



BSc (Hons) Countryside Management

UCAS code D4N9

Institution code H12

Duration 4 years (full-time) including a one-year work placement

Start date September 2019

Accredited by [Institute of Chartered Foresters](#) (ICF)

Location [Harper Adams University campus](#) (and location of work placement)

The course

Do you want to play a rewarding part in the management and conservation of our natural heritage?

These vocational courses will help you to develop the knowledge and skills you will need to work as a professional in the countryside. The importance of sustainable countryside management is increasingly being recognised by both government policy and by potential understanding of the countryside and the pressures that both wildlife and the environment are facing. The main emphasis is to balance the often competing needs of the countryside with those of recreational visitors and, importantly, to understand the current issues associated with conservation, agricultural land use and policy.

Key features include:

- Residential field trips in years 1 and 4 to underpin and contextualise what you learn.
- Field trips and visits to local and national organisations to provide real life experience and to meet professionals in their field of work.
- An emphasis on developing your business and people skills in the rural sector.
- A focus on the practical application of theory to give you the skills to succeed.

A-level entry requirements

- Offers tend to be in the region of **88 - 104** UCAS points (from A2 exams only)
- Students should typically be studying **3 subjects at A2 level** to be considered
- An understanding of a science based subject, whether through a taught qualification, beyond GCSE level, or independent learning, would be preferable. Evidence of independent learning should be included within your personal statement.
- **4 GCSEs at grade C/4 or above**, including English Language, Maths and a Science
- Applicants can expect to receive offers including specific grades in specific subjects (for example, a B or C at A level, or an M or D for BTEC modules)
- Key Skills (and other level 2 variants) and First Certificates/Diplomas are not accepted in place of GCSE passes
- Overseas applicants please check our [English Language Requirements](#)
- The majority of candidates will not be called for an interview and a decision will be made via UCAS Track. However, for some students a telephone interview or campus based guidance session will be required. We will simply want to meet you to understand if the course is the right choice for you and to discuss your application in more detail. We will be keen to know your reasons for choosing the course and your career aspirations.
- We have developed a range of measures and initiatives to give everyone the best chance to access

our undergraduate degree programmes. The main feature of **Access to Harper** is our contextualised offer scheme. A contextualised offer is an offer which is reduced, by one grade or more from the standard entry requirement and is made to those applicants who may have experienced personal circumstances which put them at a disadvantage during their education, such as attending a low achieving school, living in an area of low participation in Higher Education or being a Care Leaver. The aim of this is to make the University more accessible for those applicants who may not have previously thought that they were eligible to apply. We have also introduced reduced entry requirements for those applicants who are over 21 years of age and further initiatives to make the application process easier for those applicants who need it.

To check if you qualify please visit the [Access to Harper](#) page.

Note: Entry Requirements are for guidance only, please check the UCAS website or contact Admissions for further information.

Work placement

The one-year work placements are organised and managed through a dedicated placement unit at Harper Adams. Placements can be matched to your career aspirations to help you develop skills, knowledge and understanding that will improve your employability. To further support you on placement the countryside and wildlife team have a course specific placement manager and academic staff to visit you on placement twice during the year to review your progress. You will be helped to find a placement within a countryside organisation. This time spent working in industry gives you the chance to use what you have learned in a real job and to gain experience in your chosen area of work. Placement gives you unique prospects as employers value the combination of theory and hands-on experience.

Current placement employers include public bodies such as; Natural England, Forestry Commission, local authorities, through to organisations/consultancies such as; Game & Wildlife Conservation Trust, National Trust, Tilhill Forestry and private estates integrating land management, agriculture and field sports management.

Accreditation



This course is accredited by the Institute of Chartered Foresters and gives partial fulfilment of Professional Membership Entry based upon appropriate module selection.

Teaching and learning

What you study

Modules will cover a broad range of subjects including ecology, countryside and environmental issues, wildlife, landscape development, woodlands and forestry.

Field trips

All first year CEW students attend the **Introduction to Ecology** field trip as part of their course. The trip provides students with practical ecological field skills and techniques of quantitative analysis. It normally takes place in May at the Field Studies Council Slapton Ley Field Centre in Devon. This is a seven night residential course, and costs £50*.

