MOX24663).

RAF Fairford: There are no sites of international cultural heritage significance (World Heritage Sites) within the vicinity of the 420 ABS installations. The National Heritage List for England (NHLE) indicates that there are no designated cultural heritage assets (Scheduled Monuments, Listed Buildings, Registered Battlefields or Registered Parks or Gardens) within the site. The base also does not lie within a designated Conservation Area. Records of non-designated cultural heritage assets held by the Gloucestershire and Wiltshire Historic Environment Records (HER) identify 17 known assets within RAF Fairford, which include the base itself.

RAF Welford: There are no sites of international cultural heritage significance (World Heritage Sites) within the vicinity of the 420 MUNS installation. The NHLE indicates that there are no Scheduled Monuments, Registered Battlefields or Registered Parks or Gardens within the site. There is one Listed Building within RAF Welford, the Grade II Priory (NHLE 1210712) which has elements dating from the 14th to 19th centuries and comprises the remains of a medieval priory. Records held by West Berkshire County Council indicate that the site does not lie within a locally designated Archaeologically Sensitive Area (ASA). The West Berkshire Historic Environment Record (HER) identifies 17 non-designated cultural heritage assets within the site. Many of these assets relate to the development and use of RAF Welford (HER MWB15916) during World War II and include: Stanton air raid shelters; WAAF barrack hut footings; Nissen huts; T2 Hangars and other military structures; open blast shelters; and general-purpose dispersal hut footings.

Non-military features include: the medieval Poughley Priory (HER MWB2646) and associated assets (HER MWB2647, MWB2648, MWB2650 and MWB4468); the site of a possible Iron Age banjo enclosure (HER MWB2105); the sites of a number of historic farmsteads and barns shown on historic mapping (HER MWB17087, MWB17205, MWB17206 and MWB17207); a series of strip lynchets (HER MWB18269); the course of a former drove road (HER MWB18270); the course of a branch line of the Lambourne Valley Railway (HER MWB6077) constructed in the 1950s to give access to the base; and a large number of assets preserved within woodland in the north of the base (HER MWB18271).

2.4 Mission Impacts on Natural and Cultural Resources

2.4.1 Natural and Cultural Resource Constraints to Mission and Mission Planning

Installation Supplement

Results of in-depth biological surveys, together with existing data, will form the basis of a comprehensive Base plan that would enable future planning to go ahead quickly, with less likelihood of impacting natural or cultural resources. Planners and project managers could identify potential areas of conflict at the preliminary planning stages of any project, avoiding costly delays and safeguarding natural resources.

RAF Croughton. European Protected Species present on RAF Croughton are bats and potentially white-clawed crayfish. Other protected species at RAF Croughton are birds, reptiles, potentially water vole and badger. The primary cultural constraints at RAF Croughton are the three Type C Fighter Pens.

RAF Barford St John. European Protected Species present on RAF Barford St John are bats. Other protected species at RAF Barford St John are birds and badger.

RAF Fairford. European Protected Species present on RAF Fairford are great crested newts and bats. Other protected species at RAF Fairford are birds, reptiles and badger.

RAF Welford. European Protected Species present on RAF Welford are bats. Other protected species at RAF Welford are birds and badger. The ancient woodlands on the Base are designated as a LWS. The primary cultural constraints at RAF Welford are the numerous military related archaeological sites within the Base and medieval Poughley Priory, its associated features and setting, and the large number of features preserved within woodland in the north of the base.

Based on existing environmental conditions, there are relatively few constraints to either the mission or development at RAF Croughton, RAF Barford St John, RAF Fairford and RAF Welford. A composite map of natural resources constraints such as critical habitat and sensitive species communities has been developed for each Base is shown as Figure 5, Appendices B, C, D and E.

2.4.2 Land Use

Installation Supplement

Land use is divided into areas of improved ground, semi-improved ground and unimproved ground. Improved ground is an area that is intensively maintained and is equivalent to the UK amenity grassland habitat. Semi-improved ground includes areas that have periodic maintenance for operational or recreational reasons including grounds adjacent to runways, taxiways aprons, runway clear zones, lateral safety zones, rifle ranges, picnic areas, ammunitions storage areas, antenna facilities and golf course roughs. This is equivalent to the UK species-poor or moderately species-rich grasslands. Unimproved ground includes areas not classified as improved or semi-improved. It is not usually mowed more than once a year and includes weapon ranges, forested lands, croplands, grazing lands, lakes, ponds, wetlands and airfield areas beyond safety zones. These areas are equivalent to the UK species-rich grasslands and are usually classed as UKBAP Priority Habitats.

RAF Croughton covers approximately 280ha or 694 acres.

RAF Barford St John covers approximately 192ha or 476 acres.

RAF Fairford covers approximately 564ha or 1,396 acres.

RAF Welford covers approximately covers 326ha or 806 acres (with approximately 190ha used for munitions storage.

2.4.3 Current Major Impacts

Installation Supplement

RAF Croughton: The operation of the Base Mission has minor/negligible impacts on the local environment.

RAF Barford St John: The operation of the Base Mission has minor/negligible impacts on the local environment.

RAF Fairford: The operation of the Base Mission has few impacts on the local environment. There are no permitted air pollution sources. There are clean-up programs for uncontrolled releases of a hazardous substances / fuel.

Air and Water Pollution Point Sources: The Base has several "Consented Discharge points" that are regulated by the Environment Agency. Sewage and storm drainage infrastructure presents a potential source of pollution and requires periodic assessment. Visual inspections are undertaken every two years. Maintenance work is undertaken as required.

RAF Welford: The operation of the base has few impacts on the local environment. These impacts are described below and include grass cutting; emergency water supply (EWS) tank management; and pollution point sources.

Emergency Water Supply (EWS) Tank Management: The EWS tanks currently require maintenance and a long term program of management.

Grass Cutting: The grass is maintained at a height of 5cm in the munitions area to minimize the fire hazard. Care is taken to avoid ground nesting birds.

Air and Water Pollution Point Sources: The Base has two "Consented Discharge points" that are regulated by the Environment Agency. Sewage and storm drainage infrastructure presents a potential source of pollution and requires periodic assessment. Visual inspections are undertaken every two years. Maintenance work is undertaken as required.

2.4.4 Potential Future Impacts

Installation Supplement

RAF Croughton: Underground and above ground storage tanks (USTs and ASTs) may pose a pollution risk. Inventories and locations of USTs and ASTs with information pertaining to their condition can be retrieved from 422 CES/CEIE.

RAF Barford St John: USTs and ASTs may pose a pollution risk. Inventories and locations of USTs and ASTs with information pertaining to their condition can be retrieved from 422 CES/CEIE.

RAF Fairford: USTs and ASTs may pose a pollution risk. Inventories and locations of USTs and ASTs with information pertaining to their condition can be retrieved from 420 ABS/CE.

RAF Welford: USTs and ASTs may pose a pollution risk. Inventories and locations of USTs and ASTs with information pertaining to their condition can be retrieved from 420 ABS/CE.

3 ENVIRONMENTAL MANAGEMENT SYSTEM

The DAF environmental program adheres to the Environmental Management System (EMS) framework and its "Plan, Do, Check, Act" cycle for ensuring mission success. Executive Order (EO) 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*; DoDI 4715.17, *Environmental Management Systems*; DAFI 32-7001, *Environmental Management*; and International Organization for Standardization (ISO) 14001 standard, *Environmental Management Systems – Requirements with guidance for use*, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

The Natural and Cultural Resources program employs EMS-based processes to achieve compliance with all legal obligations and current policy drivers, effectively manage associated risks, and instill a culture of continual improvement. The INCRMP serves as an administrative operational control that defines compliance-related activities and processes.

4 GENERAL ROLES AND RESPONSIBILITIES

General roles and responsibilities that are necessary to implement and support the natural and cultural resources program are listed in the table below. Specific natural and cultural resources management-related roles and responsibilities are described in appropriate sections of this plan.

Installation Supplement

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	Installation Role/Responsibility Description
Installation Commander	In accordance with AFI 32-7064 the Installation Commander shall: • Approve the INRMP by signature on all revised INRMPs. The Installation Commander may re-delegate signature authority to a lower level provided that the signatory has control over all aspects and management objectives addressed within the subject INRMP. • Certify the annual review of the INRMP as valid and current; or delegates the certification of the annual INRMP review authority to no lower than the Civil Engineer Squadron Commander. • Provide appropriate staffing to ensure implementation of the INRMP. • Control access to and use of installation natural resources. • Sign Findings of No Practicable Alternative (FONPA) for actions within a floodplain or wetland. The Deputy Director, Air National Guard, signs the FONPA for ANG installations. • IAW 501st Delegation Memo, this authority has been delegated to the 422 ABG/CC
AFIMSC/AFCEC Natural and Cultural Resources Media Manager/SME/Subject Matter Specialist (SMS)	AFMC/AFCEC/CZTQ Subject Matter Specialist
Installation Natural and Cultural Resources Managers/POCs	422 CES/CEI/420 ABS/CEI Responsible for ensuring an initial baseline Natural Resources survey is carried out. Responsible for developing a compliance plan to ensure current base practices are consistent with FGS-UK and AF standards. Will program funding through the applicable AF program to ensure surveys are carried out as required and protected species and/or habits are maintained to the required standards.

Installation Security Forces	422 SFS/420 SFS and Ministry of Defence (MDP) Wildlife Officers: Provide licensed officers to handle/move endangered and protected species, also provide guidance to 422 CES/CEIE and 420 ABS/CEIE regarding the legal implications of handling, moving and obstructing endangered and protected species.
Installation Unit Environmental Coordinators (UECs); see AFI 32-7001 for role description	List available from EMS Coordinator
Installation Wildland Fire Program Manager	N/A
Pest Manager	422 CES/CEIE 420 ABS/CEI
422 CES/CEO and 420 ABS/CEO	Identify to 422 CES/CEIE and 420 ABS/CEIE any future, new or maintenance works that may impact natural and cultural resources. Identify any works required that will have a negative impact to Natural and Cultural Resources across the 422 ABG installations using the 332 process and coordinate all project works with 422 CES/CEIE or 420 ABS/CEIE as applicable.
Defence Infrastructure Organisation (DIO)	In coordination with 422 CES/CEIE/420 ABS/CEIE will serve as the focal point for liaison with regulatory agencies and is responsible for preparing, modifying and obtaining permits/variances for permits. Provide contract management services for the grounds maintenance contract across the 422 ABG. Any changes requested by 422 CES/CEIE or 420 ABS/CEIE to the current grounds maintenance regime will be negotiated into the Contract by DIO USF.
Judge Advocate	Advise the 422 ABG/CC and ESOHC members on the legal aspects of natural and cultural resource management, including liabilities associated with failing to comply with environmental laws and regulations.
RAF Commander (RAF/CC) Croughton and Fairford	Acts as Liaison Officer on behalf of the MOD and Her Majesty's Government with overall estate management responsibility in conjunction with DIO on environmental matters. Utilize DIO Environmental Advisor (DIO EA) and in coordination with 422 CES/CEIE or 420 ABS/CEIE as applicable and serves pursuant to bilateral agreement as the liaison with national authorities and as the contact with local authorities and local external military and civil authorities

5 TRAINING

USAF installation NRMs/CRMs/POCs and other natural and cultural resources support personnel require specific education, training, and work experience to adequately perform their jobs. Chapter 13 of the FGS requires that trained personnel perform the tasks necessary to update and carry out certain actions required within this INCRMP. Specific training and certification may be necessary to maintain a level of competence in relevant areas as installation needs change, or to fulfill a permitting requirement.

