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Dartmoor Training Area

Scoping Report for an Environmental Appraisal examining the effects of continuing military training on Dartmoor

Entec UK Ltd – September 2006








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Report for

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Executive Summary

Introduction

This Scoping Report has been prepared as part of an Environmental Appraisal (EA), which will consider the potential continuing environmental effects from activities associated with current and future military training on Dartmoor Training Area (DTA), which lies within Dartmoor National Park. The Appraisal will be based on the premise of no significant increase in levels of military activity or change to the number of live firing days currently (2006) permitted. The majority of DTA is operated under licence from the Duchy of Cornwall. The present licence expires in 2012 and prior to its renewal the Secretary of State for Defence requires confirmation that there is a military need for its retention and that if it is to be retained, how this may best be achieved. The Ministry of Defence must therefore demonstrate that:

- there is a clear military need for both live firing and dry training on DTA; and
- the management of DTA for military activities will continue to be sensitive to the environmental issues, farming and public access, and is thus sustainable in the long term.

Continuing military activity on DTA does not require consent under the Town and Country planning system. This EA will however mirror the process used for Environmental Impact Assessment, which is required for developments falling under the requirements of the *Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999* even though these regulations do not apply. The findings of the EA will therefore inform the licence re-negotiation.

Scope of the Appraisal

The Scoping Report is the first stage in the appraisal process and its main aim is to identify the effects associated with military activities, which need to be considered in detail (i.e. 'scoped-in') as part of the EA. Effects, which are unlikely to result from military training activities, have been 'scoped-out'. The organisations that have been consulted are listed in **Appendix A**. Where appropriate, the scope of the EA will be revised in response to consultees' comments.

Topic	Scoped-out effects	Scoped-in effects
Air Quality	All potential air quality effects including effects from dust and odour from military activities, emissions from military vehicles, emissions from aircraft supporting ground troops and emissions from supporting infrastructure such as generators. Air quality in the area surrounding DTA is good and it is considered the dust and odour from military activities is not causing an air quality effect.	No air quality effects require further appraisal
Cultural Heritage	Survey information demonstrates that the current training activities pose little threat to the historic environment. Survey information will be included in the EA to demonstrate this.	Effects from vehicles and troops on the erosion of monuments, the possible use of stones from historic features for bivouacs and the Willsworthy historic built estate.
Landscape and visual	Effects on landscape character due to changes in settlement patterns and watercourses are not considered to be occurring.	Effects on prevailing landscape character due to changes to features of cultural heritage importance, loss or modification of vegetation patterns, damage and/or erosion due to training and loss of tranquillity; the extent of these effects is uncertain.
	Visual intrusion effects from the Ten Tors event, which occurs once per year (with a duration of 3 days) and from the permanent training support facilities at Okehampton Camp.	Visual effects from dry training activity, infrastructure, vehicle movements and similar support activity on local residents, recreational users of DTA and views from transport routes.
Land Use	Effects on nature conservation from overgrazing because of stock clearance during live firing. Management measures to prevent this effect have been implemented.	Effects on employment of agricultural workers for stock clearance and effects on agricultural income for the right to train will be considered as part of the appraisal of socio-economic effects. Effects on the achievement of Environmentally Sensitive Area objectives as a result of limited availability of grazing land when the Range Danger Areas (RDA) are in use will be considered as part of the appraisal of nature conservation effects.
Nature conservation	Nature conservation effects associated with deterioration in surface water quality and effects on Golden Plover, Dunlin, Red Grouse, bats, otters, water voles, amphibians and reptiles. It is considered that these effects are either managed through DTA's Environmental Management System (EMS) or are not occurring as a result of military activities.	Potential effects from military activities on vegetation composition and the disturbance of birds.
Noise	Noise effects from the majority of military training, such as camping, running, climbing etc, vibration effects from training activities and noise effects from military vehicles on local roads. The noise levels associated with such activities are minimal.	Noise effects on receptors outside the RDA occurring as a result of live firing on the three ranges and the noise effects within DTA from dry tactical training, helicopters and vehicles.
Public access and recreation	None	The EA will address the demand for access and recreation by members of the public and the potential effects and the relationship between the demand for access and current levels of training.
Socio-economics	None	Effects on the tourism economy, the local economy and nuisance effects on local people will be considered further in the EA.