All final year CEW students attend a five night residential field course, currently situated on Anglesey. The course provides students with an opportunity to investigate a real world issue of relevance to the environment and provides advanced data collection, analysis, project management and presentation skills. The trip normally takes place in the autumn term and costs £30*.

**cost includes all meals, accommodation and transport to and from the field centre, and are correct as of the 2018/19 academic year.*

Teaching and learning

Here at Harper Adams we are committed to high standards in teaching and learning.

Teaching methods include student centred learning, resource based learning, independent project work, all of which is delivered in a variety of formats: including lectures, seminars and tutorials. In addition to this, research-led learning is encouraged where students can be exposed to relevant research in a number of ways, from learning about the work of others and its relevance to wildlife resource management to conducting their own studies and field experiments.

To further underpin the applied nature of this course visiting speakers from within the sector are used and practical field work and site visits form essential elements in the learning method as they provide the contextual relevance for students to establish the link between theory and practice.

Assessment methods

Assessment of student learning is conducted using a variety of methods. Each course module is assessed by a combination of coursework and an end of year exam. A part of the assessment process, student feedback forms an important element in the learning process. All students receive verbal and written feedback on their coursework and exam scripts.

Example of assessment methods include:

- Time constrained exams
- Flora and fauna Identification test
- Management plans
- Essays / case studies
- Field reports
- Practical examinations
- Poster presentations

Careers

The breadth and flexibility of this industry accredited course means our students go on to careers in a wide range of areas.

Countryside students at Harper Adams have a strong reputation in the graduate jobs market. This stems from our balanced and up-to-date course structure, good links with the industry and the placement year. These key elements of our approach help to produce graduates with a valuable combination of academic knowledge and real-world experience. These courses prepare you for careers such as countryside rangers, rights of way officers, reserves managers and agrienvironment project officers.

Opportunities are available with local authorities and employers such as Natural England, Defra, Wildlife Trusts, the National Trust, the Forestry Commission, the Royal Society for the Protection of Birds, and Groundwork Trusts. Technical awareness ensures that graduates are sought after by organisations in the agri-food sector.

The transferable nature of the commercial skills developed enables graduates to work in government, trade and overseas development organisations, banks, specialist market research agencies and consultancies. Many have also found that this qualification equips them to set up and successfully run their own food, farm or rurally-based enterprise.

What will I study?

Year	Study time (The percentage of time spent in different learning activities)			Assessment methods (This is the breakdown of assessment methods)		
	% time in lectures, seminars and similar	% time in independent study	% time on placement	Written exams	Practical exams	Coursework
1	38%	62%	0%	50%	0%	50%
2	33%	67%	0%	27%	0%	73%
3	0%	0%	100%	0%	0%	100%
4	22%	78%	0%	30%	0%	70%

Year 1	Year 2	Year 3	Year 4
Skills for the Environmental Scientist (C4009C17) 15	Research Methods for Environmental Scientists (C501017) 15	Placement year	Honours Research Project (HRPROJ) 30
Introduction to Ecology (C4004C17) 15	Wildlife Identification and Conservation (C5011C17) 15		Geographical Information Systems and Land Use (C6009C17) 15
Introduction to the Natural Environment (C4006C17) 15	Pollution, Ecology and Brownfield Reclamation (C5012C17) 15		Environment and Geography Field Course (C6007C17) 15
The Organisation in its Environment (R4014C17) 15	Project and Event Management (R5010C17) 15		Developing and Managing Environmental Projects (C6005C17) 15
Contemporary Countryside and Environmental Issues (C4012C17) 15	Planning and Development (R5011C17) 15		Environmental Assessment and Management (C6008C17) 15
Managing People in the Environment (C4007C17) 15	Forestry and Forest Products (C5013C17) 15		UK and Global Forest Systems (C6015C17) 15
Introduction to Sustainable Agriculture and the Environment (C4015C17) 15	Forestry, Game and Land Management (C5014C17) 15		Options
	Environmental Quality and Protection (C5015C17) 15		Food Security and Sustainability (F6011C17) 15
Environmental Survey and Field Skills (C4003C17) 15	Options		Applied Ecology for Management (C6003C17) 15
	Landscape Development and Management (C5016C17) 15		

Skills for the Environmental Scientist

Year of study 1
Code C4009C17
Credits 15
Core/option Core
Module contact [Mrs Kath Leigh](#)

This module helps develop students' confidence and competence in the academic skills and professional practices that will enable success within their Environment course. The module has four main strands or themes:

- 'Academic skills' including exploring reading for success, writing in different ways and information searching.
- 'Professional futures' - preparing for placement and employment.
- 'Learning well' which promotes students' self-monitoring and planned improvements in individual approaches to learning
- 'Digital citizenship' where students review the online and information technology skills that they

need to succeed in study and in their professional practice.