Installation Supplement

Natural and cultural resources management training is provided to ensure that installation personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Training records are maintained IAW the Recordkeeping and Reporting section of this plan. Below are key natural and cultural resources management-related training requirements and programs:

- ***[Add installation-specific training]***

6 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

The installation maintains required records IAW applicable FGS, AFI 32-7091, AFMAN 33-363, Management of Records. It disposes of records IAW applicable FGS, AFI 32-7091, and the Air Force Records Management System (AFRIMS) records disposition schedule (RDS). Numerous types of records must be maintained to support implementation of the natural and cultural resources programs. Specific records are identified in applicable sections of this plan, in the Natural Resources Playbook, Cultural Resources Management Playbook, and in referenced documents.

Installation Supplement

More information is available from the applicable Commanders Records Delegate.

6.2 Reporting

The installation NRM and CRM are responsible for responding to natural and cultural resources-related data calls and reporting requirements. The NRM, CRM, and supporting AFCEC Media Manager and SMSs should refer to the Environmental Reporting Playbook for guidance on execution of data gathering, quality control/quality assurance, and report development.

Installation Supplement

422 ABG will report as outlined in the Environmental Reporting Playbook

7 NATURAL AND CULTURAL RESOURCES PROGRAM MANAGEMENT

This section describes the current status of the installation's natural and cultural resources management program and program areas of interest. Current management practices, including common day-to-day management practices and ongoing special initiatives, are described for each applicable program area used to manage existing resources. Program elements in this outline that do not exist on the installation are identified as not applicable and include a justification, as necessary.

Installation Supplement

3

7.1 Fish and Wildlife Management

Installation Supplement

Applicability Statement

This section applies to AF installations that manage fish or wildlife on AF property. This section **IS** applicable to all bases.

Program Overview/Current Management Practices

Careful management of the habitats at the installations is necessary to promote biodiversity and to preserve and enhance the number of species on site. Management of the natural resource needs to be compliant with respect to legislation and, wherever possible, best practice, in order to be able to sustain the species currently supported and enhance the biodiversity. A number of management issues and recommended actions have been prescribed to manage the impacts upon the bases' Natural Resources. In line with the FGS-UK, all bases shall maintain grounds to meet designated mission use and ensure harmony with the natural landscape, where possible.

At RAF Fairford current fish and wildlife program management on the base consists primarily of a BASH management. RAF Fairford complies with UK wildlife laws for protected habitats and species, including the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way (CRoW) Act 2000 and the Conservation of Habitats and Species Regulations 2017 as described above.

At RAF Welford the current wildlife program management on the base consists of deer and hare management. The deer population is maintained, as per the Annual Deer Report for the RAF Welford Deer Management Group (2011), at a size that ensures their health and the health of the woodland. There was very little natural regeneration in the woodland but there was no evidence of bark stripping which occurs when the deer population is too high.

7.2 Outdoor Recreation and Access to Natural Resources

Installation Supplement

Applicability Statement

This section applies to AF installations that provide outdoor recreation activities and/or provide off-site personnel with access to natural resources on AF property. This section **IS** applicable to RAF Croughton, RAF Fairford and RAF Welford.

Program Overview/Current Management Practices

The management of outdoor recreational resources is to provide the greatest benefit to the public. Outdoor recreation is defined as management of natural resources to provide opportunities for outdoor recreation. These resources exclude facilities or programs associated with Urban development, for example the tennis courts at RAF Fairford, associated with Base Housing. At RAF Croughton this includes the nature trail and wildlife area.

7.3 Conservation and Protection Standards Enforcement

Installation Supplement

Applicability Statement

This section applies to AF installations that provide law enforcement in support of natural resources protection activities. This section **IS** applicable to all bases.

Program Overview/Current Management Practices

USAFE instructions require that base daily routine and maintenance comply with UK, FGS in order to preserve the natural resources.

7.4 Management of Threatened, Endangered, and Host Nation-Protected Species

Installation Supplement

Applicability Statement

This section applies to AF installations that have threatened and endangered species on AF property. This section **IS** applicable to all bases.

Program Overview/Current Management Practices

Prior to any new works or changes to ongoing management practices the 422 CES/CEIE, 420 ABS/CEIE and Host Nation should be informed and consulted to ensure that any new works do not conflict with the INCRMP.

The four installations comply with UK wildlife laws for protected habitats and species. The main piece of legislation relating to nature conservation in Great Britain is the Wildlife and Countryside Act 1981 (as amended). This Act is supplemented, inter alia, by provision in the CRoW Act 2000. Schedule 5 of the Wildlife and Countryside Act lists UK protected wild animals, Schedule 8 protected plants and Schedule 9 non-native invasive species. The CRoW Act ensures that the biodiversity is conserved and lists the species and habitats for which conservation steps should be taken.

Great crested newts and their habitats in water and on land are protected under the Wildlife and Countryside Act 1981 (as amended) and under the Conservation of Habitats and Species Regulations 2017. Taken together, these make it an offence to capture or injure a great crested newt, deliberately disturb them leading to a decline in the population or limit their ability to migrate or hibernate, destroy, sell, advertise or offer for sale, or possess this species or destroy its breeding and resting sites.

All bats are European protected species listed on Schedule 2 of The Conservation of Habitats and Species Act 2017. Under Part 3 Section 41 of the Act it is an offence to capture or injure a bat, deliberately disturb them leading to a decline in the population or limit their ability to migrate or hibernate, destroy, sell, advertise or offer for sale, or possess this species or destroy its breeding and resting sites.

Reptiles, white-clawed crayfish and water voles are listed on Schedule 5 of the Wildlife and Countryside Act 1981. White-clawed crayfish are also listed on Annex II of the European Habitats Directive (92/43/EEC), meaning that the UK government is obliged to designate Special Areas of Conservation (SACs) for their protection where internationally important populations are present.

Birds are protected by the Wildlife and Countryside Act, 1981 (as amended). This legislation makes it an offence to intentionally or recklessly kill, injure or take away any wild bird. It is also an offence to take, damage or destroy the nest of any wild bird while it is in use or being built or to take or destroy the egg of any wild bird. In addition, certain species are listed on Schedule 1 of the WCA. This makes it an additional offence to intentionally or recklessly disturb the adults while they are in and around their nest or intentionally or recklessly disturb their dependent young. Such species are considered to be in greater need of legal protection or of high nature conservation priority.

Badgers are protected by The Protection of Badgers Act 1992. It is an offence under this Act to kill, injure or take a badger, cruelly ill-treat any badger; or interfere with a badger sett including the area within 30m of an active sett.

7.5 Water Resource Protection

Installation Supplement

Applicability Statement

This section applies to AF installations that have water resources. This section **IS** applicable to all bases.

Program Overview/Current Management Practices

The 422 ABG will comply with various agency requirements for the protection of watersheds on the Bases from surface water runoff. These requirements include restrictions on the quality of the discharge, mandating that it be free of contamination from sewage, trade effluent, oil, or grease.

Non-point source pollution results from the uncontrolled releases of hazardous wastes or materials, misapplication of pesticides, storm-water runoff from streets and paved surfaces, and other activities that wash pollutants into surface waters. Sources can include industrial, commercial, or residential facilities or activities.

The Bases address non-point source pollution control measures and provides for erosion control water management, runoff disposal, and landscaping in all feasibility and development studies. Non-point source pollution is likewise a consideration in project planning, design, and construction. Implementation is accomplished by these measures:

- Funds are included as required for landscape and conservation work in project proposals, construction contracts and specification.
- Erosion at construction sites is minimized by applying a combination of erosion and sedimentation control practices.
- Best Management Practices (BMPs) are voluntary for agencies that are in compliance with specific permit requirements. If permit requirements are exceeded, BMPs will then be implemented.

7.6 Wetland Protection
Installation Supplement

Applicability Statement

This section is applicable to all overseas installations.

Program Overview/Current Management Practices

7.7 Grounds Maintenance
Installation Supplement

Applicability Statement

This section applies to AF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to all bases.

Program Overview/Current Management Practices

The 422 ABG. The intensity, frequency, and type of grounds maintenance practices for the Bases generally depends on the classification of the land area. Grounds categories are all lands not occupied by buildings, structures, roads, or pavements. This includes all land and water acreage for which an installation commander has responsibility including outlying and satellite areas. Grounds are usually categorized as improved, semi-improved, and unimproved.

Improved Grounds: Improved grounds are the developed areas that have lawns and landscape plantings that require intensive maintenance. These include areas such as the athletic areas, military training areas and housing areas. These areas are equivalent to the British amenity grassland and introduced shrub phase 1 habitats.

Grounds maintenance and vegetative cover types are specified, described, and discussed in each installation's Grounds Maintenance Contract. The Grounds Maintenance Contract contains the minimum requirements for soil preparation, seeding, fertilizing, liming, mowing, irrigating, weed control, aerification, spraying, pruning, mulching, vegetated waterways, firebreaks, and drainage ditches.

Semi-Improved Grounds: Semi-improved grounds are areas where periodic maintenance is performed primarily for operational and aesthetic reasons, such as erosion and dust control, bird control, and maintaining visual clear zones. These usually include grounds adjacent to rifle and pistol ranges; picnic areas; ammunition storage areas; antenna facilities; and golf course roughs.

Unimproved Grounds: Unimproved grounds are land areas mowed usually not more than once a year and not included in improved or semi-improved grounds. Unimproved lands usually include weapons ranges, crop and grazing lands or other outlying grasslands, ponds and wetlands.

7.8 Forest Management
Installation Supplement

Applicability Statement

This section applies to AF installations that maintain forested land on AF property. This section **IS** applicable to RAF Fairford and RAF Welford.

Program Overview/Current Management Practices

RAF Fairford. The trees in the small area of woodland are monitored for health and structural safety.

RAF Welford. The trees in the woodland areas are monitored for health and structural safety. The woodland has been coppiced in the past but is not currently managed.

7.9 Wildland Fire Management
Installation Supplement

Applicability Statement

This section applies to AF installations with unimproved lands that present a wildfire hazard and/ or installations that utilize prescribed burns as a land management tool. This section **IS NOT** applicable to the 422 ABG.

Program Overview/Current Management Practices

7.12 Agricultural Outleasing
Installation Supplement

Applicability Statement

This section applies to AF installations that lease eligible AF land for agricultural purposes. This section **IS** applicable to RAF Croughton, RAF Barford St John and RAF Welford.

Program Overview/Current Management Practices

7.13 Coastal Zone and Marine Resources Management
Installation Supplement

Applicability Statement

This section applies to AF installations that are located along coasts and/or within coastal management zones. This section **IS NOT** applicable to the 422 ABG.