Topic	Scoped-out effects	Scoped-in effects
Surface water	Effects associated with changes to run-off rates from off-road vehicle use, drainage pools due to rutting from vehicle activity, spillages and chemical toilet waste; as these effects are managed through DTA's EMS.	It is considered unlikely, with current management measures in place, that potential water quality effects associated with military activities are significant. However, further baseline information will be obtained and included in the EA to demonstrate that this is the case.
Traffic and transport	All potential effects associated with military-related traffic. These include delay to drivers and pedestrians, accident and safety issues, pedestrian amenity (i.e. the pleasantness of a journey), fear and intimidation of those using local pavements adjacent to roads from heavy goods vehicle traffic and severance effects, for example, difficulty in crossing roads due to high volumes of traffic. Existing traffic levels associated with military activities are not considered to be causing an effect on traffic flows on local roads.	No traffic and transport effects require further appraisal.

Contents

1. Introduction

1.1 Purpose of this Report

1.1.1 Dartmoor Training Area (DTA) comprises approximately 13,000 hectares (ha) of freehold and licensed training areas, some sites on long-term agreements and training on private land (TOPL) within the Dartmoor National Park (DNP). The topography, climate and management of the area have resulted in an upland landscape of open aspect with little cover from the elements and rapidly changing weather conditions. Accordingly, it provides facilities for arduous training in a natural environment on the UK Defence Training Estate (DTE), within which the conditions and frictions of war can be experienced. It is prioritised for the training of light forces[1].

1.1.2 The majority of DTA is operated under licence from the Duchy of Cornwall. The present licence expires in 2012 and prior to its renewal the Secretaries of State for Defence and Environment require confirmation that:

- there is a clear military need for both live firing and dry training on DTA; and
- the management of DTA for military activities will continue to be sensitive to the environmental, farming and public access issues, and is thus sustainable in the long term.

1.1.3 These requirements will be addressed through the preparation of an Environmental Appraisal (EA). The EA will not be restricted to assessment of the licensed area only but will consider the whole of DTA. It is anticipated that the results from the appraisal of the effects of military activities on Dartmoor will also be used to inform the licence re-negotiation.

1.1.4 This Report identifies the environmental, land use and public access issues associated with military activities on DTA that need to be addressed in detail. As well as identifying those issues that require further consideration, this Report is intended to stimulate dialogue with our stakeholders. Once the

[1] Light force training takes place essentially on foot in groups of up to 650 soldiers (battalion strength). This training activity can involve limited use of vehicles (Land Rovers, four-ton trucks and light tracked articulated vehicles (BV206)) largely on tracks. Helicopters can be used to move troops especially to remote areas of DTA.

issues are agreed, they will be assessed further as part of the EA. The rationale behind this approach is explained further in Section 1.2.

1.1.5 In the context of this Scoping Report and the subsequent EA, the focus will be the continuation of light forces training beyond 2012 within the existing boundaries of DTA. The Appraisal will be based on the premise of no significant increase in levels of military activity or change to the number of live firing days currently (2006) permitted. The level of military activity considered in the EA will be similar to that which will occur when there are low levels of overseas deployment, as this is the steady state required to meet the training need. The Appraisal will also consider the continued use of the two camps (Okehampton and Willsworthy) within DTA and the main access roads to the camps from the trunk roads. It is assumed that 43 (Wessex) Brigade will continue to organise the Ten Tors Challenge. Fixed wing aircraft and helicopters used to support troops training on DTA will be included in the EA. Over flying fixed wing aircraft and helicopters are excluded from the EA, as they do not form part of the training activities on DTA for which DTE is responsible.