Introduction to Ecology

Year of study 1
Code C4004C17
Credits 15
Core/option Core
Module contact [Nicky Hunter](#)

Ecology is about understanding the dynamic changes in individuals, populations, communities and ecosystems in relation to each other and the physical environment. This requires knowledge of the essential processes that determine the distribution and abundance of organisms and the variety of complex biotic and abiotic interactions that take place. This module is designed to provide students with a general understanding of the ecology of living systems together with an introduction to basic ecological theory. This module will include a field studies element which will deliver the practical elements of identification, sampling and analysis of data collected.

Introduction to the Natural Environment

Year of study 1
Code C4006C17
Credits 15
Core/option Core
Module contact [Simon Irvin](#)

The countryside and the quality of the rural environment are inextricably linked to studies in the natural environment. This module is designed to investigate the many aspects of the natural environment which impact on the British countryside. This will include the study of rainfall patterns in the UK and causes of climatic change, which has a marked effect on the range of natural habitats in the British countryside. The variety and nature of soils in the UK and how these affect the land quality will be considered. Conservation and the assessment, creation and management of habitats commonly found in, and around agricultural lowland sites and the impact of pollution from agricultural sources will be investigated.

- Outline the hydrological cycle in the UK and the causes and effects of climatic change on the natural environment.
- Identify and assess soil relationships, including soil texture, structure, organic matter and soil processes such as erosion.
- Demonstrate a need for conservation of species and habitat protection.
- Recognise a variety of habitats on lowland farmland and outline how these can be managed to the benefit of the environment.
- State the main sources of agricultural pollution and how these can be controlled.

The Organisation in its Environment

Year of study 1
Code R4014C17
Credits 15
Core/option Core
Module contact [Mrs Gabriella Parkes](#)

This module aims to provide you with a foundation of business and organisational understanding on which to build your further studies.

You will develop an understanding of some of the fundamental aspects of businesses and organisations and how they function. You will undertake an analysis of the changing environment in which businesses and organisations operate. You will be able to identify the various common elements in organisations, be they for profit or not-for-profit. In addition you will consider legal, social and environmental responsibilities placed on business.

Contemporary Countryside and Environmental Issues

Year of study 1
Code C4012C17
Credits 15
Core/option Core
Module contact [Dr Jonathan Cooper](#)

This module is designed to provide students with a background to contemporary countryside and environmental issues and their implications for resource management.

The principal focus for the module will be the UK, with appropriate international comparison and contextualisation.

The module will provide a background to the pressures and conflicts that occur within UK and global countryside and environmental management. It will show how government and other organisations use a range of methods to ensure sustainable management of the countryside, landscapes and natural / semi-natural environments and how environmental change influences the way in which the countryside is managed.

Managing People in the Environment

Year of study 1
Code C4007C17
Credits 15
Core/option Core

This module aims to enhance students' understanding of the link between human activities, principally recreation, and the natural environment. The module will introduce students to basic methods of assessment and management of environmental impact of typical recreational activities within the countryside and how best management practice is communicated to the wider public at range of different levels, including school children and other groups. Emphasis is placed on the need to manage conflict and develop specific visitor management techniques in order to produce sustainable management strategies within the countryside.

Introduction to Sustainable Agriculture and the Environment

Year of study 1
Code C4015C17
Credits 15
Core/option Core
Module contact [Simon Irvin](#)

Please contact the course manager for details of this module.

Environmental Survey and Field Skills

Year of study 1
Code C4003C17
Credits 15
Core/option Core
Module contact [Simon Irvin](#)

This module provides an essential understanding of the main components of applied contemporary field survey / monitoring techniques and procedures. It provides experience in the practical application of these techniques and procedures across a representative range of habitats and environments and vital awareness of risk assessment in field survey work.

The skills and knowledge gained will enable students to undertake survey and monitoring work using a range of practical methods, understand the range of techniques involved and their relative strengths and limitations and to present and interpret data in a coherent and appropriate way.