Program Overview/Current Management Practices

7.15 Climate Change Vulnerabilities
Installation Supplement

Applicability Statement

This section applies to USAF installations that have identified climate change risks, vulnerabilities, and adaptation strategies using authoritative region-specific climate science, climate projections, and existing tools. This section **IS/IS NOT** applicable to this installation.

Program Overview/Current Management Practices

7.16 Cultural Property Review Process
Installation Supplement

Applicability Statement:

This section **IS/IS NOT** applicable to this installation.

Background/Overview:

As required by each country-specific FGS, installation Commanders shall take into account the effect of any action on any property listed on the World Heritage List or on the applicable country's equivalent of the National Register of Historic Places (NRHP) for purposes of avoiding or mitigating any adverse effects. Activities, programs, or projects that have the potential to involve or affect Host Nation historic properties may include, but are not limited to:

- Ground disturbance for new construction, utility installation, road widening, etc.
- Rehabilitation, renovation or addition to buildings, structures, and/or utilities
- Replacement or maintenance of infrastructure
- Demolition of buildings and structures
- Proposed beddowns
- Environmental investigations and remediation
- Real property actions such as land transfers, out-leasing, etc.

The environmental review process should be initiated early in the planning stages of a project.

Procedure:

Project Proponents should:

- During initial project planning (e.g., completion of AF Form 813; AF Form 332, *Base Civil Engineer Work Request*; DD Form 1391, *Military Construction Project Data*, AF Form 103, *Base Civil Engineering Work Clearance Request*/Dig Permit), provide adequate information necessary to determine whether Host Nation historic properties are present and to assess impact of the proposed project on historic properties
- Implement mitigation or management conditions stipulated by the CRM resulting from the 54 USC § 307101(e) consultation/coordination process and required by the applicable FGS
- The CRM should:
- During review of the proposed action, determine whether historic properties are present and assess the impact of the proposed project on Host Nation historic properties. Results of this review could include:
    - ***No Adverse Effect to Historic Properties***: This determination is made by the CRM (with AFCEC reach back coordination if needed) when the project will have no foreseeable effects on Host Nation historic properties. Document determination and proceed with the action
    - ***Adverse Effect***: This determination is made by the CRM (with AFCEC reach back coordination if needed) when the potential effect could diminish the integrity of the characteristics that qualify the property for the World Heritage List or the Host Nation equivalent of the NRHP. Upon a finding of "adverse effect," the installation will consult with AFCEC and, if appropriate, the Host Nation about trying to avoid or mitigate the adverse effect
- Coordinate environmental review process to support desired project schedules

7.17 Resources Contracting

Installation Supplement

Applicability Statement:

This section **IS/IS NOT** applicable to this installation.

Background/Overview:

USAF Planning, Programming, Budgeting, and Execution (PPBE) is the process of acquiring funding for activities. Contracting of natural and cultural resources-related work follows standard USAF PPBE processes. The Environmental Quality PPBE Playbook and Activity Management Plan Playbooks contain detailed information on funding and contracting.

Procedure:

- The NRM/CRM proposes future projects and includes them in the INCRMP and in the Accountable Property System of Record (APSR).
- If the project is determined to be eligible and funds are available for the project, the NRM/CRM/Section specialist develops a detailed statement of work and moves forward with contracting options.

Contracting Points of Contact

Types of Natural and Cultural Resources Actions	Contracting Plan	Points of Contact
Archaeological Resources		
Historic Resources		

7.20 Cultural Discoveries

Installation Supplement

Applicability Statement:

This section **IS/IS NOT** applicable to this installation.

Background/Overview:

Discoveries of human remains and archaeological resources may occur on lands made available for USAF use overseas. When discoveries are made, the proper actions must be taken to minimize damage to resources. The CRM should refer to the applicable FGS for instructions on how to proceed.

Procedure:

USAF or Contractor personnel that make a potential cultural discovery should:

Immediately notify the CRM or Installation Commander of the nature and location of the discovery

Immediately cease potentially damaging activities and take efforts to ensure protection of resources until arrival of the CRM or designee

The CRM should:

Ensure that all cultural items are left in place and that no further disturbance is permitted to occur

Sufficiently identify the location of the discovery to provide efficient relocation, yet take efforts to minimize the types of signs that could attract personnel and place the discovery in danger

Notify Security Forces of the discovery

Provide guidance to installation personnel and contractors on FGS requirements. If the FGS is silent about a matter, go through AFCEC to seek guidance from the appropriate LEC or, if there is no LEC, the appropriate geographic combatant command

Direct installation personnel and contractors to take efforts to resume mission-associated activities in a reasonable and timely manner

Security Forces should:

Notify the Wing Commander regarding the location, nature, and circumstances of the discovery

Provide security/protection for the site to prevent unauthorized disturbance, looting, or vandalism

If human remains are discovered or if there is sufficient reason to suspect that human remains are present (such as the observation of an oval-shaped rock or earthen mound), the CRM should follow the FGS, request assistance from the LEC, or consult with the Host Nation authorities.

13 SUSPECTED VANDALISM

Installation Supplement

Applicability Statement:

This section **IS/IS NOT** applicable to this installation.

Background/Overview:

The installation has established procedures to deter vandalism and to investigate suspected acts of vandalism when a Host Nation cultural resource is damaged as a result of unauthorized activity.

Procedure:

In the event of a discovery of damaged archaeological site or other historic property, the following actions should be performed:

- Discoverer of potential looting or vandalism should:
  - Immediately notify the CRM (at ***[PHONE NUMBER]***) and Security Forces (at ***[PHONE NUMBER]***)
  - Take all necessary precautions to protect the resource from further damage, loss, or destruction
  - Wait for further instructions from the CRM or other authority
- Security Forces should:
  - Notify the Installation Commander immediately regarding the location, nature, and circumstances of the looting or vandalism
  - Provide security/protection to prevent further unauthorized disturbance, looting, or vandalism
- The CRM should:
  - Inspect the site to assess damage
  - Notify the Installation Commander of damage within 48 hours of discovery. Include the following information in the damage report: Circumstances of site damage, assessment of the nature and extent of damage, recommendations for treatment procedures (coordinate with Host Nation local authority as appropriate), and suggestions for future protection measures
  - Comply with relevant provisions in applicable FGS
- Legal Department personnel will:
  - Assess whether or not accused violators can be prosecuted
  - Advise Installation Commander and appropriate commanders on disciplinary options and processes for vandalism suspects

13.1 Wetlands and Floodplains

Installation Supplement

There are no areas on the 422 ABG Installations that meet the US Army Corps of Engineers (1998) criteria for wetlands. UK wetlands are defined in a different way and do not have the same regulatory constraints as US wetlands. In this document, "wetlands" are defined as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh or salt, including areas of marine water the depth of which at low tide does not exceed six meters." (Convention on Wetlands, 1971). According to this definition, several wetlands are present at the RAF bases, ranging from balancing reservoirs for the drainage system to ditches and ponds

13.2 Integrated Pest Management Program

Installation Supplement

Applicability Statement

This section applies to AF installations that perform pest management activities in support of natural resources management, e.g. invasive species, forest pests, etc. This section **IS** applicable to all bases.

Program Overview/Current Management Practices

The 422 ABG have current pest management plans (PMPs) that are implemented by contractors. They are designed to maximize the use of integrated pest management techniques such as biological control, pest surveys and proper sanitation, enhance environmental protection and be used as a tool to reduce the use of pesticides. When chemicals are necessary, the most effective and least toxic pesticides will be used.

The pest manager supervises and puts measures into effect to control pests that transmit diseases, harmful to personnel, destroy or degrade the quality of real property, attack trees and ornamental plants, crowd our beneficial plants, and attract and provide cover for animal pests. Pests include numerous insects and related lower animals, terrestrial and aquatic plants (weeds), domestic and feral rodents, birds, local predatory animals, snakes, nematodes, snails, algae, fungal plant diseases, and other organisms (other than domestic animals) that are not desirable.

The chemicals used in pest control are not stored on base. All pesticides used on 422 ABG Installations by contractors must be approved by the Department of the Environment, Food and Rural Affairs (DEFRA), Health and Safety Executive (HSE) and the Pesticide Safety Directorate (PSD). All personnel applying pesticides must be certified in accordance with DoD Directive 4151.07 or under the authority of UK DEFRA and the FGS-UK Chapter 11 and provide a copy of their certification to 100 CES / CEOSS. Appropriate personal protective equipment (PPE) will be worn during pesticide application.

Careless handling and application of herbicides or insecticides could potentially result in contamination of the principal, or class "1" aquifer underneath the base and unintentional poisoning of domestic animals and special-status plants or animal species found on the Base.

Other considerations within the plan include:

- the notification of CES Pest Management Personnel prior to application in order to protect Child Development Centers, medical facilities, base housing and food preparation or consumption facilities;
- The Base Exchange Manager will maintain a current pesticide inventory, co-ordinate disposals and make Safety Data Sheets (SDS's available to employees, the Fire Department, Bioenvironmental Engineering, 422 CES/CEIE, 420 ABS/CEIE and DIO EA;
- Pesticide storage;
- Public Health must be notified of fumigation work, which must be coordinated with fire, medical, security forces and safety personnel;
- Disposal of the pesticide waste should be at approved disposal sites and comply with British Law; and
- All personnel applying pesticides or herbicides should have regular health checks.

13.3 Bird/Wildlife Aircraft Strike Hazard (BASH)
Installation Supplement

Applicability Statement

This section applies to AF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS** applicable to RAF Fairford.

Program Overview/Current Management Practices

The BASH program focuses on the reduction of birds in the vicinity of aircraft runways on the Base to enhance safety of aircraft operations. The primary management techniques focus on the elimination or reduction of environmental conditions that attract birds to the airfields. Techniques include:

Falconry;

Control of vegetation and growth, including mowing and removal of perching vegetation

Establishment of bird strike grass mixture

Control of water such as ditches or ponds

Control of bird habitat through the use of repellents or electronic or sound deterrents to roosting

Prevention of bare areas, as birds frequently use them as resting sites on the airfield.

Outside runway areas, the landscape guidelines recommend minimizing use of fruit-bearing trees, which attract birds for feeding.

Some wildlife are detrimental to the Base mission or to resource management objectives when the animals occur in undesirable locations. The wildlife species vary among different habitats, but the most critical ones for the Base mission are birds that present aircraft strike hazards in the “airdrome” (i.e., air space above the Base). The Base controls such birds through the BASH program.

Other examples of nuisance species include hares, rabbits and rodents on improved and semi-improved grounds that may be controlled through the use of traps or baits.

13.4 Communication, Planning, and EIAP
Installation Supplement

Applicability Statement:

This section **IS/IS NOT** applicable to this installation

Background/Overview:

The EIAP is the USAF procedure for performing environmental project review, in compliance with the requirements of 32 CFR Part 187, *Environmental Effects Abroad of Major Department of Defense Actions*. The proponent of an action is responsible for initiating the EIAP early in the planning stages of a proposed action. The EIAP process is documented on Air Force (AF) Form 813, *Request for Environmental Impact Analysis*. The NRM and CRM must be familiar with the EIAP process for overseas actions, which is specified in AFI 32-7091. Additional information and guidance regarding overseas EIAP is available on the eDASH Overseas EIAP website.

Procedure:

The NRM/CRM should:

- Work in close coordination with EIAP manager during all environmental reviews
- Identify and consult with local governments/other parties, when appropriate
- Plan for public participation, as necessary

13.5 Public Access to Host Nation Sites of Cultural or Traditional Importance

Installation Supplement

Applicability Statement:

This section applies to USAF installations that have sites of cultural or historical importance and allow public access. This section **IS/IS NOT** applicable to this installation.

Procedure:

13.6 Accidents and Emergencies Affecting Historic Properties

Installation Supplement

Applicability Statement:

This section **IS/IS NOT** applicable to this installation.

Procedure:

13.7 Curation of Collections and Records

Installation Supplement

Applicability Statement:

This installation **DOES/DOES NOT** maintain such a collection and IS/IS NOT required to implement this SOP.

Procedure:

13.8 Management and Coordination

Installation Supplement

Applicability Statement:

This section **IS/IS NOT** applicable to this installation.

Background/Overview:

The following Procedure outlines and describes natural and cultural resources-related communication, review, and coordination processes and workflows.

Procedure:

Internal Reviews

Internal review procedures will be initiated as early in project planning as possible, so that personnel are allowed sufficient time to implement appropriate natural and cultural resource activities, as required. Specific documents and processes that typically require internal review include:

- Completion of AF Form 332 for proposed work to Civil Engineering (CE) to determine whether the proposed work will affect any natural or cultural resources
- Completion of AF Form 103, generally for work involving digging to CE to determine whether the proposed work will affect any natural or cultural resources
- Environmental project review, including the EIAP and completion of the AF Form 81

Notification and Consultation

- Consultation can occur at any time with Host Nation officials at the discretion of the NRM and CRM

Agreement Documents

- Agreement documents pertaining to the treatment of natural and cultural resources will be drafted and coordinated by the NRM and CRM and approved by the Installation Commander
- Agreement documents are referenced in the Appendix section of this INCRMP

13.9 Public Outreach

Installation Supplement

Applicability Statement

This section applies to AF installations that perform community outreach activities in support of natural resource programs. This section **IS** applicable to RAF Croughton.

Program Overview/Current Management Practices

13.10 Geographic Information Systems (GIS)

Installation Supplement

Applicability Statement

This section applies to all AF installations that maintain geospatial information must within a GeoBase system. The section **IS** applicable to all bases.

Program Overview/Current Management Practices

Standardized data models and the minimum required attributes for the geospatial data required for natural resources management have been developed for all Installations.

14 MANAGEMENT GOALS AND OBJECTIVES

The installation establishes long term, expansive goals and supporting objectives to manage and protect natural and cultural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural and cultural resources and are the primary focal points for INCRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. Also, in cases where off-installation land uses may jeopardize USAF missions, this section may list specific goals and objectives aimed at eliminating, reducing or mitigating the effects of encroachment on military missions. These natural and cultural resources management goals for the future have been formulated by the preparers of the INCRMP from an assessment of the natural and cultural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the natural and cultural resources programs.

The installation goals and objectives are displayed in the "Installation Supplement" section below in a format that facilitates an integrated approach to natural and cultural resource management. By using this approach, measurable objectives can be used to assess the attainment of goals. Individual work tasks support INCRMP objectives. The projects are key elements of the annual work plans and are programmed into the conservation budget, as applicable.

Installation Supplement

RAF Croughton

Goal 1. Maintain and enhance ecological value of existing habitats.

Objective 1.1 Enhancing pasture land.

Reducing the cutting/ mowing regime in part of the grassland area (perhaps the zone furthest away from any buildings and any critical military areas) will cause a significant increase in the availability of flower heads and seeds which provide an important food resource for bird species (especially declining farmland birds). The former landfill site which is currently left unmanaged provides resources for species requiring dense vegetation cover, including mammals and certain bird species.

Project 1.1.1 Identify areas for a reduced cutting/mowing regime.

Creating variation in the cutting regime across the site will bring maximum benefit to a wide range of wildlife species including invertebrates and bats. It would also be beneficial to have some areas of rough grassland on site, perhaps on a long rotation – this will encourage small mammals in particular which will provide a food source for predator species such as birds of prey and grass snake. Having some areas of short-mown/ grazed grassland throughout the bird breeding season would be of particular value to birds on site, such as skylark.

Objective 1.2 Enhancing scrub woodland habitats.

It is recommended that the patches of scrub are cut in rotation to maintain different age structures. The taller bushes will be used as singing perches for birds during the breeding season.

Project 1.2.1 The scrub woodland habitat within the conservation area should be subject to ride widening/ coppicing etc., so as to open up the canopy and increase botanical and invertebrate diversity. This will also be of benefit to bird and bat species.

Objective 1.3 Ponds and Croughton Brook

Croughton Brook and Wildlife Conservation Area should be maintained so as to maximize ecological value of waterbody/ watercourse margins by cutting back of tall, coarse vegetation 1-2 times per year. No more than half the bank sides should be cut at any one time and the cut grass should be raked off. No machinery should be allowed within 5m of the bank top to avoid the risk of damaging water vole tunnels.

The ponds in the wildlife conservation area were created in order to enhance the water vole population however they do not retain water in the summer months and no water vole holes were present. It is therefore recommended that the temporary ponds are allowed to develop ecological value in their own right. It is recommended that the flora and fauna of the ponds are monitored to determine if further management is required to optimize ecological value.

Water bodies/ watercourses – enhancement of waterbodies will increase the value of the site for certain species of birds, bats, and white-clawed crayfish and water voles if present. Use buffer areas to protect habitats from farming operations such as spraying and spreading fertilizer, muck or slurry. Restricting livestock access helps. Also consider the following:

- Comply with Nitrate Vulnerable Zones (NVZ) and Local Environmental Risk Assessment for Pesticides (LERAP) regulations.
- Improve water quality.

Project 1.3.1 Create waterbody/water course buffer zones.

Objective 1.4. Enhancing unimproved grassland.

The biodiversity of the unimproved grassland south of the perimeter fence should be maintained and left as grassland. The extensive badger sett in the strip of scrub should not be disturbed.

Cutting of the grassland should be undertaken manually with strimmer's to avoid damaging the ant hills. Cuttings should be raked and removed into compost heaps at the perimeter which can provide breeding sites for grass snake.

Badger setts should not be disturbed by noise within at least 5m of any entrance holes and heavy machinery within 30m of the entrance hole.

Give priority to all areas of grassland that have not been heavily-improved, for example through re-seeding or nutrient inputs. Under the right management, such grassland can benefit wildlife, provide carbon storage and protect water. Flower-rich grassland or wet grassland are of high value for birds, bats and grass snakes (and can be supported by agri-environment funding).

Objective 1.5. Maximize the value of field boundaries.

Hedges, ditches and walls are important for wildlife. Making the most of these features is a simple way to help wildlife at relatively low cost. Trimming hedges (within permitted dates) and managing ditches on a 2-3 year rotation boosts flowers, fruit and refuges for wildlife. This approach is most suited to thorn-dominated hedges and ditches where rotational management will not compromise field drainage. Plant a wide range of hedgerow trees to maintain or restore former numbers in the landscape.

Hedgerow management - cutting hedges by flail is best undertaken in late winter or early spring. If carried out in the autumn the current year's fruit and winter food supply for birds and mammals is removed and if done too late in the spring, nesting habitat for birds is destroyed. If hedges can be cut in an 'A' shape rather than an 'n' shape then the wider base ensures denser growth and a better habitat for wildlife.

There are two traditional methods for managing hedgerows, both with the aim of creating and maintaining a dense, bushy, stock-proof boundary. Perhaps the best known is to 'lay' the hedge. This involves cutting almost all the way through the woody stems and then bending the stem down to be almost parallel with the ground. The hedge then grows new shoots from the cut area as well as producing lots of dense growth from the horizontal stem.

Alternatively, hedges might be coppiced. This involves cutting the hedge plants to within a few inches of the ground and allowing them to re-grow. This promotes vigorous bushy growth. Either of these techniques can be carried out every 6–7 years to maintain a dense bushy hedge. Hedges should be cut in rotation i.e. a different hedge cut every year to create diversity of habitats for wildlife.

Project 1.5.1 Review current hedgerow management regimes in line with above.

Maintaining connectivity of hedgerows is particularly important for conserving the linear network of landscape features used by commuting bats.

Project 1.5.2 Gaps in hedgerows should be planted up to avoid hedgerow fragmentation over time.

Project 1.5.3 Plant hedgerows to create sheltered habitats

Hedgerows can be planted as wind breaks to create sheltered conditions in the lea of the hedgerow. Combined with measures to promote flower-rich habitats (Goal 2) in the shelter of the new hedgerows will benefit invertebrates in particular. Proposed locations are for hedgerows to be planted on grassed berms to enhance southerly facing slopes e.g. near building 56 the Medical Centre.

Goal 2. Create new habitat.

Objective 2.1 Create flower-rich habitats - flowering plants are essential for many beneficial insects and a wealth of wildlife, especially bird species.

Appropriate conservation management will increase diversity of flowering plants in existing grassland. Restoration/ creation of new areas of grassland may also be done sowing with locally-sourced green hay collected from nearby botanically diverse grassland or native local-provenance grassland and wildflower seed mixtures. Other possible measures are as follows:

- Consider increasing plant diversity sown in grass leys on areas such as headlands or where there will be short runs when mowing.
- Legumes, such as clovers, can reduce use of inorganic fertilizer, boost protein and mineral supply for livestock and benefit soil structure. Some flowering herbs, such as plantains and chicory, can be productive in grass leys.
- Alternatively, establish small flower-rich areas. This may include encouraging native plants on less fertile grassland areas or cultivating margins to stimulate germination of arable plants in the seed bank.

Project 2.1.1 Identify areas for creation of flower-rich habitat.

Objective 2.2. Other wildlife areas.

Less productive areas such as infertile earth banks can provide ideal wildlife habitats. Create taller grassland rich in insects by leaving areas unmown or un-topped or by grazing lightly. Establish rough grass areas where water channels run through fields or beside water courses and ponds.

Objective 2.3 Creating habitat within the arable field.

Arable field margins are a UK BAP Priority Habitat. Management for conservation value by sowing conservation 'headlands' rich in flowers and seed-bearing species will provide high quality foraging habitat for birds and bats.

Use a mix of forage crops to help wildlife on arable areas where possible. Mixed arable and livestock farms generally benefit wildlife (more than specialist enterprises) and can improve nutrient use efficiency and soil structure. Mixed farms can offer increased diversity of plants, insects and mobile species such as birds. Crops and management affect wildlife value. Grain and weed seeds are essential winter food for many farmland birds. Growing cereals for whole-crop (silage) or crimping provides valuable alternative forage for livestock and an entry into grass. Winter food and shelter is vital for a range of farm wildlife such as declining farmland bird species; linnet, yellowhammer and skylark. To achieve this:

- Provide winter seed food from cereal stubbles and wild seed mix that gives bird's food and shelter.
- Cut hedges on rotation and establish berry producing trees.
- Establish areas of rough grass to give shelter for mammals and a range of insects.