This module complements the modules at level 4: Introduction to the Natural Environment and Introduction to Ecology and links to the level 5 module Habitat Ecology and Conservation Management. These modules are core modules for all routes accessing this module and form a fundamental knowledge and practical base for any student entering the environmental and wildlife sector. The module content will also provide material which directly relevant to placement work undertaken by the majority of the students.

Research Methods for Environmental Scientists

Year of study 2

Code C501017

Credits 15

Core/option Core

Module contact [Dr Andrew Cherrill](#)

The module develops the skills and knowledge necessary to successfully complete the Honours Research Project. Enhanced research confidence will also be an employability skill for the Placement Period and careers on graduation.

The module will cover the key elements of the research process, set in the context of the student's own course discipline. Students will examine the academic role of research and how it informs professional and managerial practice. They will enhance their ability to locate, select and critically evaluate information associated with a particular problem, using a range of sources and particularly peer reviewed empirical studies. By carrying out statistical analysis using appropriate software, the students will develop their ICT skills and further their understanding of the role of statistics in the research process.

Wildlife Identification and Conservation

Year of study 2

Code C5011C17

Credits 15

Core/option Core

Module contact [Nicky Hunter](#)

This module aims to provide students with an extension of knowledge from the level 4 ecology module and to focus primarily on the synthesis and analysis of the ecological requirements of species and habitats, and the issues around conservation and funding currently in the UK. In order to fully understand the ecology of species, correct identification and adaptation features for the major groups of fauna and flora needs to be recognised.

A practical knowledge and skills-based understanding of the selection and use of identification keys and community classification systems is one of the corner stones to effective assessment of biodiversity for conservation. Students will develop practical knowledge of, and skills in, the use of species identification techniques. Particular attention will be focused on species that are associated with the UK countryside, but the module will also address globally applicable general principles and concepts. Essentially a hands-on approach to learning is encouraged introducing students to the flora and fauna found in a range of habitats which will reinforce the competences of survey skills studied previously.

Pollution, Ecology and Brownfield Reclamation

Year of study 2

Code C5012C17

Credits 15

Core/option Core

Module contact [Dr William Hartley](#)

The aim of the module is to interpret the effects of anthropogenic pollution on ecosystems. You will

evaluate, monitor and quantify the ecological impact of environmental pollution and the scientific and methodological problems associated with contaminated land reclamation. You will investigate patterns of environmental contamination, accumulation and chronic toxicity caused by toxic metals and other hazardous wastes and the response of plants and animals to pollution, the evolution of pollution tolerance and the effectiveness of bioremediation treatments.

Project and Event Management

Year of study 2
Code R5010C17
Credits 15
Core/option Core
Module contact [Emma Tappin](#)

This module acts as preparation for project-based work in employment. The module involves delivery of an event-based project which serves to illustrate the common issues involved, such as clarification of client requirements, the need for careful planning and organisation of a project team. The module will offer students the opportunities to identify best practice approaches to projects based on their experience. Short term working capital requirements may be available from the department as a loan.

Planning and Development

Year of study 2
Code R5011C17
Credits 15
Core/option Core
Module contact [Emma Pierce-Jenkins](#)

This module seeks to build-upon the level 4 modules, Introduction to Rural Geography and Economics and Contemporary Countryside and Environmental Issues. The module provides a broad understanding of the statutory spatial planning system, covering both national and local planning policy, whilst exploring the particular challenges associated with rural development and the delivery of sustainable development.

This will include an analysis of policy and practice in a range of topics such as housing, agriculture, renewable energy, infrastructure planning and protection of designated areas.

The module will provide a grounding in spatial planning, upon which the level 6 modules, such as Environmental Assessment and Management, can be developed.

Forestry and Forest Products

Year of study 2
Code C5013C17
Credits 15
Core/option Core
Module contact [Jim Waterson](#)

Forestry and forest products have an increasingly important role in the management of land and in making a series of significant contributions to sustainable living and development. This is closely reflected in national and international policy.

This module will give students a comprehensive and detailed understanding of sustainable forest management policy and practice in the UK. It will also provide an overview of global forestry issues and a full appreciation of both traditional and contemporary products and services sourced from forests and forest management.