Lapwing and skylark unsown plots can also be considered within arable land.

Project 2.3.1. Planting hedgerows around arable land and groups of trees at field corners will provide commuting and foraging habitat for bats.

Goal 3. Prioritize management of the site for the most the most ecologically important species groups present.

Objective 3.1. Management for farmland birds.

Maintain existing bird nesting boxes and consider siting of new nest-boxes to suit a wide range of different bird species. Regular maintenance is required and is essential for successful use.

Project 3.1.1 Encourage species of high conservation value. Online resources indicate a number of turtle dove records scattered across the area surrounding the site, and in addition the 2011 survey recorded lapwing as being present during the breeding season – these species may potentially breed on site, and habitats they favor are of high ecological value (and benefit other key species even if the desired species themselves are not attracted to the site (see Farm Management for Turtle Doves CFE advice sheet for advice on creating suitable foraging areas nesting sites and water in close proximity for this species).

It is important that if bird boxes are erected that they are monitored and maintained annually. Any work of this nature should be undertaken by the local bird groups in liaison with the Base Wildlife Officer.

Objective 3.2. Management for bats.

It is important that if bat boxes are erected that they are monitored and maintained annually. The locations of bat boxes need careful consideration for it to be successful and the maintenance requires a bat handling license. Any work of this nature should be undertaken by the local bat group in liaison with the Base Wildlife Officer.

Project 3.2.1 Establish links with the local bat group to develop a bat monitoring and bat box maintenance plan.

RAF Barford St John

Goal 1. Maintain and enhance ecological value of existing habitats.

Objective 1.1 Appropriate management of grassland to maximize ecological benefit:

Give priority to all areas of grassland that have not been heavily-improved, for example through re-seeding or nutrient inputs. Under the right management, such grassland can benefit wildlife, provide carbon storage and protect water. Flower-rich grassland or wet grassland are of high value for birds (and can be supported by agri-environment funding).

Just reducing the cutting/ mowing regime in part of the grassland area (perhaps the zone furthest away from any buildings and any critical military areas) will cause a significant increase in the availability of flower heads and seeds which provide an important food resource for owls and birds of prey. Having some areas of short-mown/ grazed grassland throughout the bird breeding season would be of particular value to birds on site, such as skylark.

Creating variation in the cutting regime across the site will bring maximum benefit to a wide range of wildlife species including invertebrates and bats. It would also be beneficial to have some areas of rough grassland on site, perhaps on a long rotation – this will encourage small mammals in particular which will provide a food source for owls and birds of prey.

Badger setts should not be disturbed by noise within at least 5m of any entrance holes and heavy machinery within 30m of the entrance hole.

Project 1.1.1 Identify areas for a reduced cutting/mowing regime and enhancement of grassland habitats.

Objective 1.2 Appropriate management of trees.

Mature trees should be conserved on site to maintain potential bat roost features and sheltered foraging areas. This includes retaining dead boughs and standing dead wood where possible. Fallen trees or branches should be left where they fall or, if necessary, moved to a semi-shaded area nearby. Tree surgery to remove branches is preferable to completely felling a dead tree. Loss of this important habitat for bats should be avoided.

Project 1.2.1 Planting of new parkland and hedgerow trees should be undertaken to provide replacement trees into the future. Trees should be planted in small groups (3 to 5 trees) in gaps between existing scattered mature trees in grassland to either side of the Base entrance gate in the west of the Base and also single trees should be planted in gaps in hedgerows in the western and northern boundaries. Container grown plants to be planted at any time of year if prevailing weather conditions are suitable. Bare root specimens should be planted in late October-February inclusive when trees are dormant.

Objective 1.3. Maximize the value of field boundaries.

Maximize the value of field boundaries. Hedges, ditches and walls are important for wildlife, and maintaining large mature native hedgerows are considered to be an important habitat resource for tree sparrows. Making the most of these features is a simple way to help wildlife at relatively low cost. Trimming hedges (within permitted dates) and managing ditches on a 2-3 year rotation boosts flowers, fruit and refuges for wildlife. This approach is most suited to thorn-dominated hedges and ditches where rotational management will not compromise field drainage. Plant a wide range of hedgerow trees to maintain or restore former numbers in the landscape.

Hedgerow management - cutting hedges by flail is best undertaken in late winter or early spring. If carried out in the autumn the current year's fruit and winter food supply for birds and mammals is removed and if done too late in the spring, nesting habitat for birds is destroyed. If hedges can be cut in an 'A' shape rather than an 'n' shape then the wider base ensures denser growth and a better habitat for wildlife.

There are two traditional methods for managing hedgerows, both with the aim of creating and maintaining a dense, bushy, stock-proof boundary. Perhaps the best known is to 'lay' the hedge. This involves cutting almost all the way through the woody stems and then bending the stem down to be almost parallel with the ground. The hedge then grows new shoots from the cut area as well as producing lots of dense growth from the horizontal stem.

Alternatively, hedges might be coppiced. This involves cutting the hedge plants to within a few inches of the ground and allowing them to re-grow. This promotes vigorous bushy growth. Either of these techniques can be carried out every 6–7 years to maintain a dense bushy hedge. Hedges should be cut in rotation i.e. a different hedge cut every year to create diversity of habitats for wildlife.

Project 1.3.1 Review current hedgerow management regimes in line with above.

Maintaining connectivity of hedgerows is particularly important for conserving the linear network of landscape features used by commuting bats.

Project 1.3.2 Gaps in hedgerows should be planted up to avoid fragmentation over time.

Goal 2. Create new habitat.

Objective 2.1 Create flower-rich habitats - flowering plants are essential for many beneficial insects and a wealth of wildlife, especially bird species. Appropriate conservation management will increase diversity of flowering plants in existing grassland. Restoration/ creation of new areas of grassland may also be done sowing with locally-sourced green hay collected from nearby botanically diverse grassland or native local-provenance grassland and wildflower seed mixtures. Other possible measures are as follows:

- Consider increasing plant diversity sown in grass leys on areas such as headlands or where there will be short runs when mowing.
- Legumes, such as clovers, can reduce use of inorganic fertilizer, boost protein and mineral supply for livestock and benefit soil structure. Some flowering herbs, such as plantains and chicory, can be productive in grass leys.
- Alternatively, establish small flower-rich areas. This may include encouraging native plants on less fertile grassland areas or cultivating margins to stimulate germination of arable plants in the seed bank.

Project 2.1.1 Identify areas for creation of flower-rich habitat.

Objective 2.2. Other wildlife areas.

Less productive areas such as infertile earth banks can provide ideal wildlife habitats. Create taller grassland rich in insects by leaving areas unmown or un-topped or by grazing lightly. Establish rough grass areas where water channels run through fields or beside water courses and ponds.

Objective 2.3 Dewpond creation – there is currently no surface water on site at Barford.

Project 2.3.1 Creation of a new dewpond would be of considerable value to all wildlife; including bird species and foraging bats.

Goal 3. Prioritize management of the site for the most the most ecologically important species groups present.

Objective 3.1. Management for farmland birds.

Farmland bird species: as a group these species (includes corn bunting, linnet, song thrush, starling, stock dove, tree sparrow and yellowhammer at Barford) are considered a conservation priority due to significant declines in numbers nationally in recent decades. Providing conditions suitable for successful breeding of these species should be considered a key management objective.

Provide nesting locations for breeding birds - maintain any existing bird nesting boxes, and consider siting of new nest-boxes to suit a wide range of different bird species. Regular maintenance is required and is essential for successful use.

Project 3.1.1 The steep decline in tree sparrow numbers in recent decades is thought to be partly due to competition for nesting sites, so installing nest boxes suitable for this species should be the highest priority.

Tree sparrows - key points/ requirements:

- Protecting/ providing nest sites for tree sparrows. Ensure there are nesting holes available in trees and farm buildings, or use nest boxes.
- Use low-input crop management, field margins or wetland features to create insect-rich habitats.
- Use over-wintered stubble or wild bird seed mixtures to provide seed food throughout the winter.

(see https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/advice/helping-species/tree-sparrow/).

It is important that if bird boxes are erected that they are monitored and maintained annually. Any work of this nature should be undertaken by the local bird group in liaison with the Base Wildlife Officer.

Project 3.1.2 Encourage species of high conservation value (including those not currently recorded).

Corn bunting - key points/ requirements:

- Where possible adapt farming methods to avoid impact to nests. Because corn buntings are a late nesting species, their nests can be destroyed during harvesting or cutting.
- Ensure the farmland provides nesting habitat, summer food and winter food.
- Boost insect food using buffer strips, conservation headlands or other low-input crop options
- Provide seed food, especially cereal grain, through the winter with over-wintered stubbles or seed-rich wild bird cover crops.

(see https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/advice/helping-species/corn-bunting/).

Other species such as turtle dove and lapwing could potentially utilize the site for breeding, and the habitats they favor are of high ecological value (and benefit other key species even if the desired species themselves are not attracted to the site). Specialist ornithological advice should be sought to obtain specific advice on this point if it is to be followed up (see Farm Management for Turtle Doves CFE advice sheet for advice on creating suitable foraging areas nesting sites and water in close proximity for this species).

Objective 3.2. Management for bats.

It is important that if bat boxes are erected that they are monitored and maintained annually. The locations of bat boxes need careful consideration for it to be successful and the maintenance requires a bat handling license. Any work of this nature should be undertaken by the local bat group in liaison with the Base Wildlife Officer.

Project 3.2.1 Establish links with the local bat group to develop a bat monitoring and bat box maintenance plan.

RAF Fairford

Goal 1. Maintain and enhance ecological value of existing habitats.

Objective 1.1 Enhancing grassland.

Give priority to all areas of grassland that have not been heavily-improved, for example through re-seeding or nutrient inputs. Under the right management, such grassland can benefit wildlife in general, as well as providing carbon storage and protecting water resources. Flower-rich grassland or wet grassland are of high value and just reducing the cutting/ mowing regime in part of the grassland area (perhaps the zone furthest away from any buildings and any critical military areas will be the most acceptable way of doing this) will cause a significant increase in the availability of flower heads and seeds which provide an important food resource for wildlife.

Project 1.1.1 Identify areas for a reduced cutting/mowing regime.

Creating variation in the cutting regime across the site will bring maximum benefit to a wide range of wildlife species including invertebrates and bats. It would also be beneficial to have some areas of rough grassland on site, perhaps on a long rotation – this will encourage small mammals in particular which will provide a food source for grass snake.

Flower-rich habitats and wildlife banks should be created close to water bodies. The grassland in the South West Loop should be cut to a height of 5cm annually in April and the cuttings removed to a compost heap at the boundary to increase biodiversity.

Project 1.1.2 Maintenance of bee orchid populations

Cutting of grassland supporting bee orchids, to the north of the airfield, should be delayed until after seed has ripened in late July.

Objective 1.2 Enhancing woodland and tree habitats.

Appropriate management of the woodland habitat within the site will benefit biodiversity; for example coppicing small areas on a cyclical basis and opening paths and ride habitats will result in an increase in botanical and invertebrate diversity. Badger setts should not be disturbed by noise within at least 5m of any entrance holes and heavy machinery within 30m of the entrance hole.

Mature trees should be conserved on site to maintain potential bat roost features and sheltered foraging areas. This includes retaining dead boughs and standing dead wood where possible. Fallen trees or branches should be left where they fall or, if necessary, moved to a semi-shaded area nearby. Tree surgery to remove branches is preferable to completely felling a dead tree. Loss of this important habitat for bats should be avoided.

Project 1.2.1 Planting of new parkland trees should be undertaken to provide replacement trees into the future.

Objective 1.3 Appropriate management of water bodies and surrounding habitats

Project 1.3.1 The ditch within the South West Loop is silting up. The habitat suitability for great crested newt should be monitored and the ditch should be dredged if necessary to maintain a suitable water depth for the species.

The area around the pond in the Constructors Compound should be maintained as a mosaic of scrub, scattered trees and tall grassland. The grassland should be cut to a height of two inches during April and the cuttings removed to maintain a diverse flora. The plants should then be allowed to flower and set seed. See grassland recommendations above.

Leachate from the composting material should not be allowed to enter the pond as this will cause eutrophication and reduce the biodiversity.

Enhancement of waterbodies will increase the value of the site for certain species including great crested newt. Also consider the following:

- Comply with Nitrate Vulnerable Zones (NVZ) and Local Environmental Risk Assessment for Pesticides (LERAP) regulations.
- Improve water quality.

Project 1.3.2 Create waterbody/water course buffer zones.

Objective 1.4. Maximize the value of field boundaries.

Maximize the value of field boundaries. Hedges, ditches and walls are important for wildlife. Making the most of these features is a simple way to help wildlife at relatively low cost. Trimming hedges (within permitted dates) and managing ditches on a 2-3 year rotation boosts flowers, fruit and refuges for wildlife. This approach is most suited to thorn-dominated hedges and ditches where rotational management will not compromise field drainage. Plant a wide range of hedgerow trees to maintain or restore former numbers in the landscape.

Hedgerow management - cutting hedges by flail is best undertaken in late winter or early spring. If hedges can be cut in an 'A' shape rather than an 'n' shape then the wider base ensures denser growth and a better habitat for wildlife.

There are two traditional methods for managing hedgerows, both with the aim of creating and maintaining a dense, bushy, stock-proof boundary. Perhaps the best known is to 'lay' the hedge. This involves cutting almost all the way through the woody stems and then bending the stem down to be almost parallel with the ground. The hedge then grows new shoots from the cut area as well as producing lots of dense growth from the horizontal stem.

Alternatively, hedges might be coppiced. This involves cutting the hedge plants to within a few inches of the ground and allowing them to re-grow. This promotes vigorous bushy growth. Either of these techniques can be carried out every 6–7 years to maintain a dense bushy hedge. Hedges should be cut in rotation i.e. a different hedge cut every year to create diversity of habitats for wildlife.

Project 1.4.1 Review current hedgerow management regimes in line with above.

Maintaining connectivity of hedgerows is particularly important for conserving the linear network of landscape features used by commuting bats.

Project 1.4.2 Gaps in hedgerows should be planted up to avoid fragmentation over time.

Goal 2. Create new habitat.

Objective 2.1 Create flower-rich habitats - flowering plants are essential for many beneficial insects and a wealth of wildlife.

Appropriate conservation management will increase diversity of flowering plants in existing grassland. Restoration/ creation of new areas of grassland may also be done sowing with locally-sourced green hay collected from nearby botanically diverse grassland or native local-provenance grassland and wildflower seed mixtures. Other possible measures are as follows:

- Consider increasing plant diversity sown in grass leys on areas such as headlands or where there will be short runs when mowing.
- Legumes, such as clovers, can reduce use of inorganic fertilizer, boost protein and mineral supply for livestock and benefit soil structure. Some flowering herbs, such as plantains and chicory, can be productive in grass leys.
- Alternatively, establish small flower-rich areas. This may include encouraging native plants on less fertile grassland areas or cultivating margins to stimulate germination of arable plants in the seed bank.

Project 2.1.1 Identify areas for creation of flower-rich habitat.

Objective 2.2. Other wildlife areas.

Less productive areas such as infertile earth banks can provide ideal wildlife habitats. Create taller grassland rich in insects by leaving areas unmown or un-topped or by grazing lightly. Establish rough grass areas where water channels run through fields or beside water courses and ponds.

Objective 2.3 Design of reconfigured Base Lake.

The base lake is proposed to be filled in. The existing lake does not support great-crested newts despite high populations on the base due to the unsuitable size. Therefore a mitigation pond should be designed and managed to maximize benefit to the great crested newt population, following guidance in the Great crested newt conservation handbook (Froglife, 2001).

The Base Lake area and surrounding natural habitats should be maintained so as to maximize ecological value of waterbody/ watercourse margins (as far as permitted by Bird / Aircraft Strike Hazard measures) by cutting back of tall, coarse vegetation 1-2 times per year, and maintaining a proportion of cover of scrub species among predominately open grassland with diverse plant species and habitat structure (i.e. to provide varying lengths and tussocky areas).

Continue to allow scattered scrub to develop in the abandoned field adjacent to the Base Lake to benefit small mammals and invertebrates. Cut small areas of the grassland on an ad hoc basis to develop a variable height sward which will increase biodiversity.

Goal 3. Prioritize management of the site for the most the most ecologically important species groups present.

Objective 3.1. Management for water voles.

Maintain existing watercourse habitat present within the section of Washpool Lane Drain at Gate 7 Interceptor.

Project 3.1.1 Water vole should be assumed present within the section of Washpool Lane Drain at Gate 7 Interceptor. The species should continue to be monitored. Channel and bank management should be sensitive to this species including:

- leaving buffer zones to each side of the bank top;
- bank side vegetation cutting to no shorter than 150mm;

- cut alternate banks each year;
- when desilting, only remove silt from the center of the channel and retain a fringe of vegetation along the edge of the channel; and
- carry out maintenance outside the water vole spring-summer breeding season, ideally in late September or October.

Objective 3.2. Management for bats.

It is important that if bat boxes are erected that they are monitored and maintained annually. The locations of bat boxes need careful consideration for it to be successful and the maintenance requires a bat handling license. Any work of this nature should be undertaken by the local bat group in liaison with the Base Wildlife Officer.

Project 3.2.1 Establish links with the local bat group to develop a bat monitoring and bat box maintenance plan.

RAF Welford

Goal 1. Maintain and enhance ecological value of existing habitats.

Objective 1.1 Enhancing Parkland and grassland habitats.

Parkland P3 and P4 in the munitions area should only be mown after the woodland flora has set seed to maintain the biodiversity. Less frequent mowing in the other parkland areas within the munitions area would produce a more diverse flora.

Give priority to all areas of grassland that have not been heavily-improved, for example through re-seeding or nutrient inputs. Under the right management, such grassland can benefit wildlife, provide carbon storage and protect water. Flower-rich grassland or wet grassland are of high value for birds (and can be supported by agri-environment funding).

Just reducing the cutting/ mowing regime in part of the grassland area (perhaps the zone furthest away from any buildings and any critical military areas) will cause a significant increase in the availability of flower heads and seeds which provide an important food resource for bird species (especially declining farmland birds).

Project 1.1.1 Identify areas for a reduced cutting/mowing regime.

Creating variation in the cutting regime across the site will bring maximum benefit to a wide range of wildlife species including invertebrates and bats. It would also be beneficial to have some areas of rough grassland on site, perhaps on a long rotation – this will encourage small mammals in particular which will provide a food source for owls and birds of prey.

The nests of ground nesting birds should be avoided by the grass cutters. If some areas are made more favorable for them by creating a variable height sward they will be attracted to these areas and regular cutting could be maintained on the more critical military areas.

Objective 1.2 Enhancing value of woodland and trees.

The ancient woodland habitat within the site will benefit from appropriate management, for example coppicing small areas on a cyclical basis and opening paths and ride habitats will result in an increase in botanical and invertebrate diversity which will be of benefit for birds. Dead wood should be left standing/lying in the woodland as it creates a microhabitat for beetles and flies, which in turn supplies food for birds and bats.

Old badger setts should be retained as a resource for badgers in the wider landscape which may recolonize them. Badger setts should not be disturbed by noise within at least 5m of any entrance holes and heavy machinery within 30m of the entrance hole.

Tree management. Mature trees should be conserved on site to maintain potential bat roost features and sheltered foraging areas. This includes retaining dead boughs and standing dead wood where possible. Fallen trees or branches should be left where they fall or, if necessary, moved to a semi-shaded area nearby. Tree surgery to remove branches is preferable to completely felling a dead tree. Loss of this important habitat for bats should be avoided.

Project 1.2.1 Planting of new parkland and hedgerow trees should be undertaken to provide replacement trees into the future. Locations for tree planting should be targeted at species-poor grassland, determined following botanical surveys in 2019. Container grown plants to be planted at any time of year if prevailing weather conditions are suitable. Bare root specimens should be planted in late October-February inclusive when trees are dormant.

Objective 1.3. Maximize the value of field boundaries.

Hedges, ditches and walls are important for wildlife. Making the most of these features is a simple way to help wildlife at relatively low cost. Trimming hedges (within permitted dates) and managing ditches on a 2-3 year rotation boosts flowers, fruit and refuges for wildlife. This approach is most suited to thorn-dominated hedges and ditches where rotational management will not compromise field drainage. Plant a wide range of hedgerow trees to maintain or restore former numbers in the landscape.

Hedgerow management - cutting hedges by flail is best undertaken in late winter or early spring. If carried out in the autumn the current year's fruit and winter food supply for birds and mammals is removed and if done too late in the spring, nesting habitat for birds is destroyed. If hedges can be cut in an 'A' shape rather than an 'n' shape then the wider base ensures denser growth and a better habitat for wildlife.

There are two traditional methods for managing hedgerows, both with the aim of creating and maintaining a dense, bushy, stock-proof boundary. Perhaps the best known is to 'lay' the hedge. This involves cutting almost all the way through the woody stems and then bending the stem down to be almost parallel with the ground. The hedge then grows new shoots from the cut area as well as producing lots of dense growth from the horizontal stem.

Alternatively, hedges might be coppiced. This involves cutting the hedge plants to within a few inches of the ground and allowing them to re-grow. This promotes vigorous bushy growth. Either of these techniques can be carried out every 6–7 years to maintain a dense bushy hedge. Hedges should be cut in rotation i.e. a different hedge cut every year to create diversity of habitats for wildlife.

Project 1.3.1 Review current hedgerow management regimes in line with above.

Maintaining connectivity of hedgerows is particularly important for conserving the linear network of landscape features used by commuting bats.

Project 1.3.2 Gaps in hedgerows should be planted up to avoid fragmentation over time.

Goal 2. Create new habitat.