Students completing the module will be able to critically evaluate different approaches to silviculture and forest management in terms of the range and quality of products/services supplied and the economic, social and environmental implications of the management and conservation processes adopted.

Forestry, Game and Land Management

Year of study 2
Code C5014C17
Credits 15
Core/option Core

Please contact the course manager for details of this module.

Environmental Quality and Protection

Year of study 2
Code C5015C17
Credits 15
Core/option Core
Module contact [Paul Lewis](#)

The maintenance of high quality soil, water and air is an essential component of sustainable development. The countryside is used in a wide variety of ways, each of which can have an impact on the environment. For example, pesticides and fertilisers used in agriculture, fish farming and forestry, if not carefully controlled, may affect the air, water and soil quality and eventually contaminate food. The disposal of wastes, access to the countryside for leisure and amenity use and the introduction of new technology may also have an environmental impact. Changes to ecosystems resulting from the emission of greenhouse gases and ozone depleters could significantly affect the rural landscape.

This module will allow the student to define what is meant by soil, water and air quality and to identify some of the major risks to environmental quality arising from our varied use of the countryside. Approaches to managing the countryside so as to maintain or improve the environmental quality will then be evaluated together with assessment of appropriate environmental legislative requirements.

- Select appropriate approaches to assessing soil, air and water quality
- Identify and evaluate the severity of the various risks to soil, air and water quality
- Formulate strategies for protecting soils, air and water and for protecting the countryside from the risk of pollution
- Compare the current status of a site with the appropriate environmental standard(s).

Landscape Development and Management

Year of study 2
Code C5016C17
Credits 15
Core/option Option
Module contact [Dr Richard Byrne](#)

Over the centuries the countryside has undergone considerable changes and developed in an evolutionary fashion. Nowadays there are many, often conflicting, demands made on the countryside. How the assets of the countryside are assessed and recorded and how change is affected and managed is of major concern.

The module also explores landscape development and examines how landscape components have evolved over time. The module will be also be concerned with the relationship between human activity and landscape. It will deal with societal drivers of change and the effects of human activity on landscape pattern. An important part of this relationship is understanding the impact of human activity on landscapes and how these effects can be assessed using appropriate landscape assessment methodologies. Additionally it will explore the impact of recreational activities upon landscape and the process of landscape restoration.

Placement year

Year of study 3
Core/option Core

Read our dedicated [Placement Learning](#) pages for information on the many benefits of the placement year.

Honours Research Project

Year of study 4
Code HRPROJ
Credits 30
Core/option Core

To qualify for an honours degree a student must demonstrate the capacity for sustained, independent and high quality work. One of the most important vehicles for the demonstration of this capacity, and for developing the necessary skills, is the individual Honours Research Project. Each student will therefore be required to complete such a project under the general supervision of a member of staff and present the results in a project report and in a viva voce exam, with two tutors, which will also test to a high level, skills of communication and rational argument. This major exercise represents one-quarter of the final year studies and will therefore have an important influence on the classification of award.

Geographical Information Systems and Land Use

Year of study 4
Code C6009C17
Credits 15
Core/option Core
Module contact [Dr Andy Wilcox](#)

Land management is a complex process involving a combination of agricultural, environmental, recreational and social issues. Geographical Information Systems (GIS) allow storage, analysis and dissemination of spatial information are an essential tool for resource management. This module will provide students with an overview of GIS theory, application and software and allow students to develop practical skills relating to spatial data capture, analysis and presentation using the ESRI ArcGIS platforms.

Environment and Geography Field Course

Year of study 4
Code C6007C17
Credits 15
Core/option Core
Module contact [Dr Andy Wilcox](#)

Sustainable solutions to environmental problems are often complex and require a combination of different disciplines in order to achieve an acceptable outcome. Typically, such activities are carried out by a single project team or collection of project teams that each offer their own area of expertise to the solution. This module allows students to develop their high level skills and abilities by undertaking a team project based on a real situation or issue. The project will be focused around a residential field course and combine elements of the entire CEWG portfolio, including aspects of countryside, environmental and geographical management.

Developing and Managing Environmental Projects

Year of study 4
Code C6005C17
Credits 15
Core/option Core
Module contact [Emma Tappin](#)

Countryside and environmental management are complex and multi-disciplinary areas of practice. For both non-governmental organisations such as National Parks, Wildlife Trusts and the National Trust and government agencies such as Natural England, short term projects are an important mechanism to achieve desired environmental and social changes. This drive towards project delivery is as a result of funding sources increasingly being linked to short-term projects.