Objective 2.1 Create flower-rich habitats - flowering plants are essential for many beneficial insects and a wealth of wildlife, especially bird species. Appropriate conservation management will increase diversity of flowering plants in existing grassland. Restoration/ creation of new areas of grassland may also be done sowing with locally-sourced green hay collected from nearby botanically diverse grassland or native local-provenance grassland and wildflower seed mixtures. Other possible measures are as follows:

- Consider increasing plant diversity sown in grass leys on areas such as headlands or where there will be short runs when mowing.
- Legumes, such as clovers, can reduce use of inorganic fertilizer, boost protein and mineral supply for livestock and benefit soil structure. Some flowering herbs, such as plantains and chicory, can be productive in grass leys.
- Alternatively, establish small flower-rich areas. This may include encouraging native plants on less fertile grassland areas or cultivating margins to stimulate germination of arable plants in the seed bank.

Project 2.1.1 Identify areas for creation of flower-rich habitat.

Objective 2.2. Other wildlife areas.

Less productive areas such as infertile earth banks can provide ideal wildlife habitats. Create taller grassland rich in insects by leaving areas unmown or un-topped or by grazing lightly. Establish rough grass areas where water channels run through fields or beside water courses and ponds.

Goal 3. Prioritize management of the site for the most the most ecologically important species groups present.

Objective 3.1. Management for farmland birds.

Provide nesting locations for breeding birds - maintain any existing bird nesting boxes, and consider siting of new nest-boxes to suit a wide range of different bird species. Regular maintenance is required and is essential for successful use.

It is important that if bird boxes are erected that they are monitored and maintained annually. Any work of this nature should be undertaken by the local bird group in liaison with the Base Wildlife Officer.

Project 3.1.1 Encourage species of high conservation value. Online resources indicate a number of turtle dove records scattered across the area surrounding the site – this species may potentially occur as a breeding species and habitats it favors are of high ecological value and benefit other key species even if turtle doves are not attracted to the site (see Farm Management for Turtle Doves CFE advice sheet for advice on creating suitable foraging areas nesting sites and water in close proximity for this species).

Project 3.1.2 Encourage owls to the site by providing species-specific nest boxes. Barn owls will benefit from strips of rough grassland (at least 4m wide) being left to develop thick thatch to encourage vole prey (see the Barn Owl Conservation Handbook).

Objective 3.2. Management for bats.

It is important that if bat boxes are erected that they are monitored and maintained annually. The locations of bat boxes need careful consideration for it to be successful and the maintenance requires a bat handling license. Any work of this nature should be undertaken by the local bat group in liaison with the Base Wildlife Officer.

Project 3.2.1 Establish links with the local bat group to develop a bat monitoring and bat box maintenance plan.

The bat roosts should be monitored regularly to highlight any rapid decline in numbers at an early stage.

A bat activity survey should be undertaken prior to the start of any work on the buildings used by the bats and in the woodland. Bats are known to hibernate on the site. Therefore this recommendation applies to the whole year.

Objective 3.3. Monitoring for dormouse.

Dormice monitoring is recommended for this site in order to detect the species if present.

Project 3.2.2 An annual program of checking of hazel nut shells for dormouse marks should be undertaken within hazel coppice areas of the woodlands on site. Nut searches and checks should be carried out in the period September to December.

Objective 3.4. Enhancement of the site to support hedgehog.

With enhancements, the site is a potentially suitable site for release of rescued/rehabilitated hedgehogs.

Project 3.2.3 A series of hedgehog enhancement measures should be undertaken including providing nesting sites (log piles, leaf piles and purpose-built nest boxes), providing foraging sites including wilderness (unmanaged) areas, and avoiding use of pesticides on site.

15 INCRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

15.1 Natural and Cultural Resources Management Staffing and Implementation

Installation Supplement

This plan updates and replaces the Installation INCRMPs dated 2011 and is a first INCRMP for RAF Barford St John.

15.2 Monitoring INCRMP Implementation

15.3 Annual INCRMP Review and Update Requirements

Installation Supplement

The INCRMP requires annual review, IAW AFMAN 32-7003, to ensure the achievement of mission goals, verify the implementation of projects, and establish any necessary new management requirements. This process involves the NRM and CRM reviewing the INCRMP to assess status of meeting INCRMP goals/objectives; updating the work plans; ensuring that projects are programmed, budgeted, and executed IAW established PPBE processes; and determining internal USAF or tenant units that may be affected and coordinating reviews of any updates to the INCRMP. An Annual INCRMP Review Report will be produced and signed by the Civil Engineering Squadron Commander and posted to the installation eDASH Natural Resources page, Cultural Resources page, and EMP Repository.

16 ANNUAL WORK PLANS

The INCRMP Annual Work Plans are included in this section. These projects are listed by fiscal year, including the current year and four succeeding years. For each project and activity, a specific timeframe for implementation is provided (as applicable), as well as the appropriate funding source, and priority for implementation. The work plans provide all the necessary information for building a budget within the AF framework. Priorities are defined as follows:

- High: The INCRMP signatories assert that if the project is not funded the INCRMP is not being implemented and USAF is non-compliant with the Sikes Act; or that it is specifically tied to an INCRMP goal and objective and is part of a "Benefit of the Species" determination necessary for ESA Sec 4(a)(3)(B)(i) critical habitat exemption
- Medium: Project supports a specific INCRMP goal and objective and is deemed by INCRMP signatories to be important for preventing non-compliance with a specific requirement within a natural or cultural resources law or by EO 13112, *Invasive*

Species. However, the INCRMP signatories would not contend that the INCRMP is not be implemented if not accomplished within programmed year due to other priorities

- Low: Project supports a specific INCRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or support long-term compliance with specific requirements within natural and cultural resources law, but is not directly tied to specific compliance within the proposed year of execution

Installation Supplement

Annual Work Plans

Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	OPR	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
					422 CES/CEIE and 420 ABS/CEIE	Air Force					

***Cultural Resources Standard Titles by PB28 Code (excluding CZT/CZC titles):**

ARCU	NA&H	MCRA	HIST
P&F, CN	Consultation, Native American	Compliance Public Notification	Environmental Services CN
Curation	Environmental Services, CN	Outreach	Outsourced Environmental Services, CN
Interagency/Intraagency, Government, Sikes Act		Plan Update, ICRMP	Supplies, CN
Interagency/Intraagency, Government, Sikes Act, CLEO			Equipment Purchase / Maintain, CN
Outsourced Environmental Services, CN			Vehicle Leasing, CN
Supplies, CN			Vehicle Fuel & Maintenance, CN
Environmental Services, CN			Monitor, Cultural Resources
Equipment Purchase / Maintain, CN			Mgt, Cultural Sites
Mgt, Cultural Sites			Survey / Inventory Update, Cultural Resources, Hist
Monitor, Cultural Resources			Interagency/Intraagency, Government, Sikes Act
Plan Update, ICRMP			Strategic Evaluation and Planning
Supplies, CN, CLEO			
Survey / Inventory Update, Cultural Resources, Arch			
Vehicle Fuel & Maintenance, CN			
Vehicle Leasing, CN			

17 REFERENCES

Standard References *(Applicable to all USAF installations)*

- AFI 32-7001, *Environmental Management* (Includes UEC Role)
- AFMAN 32-7003, *Environmental Conservation*

- AFI 32-1015, *Integrated Installation Planning*
- AFI 32-7091, *Environmental Management Outside the United States*
- AFI 32-10112, *Installation Geospatial Information and Services (IGI&S)*
- Cultural Resources Environmental Action Plan (EAP)
- Cultural Resources Management Playbook
- eDASH Air Force Legal Operations Agency (AFLOA) Legal and Other Requirements List
- eDASH Cultural Resources Home Page
- eDASH Natural Resources Program Page
- eDASH Training Matrix
- Environmental Reporting Playbook
- Environmental Quality PPBE Playbook
- Natural Resources Management Playbook
- Air Force Activity Management Plan Playbooks

Installation Supplement

- Final Governing Standards – United Kingdom
- Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT) (May 2008), Barford St John Airfield - draft Local Wildlife Site survey form.
- Mark Eaton, Nicholas Aebischer, Andy Brown, Richard Hearn, Leigh Lock, Andy Musgrove, David Noble, David Stroud and Richard Gregory (December 2015), Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108, December 2015, pp.708–746

18 ACRONYMS

Standard Acronyms *(Applicable to all USAF installations)*

- eDASH Acronym Library
- Cultural Resources Management Playbook – Acronym Section
- Natural Resources Management Playbook – Acronym Section

Installation Supplement

3AF	3rd Air Force
422 ABG	422nd Air Base Group
AF	Air Force
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AOD	Above Ordnance Datum
ASA	Archaeologically Sensitive Area
AST	Aboveground Storage Tank
BAP	Biodiversity Action Plans
BASH	Bird Aircraft Strike Hazard
BBOWT	Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust
BCE	Base Civil Engineer
Birds Directive	Directive on the Conservation of Wild Birds 1979
BOCC4	Birds of Conservation Concern 4
CES	Civil Engineering Squadron
CEIE	Environmental Management Element
CRoW	Countryside and Rights of Way Act 2000
CRV	Conservation Road Verge
CWS	County Wildlife Site
DEFRA	Department of the Environment, Food and Rural Affairs
DIO	Defence Infrastructure Organisation
DIO EA	Defence Infrastructure Organisation Environmental Advisor

DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environment Agency
EEA	Environmental Executive Agent
EIAP	Environmental Impacts Analysis Process
EAP	Environmental Management Plan
EEAs	Environmental Executive Agents
ER	Environmental Review
ES	Environmental Study
EU	European Union
EWS	Emergency Water Supply
FGS	Final Governing Standards
FONPA	Findings of No Practicable Alternative
GCER	Gloucestershire Center for Environmental Records
GIS	Geographical Information Systems
GSAP	Gloucestershire Species Action Plans
GSU	Geographically Separated Unit
GWT	Gloucestershire Wildlife Trust
Ha	Hectares
HER	Historic Environment Records
HN	Host Nation
HQ	Headquarters
INRCMP	Integrated Natural and Cultural Resources Management Plan
IST	Installation Support Team
JA	Judge Advocate
km	Kilometers
KWS	Key Wildlife Site
L	Liter
MOD	United Kingdom Ministry of Defence
MSA	Munitions Storage Area
NATO	North Atlantic Treaty Organization
NBRC	Northamptonshire Biological Records Center
NE	Natural England
NERC	Natural Environment Research Council
NHLE	National Heritage List for England
NRM	Natural Resource Manager
NVC	National Vegetation Classification
O&M	Operations and Maintenance
OEBGD	Overseas Environmental Baseline Guidance Document
PMP	Pest Management Plan
POC	Point of contact
RAF	Royal Air Force
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest
T&E	Threatened and endangered species
TVERC	Thames Valley Environmental Records Center
UCC	Unified Combatant Command
U.S.	United States

UST	Underground Storage Tank
U.K.	United Kingdom
FGS-U.K.	Final Governing Standards for the United Kingdom
USAF	United States Air Force
USAFE	United States Air Forces in Europe
WCA	Wildlife and Countryside Act 1981
WWII	World War II

- Species of Principle Importance in England (NERC Act 2006, S.41) - Bird Species of Principal Importance in England are listed on the Natural Environment and Rural Communities Act 2006 list (sec: birds); abbreviated to NERC S.41 SPI in this report