The implementation and success of these projects requires a sound understanding of the principles of project management. This module aims to give students insight into project development and management for clients. This module will be action-based learning where students actively work on live projects for clients, developing proposals and competing for 'support' or 'funding'. Students will gain insights into writing project proposals, competing in this bidding process, working and negotiating with clients and implementing projects proposals. They will be encouraged to develop as reflective practitioners in order that they can improve their skills for future practice.

Environmental Assessment and Management

Year of study 4
Code C6008C17
Credits 15
Core/option Core
Module contact [Emma Pierce-Jenkins](#)

Environmental protection and enhancement is a crucial element of achieving sustainable development and features heavily in International, European and UK legislation and policy, a key requirement of which is that potential environmental impacts of human activities are identified and considered in decision making.

In seeking to protect our environment and deliver sustainable development it is crucial that we are able to recognise when and how human activity will impact upon the environment and how best to mitigate and manage those impacts. This module will examine the relevance and relative merits of a range of formal processes for assessing likely environmental impacts of human interaction with our environment. It will build upon earlier modules relating to environmental policy and legislation, as well as developing conservation, environment and planning themes from earlier modules.

It studies in detail Environmental Impact Assessment (EIA) and Environmental Management Systems (EMS) in terms of legislative compliance, assessment techniques, environmental protection and mitigation strategies etc. and introduces Strategic Environmental Assessment (SEA)/ Sustainability Appraisal.

UK and Global Forest Systems

Year of study 4
Code C6015C17
Credits 15
Core/option Core
Module contact [Jim Waterson](#)

Forestry and forest products have significant functional importance in the management and conservation of land, the supply of raw and processed materials, environmental protection and in contributing to sustainable living and development. This is closely reflected in UK and global forest policies.

This module will enable a comprehensive and detailed understanding of sustainable forest management policy and practice in the UK. It will also provide a current overview of global forestry issues and an appreciation of mainstream and innovative products and services sourced from forests and sustainable forest management worldwide.

Students completing the module will be able to critically evaluate different approaches to forest

management in terms of the range and quality of products/services supplied and the economic, social and environmental implications of the management and conservation processes adopted.

Food Security and Sustainability

Year of study 4
Code F6011C17
Credits 15
Core/option Option
Module contact [Mr Luís de Aguiar](#)

Food security and sustainability are now topics of critical importance to mankind, and of particular and specific importance to food industry professionals. In recent years, both political instability and cross-border conflicts in addition to global climatic events have increased vulnerability and put pressure on governments and the food industry to come up with strategic food sovereignty and security solutions. Demographic pressure and climate change have been of concern regarding the extent present and future food production systems are sustainable. Intrinsic to this objective is the development of sustainable methods of food production that satisfy human nutrition needs without sacrificing biodiversity and the ecological balance it provides. Food industry managers ought to be able to appraise food security and sustainable food production systems to help them with decision-making and strategic planning processes. Food security and sustainable food production are topics of direct relevance to the contemporary food business environment and the work of the global food industry in contributing to human health and well-being.

This module explores the concepts of food security and sustainable food production in relation to the growing world population; human nutrition; health and well-being; the nature and dynamics of the global food supply system; political and geo-political influences; food aid; agricultural production; the ecological impacts of human food production; food poverty; the sustainability of urban and rural communities. Owing to the cross disciplinary nature of the topics covered in this module the scope is broad.

Applied Ecology for Management

Year of study 4
Code C6003C17
Credits 15
Core/option Option
Module contact [Dr Nicola Randall](#)

Humans depend upon biological processes for their continued existence and for the provision of ecosystem services. The high rates of biodiversity loss remain the subject of concern. This module aims to provide an understanding of the concepts of biodiversity and of ecosystem services, and the use of biodiversity as an ecosystem service provider

In order that biodiversity may be conserved or exploited sustainably, it is important to have an understanding of how populations and communities of organisms are distributed and function and how they react to disturbance. This module is designed to provide students with a background to the complexities of community organization and the general factors that affect community stability. The module subsequently demonstrates how ecological science can be applied to real world conservation and management situations such as the design of nature reserves, pest control, and the sustainable harvesting of populations.