19 DEFINITIONS

Standard Definitions *(Applicable to all USAF installations)*

- Cultural Resources Management Playbook – Definitions Section
- Natural Resources Management Playbook – Definitions Section

Installation Supplement

- Above Ordnance Datum. Height relative to the average sea level at Newlyn, Cornwall UK.
- Aquifer. A body of permeable rock which can contain or transmit groundwater.
- Biodiversity Action Plans. BAPs described the biological resources of the geographical area referred to and provide detailed plans for conservation of the most threatened species (Species Action Plans) and habitats (Habitat Action Plans) to aid recovery.
- Birds of Conservation Concern 4. Commonly referred to as the UK Red List for birds, this is the fourth review of the status of birds in the UK, Channel Islands and Isle of Man, and updates the last assessment in 2009. Using standardized criteria, 244 species with breeding, passage or wintering populations in the UK were assessed by experts from a range of bird NGOs and assigned to the Red, Amber or Green lists of conservation concern.
- Borehole. A deep vertical hole of small diameter bored into the earth to ascertain the nature of the underlying strata or to obtain water.
- British Geological Survey. The British Geological Survey is the UK's main provider of objective and authoritative geoscientific data, information and knowledge, focusing on public-good science for government, and research to understand earth and environmental processes.
- Classification System. The product of arranging things into kinds of things or into groups of classes.
- Consented Discharge points. A location for which there is a license to discharge effluent subject to conditions stipulating the quality and quantity of effluent that can be discharged.
- Conservation of Habitats and Species Regulations 2017. Also known as the Habitat Regulations, the Conservation of Habitats and Species Regulations 2017 consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. They also transpose elements of the EU Wild Birds Directive in England and Wales. The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.
- Conservation Road Verge. Non-statutory road verge sites identified by Gloucestershire County Council and Gloucestershire Wildlife Trust as being of significant wildlife and community value in the County in order to undertake appropriate conservation management as part of highways maintenance and related schemes.
- County Wildlife Site. Non-statutory site meeting county level importance qualifying criteria for its wildlife value.
- Countryside and Rights of Way Act 2000. The Countryside and Rights of Way Act 2000 (CROW Act) normally gives a public right of access to land mapped as 'open country' (mountain, moor, heath and down) or registered common land. These areas are known as 'open access land'.
- Emergency Water Tanks. Tanks to contain emergency water supplies for firefighting.
- European Birds Directive. Directive 2009/147/EC (Birds Directive) on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended) provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. It sets broad objectives for a wide range of activities, although the precise legal mechanisms for their achievement are at the discretion of each Member State (in the UK delivery is via several different statutes). In the England the provisions of the Birds Directive are implemented through among others the Wildlife & Countryside Act 1981

(as amended) and the Conservation of Habitats and Species Regulations 2017. A very wide range of other statutory and non-statutory activities also support the implementation of the Birds Directive in the UK. This includes national bird monitoring schemes, bird conservation research, and the UK Biodiversity Action Plan which involves action for a number of bird species and the habitats which support them.

- European Habitats Directive. Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, known as the Habitats Directive was adopted in 1992. The Directive is the means by which the European Union meets its obligations under the Bern Convention. The Directive applies to the UK and to its Overseas Territory of Gibraltar. The main aim of the Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favorable conservation status, introducing robust protection for those habitats and species of European importance. In applying these measures Member States are required to take account of economic, social and cultural requirements, as well as regional and local characteristics.
- Final Governing Standards – United Kingdom. FGS for a country are environmental compliance standards that include substantive provisions (e.g., technical limits on air emissions or wastewater discharges) and specific management practices (e.g., recordkeeping and reporting requirements) that apply to all DoD installations located in that country unless an exemption or exception applies.
- Grade II Listed. A statutory listing by Historic England. Grade II listed buildings are subject to regulations which protect their historical and architectural significance.
- Groundwater Directive. Directive (2006/118/EC) establishes a regime which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The Groundwater Directive complements the Water Framework Directive.
- Hedgerow Regulations 1997. The Hedgerows Regulations 1997 of England and Wales came into effect on 1st June 1997 and is government legislation which falls under the Environment Act 1995. It was created to protect hedgerows, in particular those in the countryside aged 30 years or older. Since the legislation came into effect it is a criminal offence to remove a hedgerow in contravention to the regulations.
- Key Wildlife Site. Non-statutory site (Gloucestershire) meeting county level importance qualifying criteria for its wildlife value.
- National Character Area. A natural subdivision of England based on a combination of landscape, biodiversity, geodiversity and economic activity. There are 159 National Character Areas defined by Natural England, following natural, rather than administrative, boundaries
- National Heritage List for England. The official, up to date, register of all nationally protected historic buildings and sites in England - listed buildings, scheduled monuments, protected wrecks, registered parks and gardens, and battlefields. The list is maintained by Historic England.
- National Vegetation Classification. The National Vegetation Classification (NVC) is one of the key common standards developed for the country nature conservation agencies. The NVC is a detailed phytosociological classification, which assesses the full suite of vascular plant, bryophyte and macro-lichen species within a certain vegetation type.
- Nitrate Vulnerable Zones. Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution. They include about 55% of land in England and are reviewed every 4 years to account for changes in nitrate concentrations.
- Oolitic Limestone. Oolitic limestone is made up of small spheres called ooiliths that are stuck together by lime mud. They form when calcium carbonate is deposited on the surface of sand grains rolled (by waves) around on a shallow sea floor.
- Oxford Clay. The Oxford Clay is a Jurassic marine sedimentary rock formation underlying much of southeast England, from as far west as Dorset and as far north as Yorkshire. The Oxford Clay Formation dates to the Jurassic, specifically, the Callovian and Oxfordian ages.
- RAMSAR Convention. The Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat is an international treaty for the conservation and sustainable use of wetlands established by UNESCO and signed in 1971. It is also known as the Convention on Wetlands.
- RAMSAR Wetland Sites. A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention.
- Special Areas of Conservation. Special Areas of Conservation (SACs) are strictly protected sites designated under the EC Habitats Directive. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).
- Special Protection Areas. A Special Protection Area (SPA) is a designation under the European Union Directive on the Conservation of Wild Birds. Under the Directive, Member States of the European Union (EU) have a duty to safeguard the habitats of migratory birds and certain particularly threatened birds.
- Site of Special Scientific Interest. A Site of Special Scientific Interest (SSSI) is a formal conservation designation of an area that is of particular interest to science due to rare species or important geological or physiological features. SSSIs are the country's very

best wildlife and/or geological sites and are protected by law.

- Species of Principle Importance in England (NERC Act 2006, S.41). Species of Principal Importance in England are listed on the Natural Environment and Rural Communities Act 2006 Section 41 list; abbreviated to NERC S.41 SPI in this report.
- Stratigraphic Formations. A formation consists of a certain amount of rock strata that have a comparable lithology, facies or other similar properties. Formations are not defined by the thickness of their rock strata; therefore the thickness of different formations can vary widely. The concept of formally defined layers or strata is central to the geologic discipline of stratigraphy.
- UK BAP Habitats. UK Biodiversity Action Plan (UK BAP) priority habitats cover a wide range of semi-natural habitat types and were those that were identified as being the most threatened and requiring conservation action.
- Upper Chalk (Upper Turonian- Santonian). The Upper Chalk Group is the lithostratigraphic unit which contains the Late Cretaceous limestone succession in southern and eastern England and the Upper Turonian – Santonian is a formation of the white chalk group from the Upper Turonian Age to the Santonian Age.
- Water Framework Directive. The 'Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy' or The Water Framework Directive (WFD) came into force in December 2000. The purpose of the Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater, ensuring that all aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands meet 'good status'.
- Wildlife and Countryside Act 1981 (as amended). The Wildlife and Countryside Act 1981 (as amended) is an Act of Parliament in the United Kingdom that consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC (replaced by Directive 2009/147/EC) on the conservation of wild birds (Birds Directive) in Great Britain. In summary, the Act gives protection to native species (especially those at threat), controls the release of non-native species, enhances the protection of Sites of Special Scientific Interest and builds upon the rights of way rules in the National Parks and Access to the Countryside Act 1949.
- World Heritage Site. A World Heritage Site is a place that is listed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as having special cultural or physical significance, and is legally protected by international treaties.

APPENDIX RAF CROUGHTON MAPS

APPENDIX RAF BARFORD ST JOHN MAPS

APPENDIX RAF FAIRFORD MAPS

APPENDIX RAF WELFORD MAPS

APPENDIX BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) PLAN

APPENDIX INTEGRATED PEST MANAGEMENT PLAN (IPMP)

APPENDIX WILDLAND FIRE MANAGEMENT PLAN

APPENDIX ANNOTATED SUMMARY OF KEY LEGISLATION RELATED TO DESIGN AND IMPLEMENTATION OF THE INCRMP

DoD Policy, Directives, and Instructions

32 CFR Part 187, *Environmental Effects Abroad of Major Department of Defense Actions*	Provides the exclusive and complete requirement for taking account of considerations with respect to actions that do significant harm to the environment of places outside the United States
32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*	Implements the USAF EIAP and provides procedures for environmental impact analysis both within the United States and abroad.
DoDI 4150.07, *DoD Pest Management Program*	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoDI 4715.05, *Environmental Compliance at Installations Outside the United States*	This instruction reissues DoD Instruction (DoDI) 4715.5 (Reference (c)) to update established policy and assigned responsibilities for managing environmental compliance to protect human health and safety outside the United States on installations under DoD control.

DoDI 4715.05-G, *Overseas Environmental Baseline Guidance Document (OEBGD)*	This Guide provides criteria, standards, and management practices for environmental compliance at DoD installations overseas.
Environmental Final Governing Standards (FGS)	A comprehensive set of country-specific substantive environmental provisions; typically technical limitations on effluent, discharges, etc., or a specific management practice, developed in accordance with DoDI 4715.05.
	USAF Instructions and Directives
AFI 32-7001, *Environmental Management*	Establishes the framework for an Environmental Management System (EMS) at Headquarters, United States Air Force (HQ USAF), major commands (MAJCOMs), and at installations
AFI 32-1015, *Integrated Installation Planning*	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations.
AFMAN 32-7003, *Environmental Conservation*	Implements AFPD 32-70, Environmental Quality; DODI 4715.03, Natural Resources Conservation Program; and DODI 7310.5, Accounting for Sale of Forest Products. It explains how to manage natural resources on USAF property in compliance with Host Nation/local standards.
AFMAN 32-7003, *Environmental Conservation*	This instruction implements AFPD 32-70 and DoDI 4710.1, Archaeological and Historic Resources Management. It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFI 32-7091, *Environmental Management Outside the United States*	This Air Force Instruction (AFI) provides information, guidance, and requirements to ensure Air Force environmental programs at enduring locations outside the United States (also referred to as "overseas") achieve and maintain environmental quality as prescribed in AFPD 32-70.
AFI 32-10112 *Installation Geospatial Information and Services (IGI&S)*	This instruction implements Department of Defense Instruction (DoDI) 8130.01, Installation Geospatial Information and Services (IGI&S) by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and Air Force Policy Directive (AFPD) 32-10 Installations and Facilities.
AFPD 32-70, *Environmental Quality*	Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.