1.1.6 This Report identifies the likely significant effects of continued military activities that need to be considered further as part of the EA process and the proposed scope of the EA (insofar as the scope can be determined at this stage of the EA). It is anticipated that this Scoping Report will continue the dialogue with, and engagement of stakeholders with an interest in the use of DTA for military activities. Based on Dartmoor National Park Authority (DNPA)'s Public Consultation list, the organisations that have been advised of and invited to comment on this Report are listed in **Appendix A**. This Report is available on DTA's website (http://www.dartmoor-range.co.uk), and copies will be available on request.

1.1.7 By circulating this Report to stakeholders, the Ministry of Defence (MoD) is inviting comments on the effects to be taken forward into the EA process. Stakeholders are also invited to comment on whether any effects that have been scoped out (or omitted) are, in their opinion, likely to have significant effects and should be brought back (or introduced) into the EA process. It would be helpful if stakeholders could explain why any such effects are likely to be significant in the context of continued military training on DTA. In addition to circulating this Report, the MoD will also invite stakeholder engagement through consultation involving exhibitions and public meetings. Details of dates and venues will be made available in due course. The consultation period will run until 17th November 2006

1.1.8 The EA is required to describe the likely significant environmental effects of continuing military activities beyond 2012 and evaluate their significance using defined criteria. The findings will be used to identify whether any management measures, in addition to those already in place, are required in DTA in order to further mitigate any residual environmental effects of military activities.

1.2 Approach to Scoping

1.2.1 The approach to scoping that has been adopted for this EA is based on that used for the assessment of effects associated with developments for which Environmental Impact Assessment (EIA) is required for projects falling under the requirements of the *Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.*

1.2.2 The EIA regulations are normally applied to certain types of 'development' or activities that require planning, or other consents, because they could have environmental effects that are likely to be significant. In this case, there is no 'development' or change that would trigger the EIA regulations. The assessment process that is used for an EIA development or activity however is seen as a suitable model to apply to the EA of the likely significant effects of the continuation of military training at the steady state level of activity beyond 2012.

1.2.3 While wishing to maintain the link to the EIA process it is recognised that in the absence of a 'development', the statutory framework of the regulations does not apply. In view of this, the term Environmental Appraisal (EA) is used to replace EIA or Environmental Statement (ES) which is the product of the EIA process.

1.2.4 This Scoping Report considers all types of effects associated with military activities, which include direct, indirect, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects.

1.2.5 Effects in relation to the following topics have been considered (in alphabetical order):

- air quality (and climate change);
- cultural heritage;
- landscape and visual;
- land use
- nature conservation
- noise;
- public access and recreation;
- socio-economics;
- soils, geology and groundwater;
- surface water; and
- traffic and transport;

1.2.6 Effects have been identified by considering the military activities taking place on DTA, the changes that result from these activities, and the effects of these changes on people and environmental resources (collectively referred to as 'receptors').

1.2.7 As military training currently takes place on Dartmoor, and has done so for more than 200 years, consideration of the scope of the EA and subsequent work involves assessing the effects of training upon the receptors within and around DTA. Therefore, the EA will establish the existing environmental quality of DTA by identifying and assessing those activities, which have the potential to cause a significant effect on receptors within DTA and surrounding area. Once the appraisal is complete, any additional measures required to improve further the environmental quality will be identified, introduced and included within DTA's management systems. An audit[2] of the DTA Environmental Management System (EMS) was completed in March 2005; the EA will take into account the findings of the audit.

1.2.8 Effects that are considered likely to be significant will be taken forward into the EA process (i.e. they are 'scoped in'), whereas any effects that are not significant will be 'scoped-out'. Where there is uncertainty as to whether any effects are likely to be significant these will be taken forward into the EA process until the significance of the effect is determined.

1.2.9 In this Report, consideration of which effects are likely to be significant has been made using information about:

- the receptors that could be affected by continuing military activities;
- the expected magnitude and other characteristics of the environmental changes that may be affecting important receptors, for example the magnitude, duration and spatial extent of military activities;
- the susceptibility of important receptors to exposure to these activities; and
- the continuing management of military activity such that the effects from these activities are not likely to be significant.

1.2.10 For effects that are likely to be significant, this Report sets out the work that is needed to complete the EA. The significance of these effects will be taken forward and assessed as part of the EA. Where appropriate these effects will be assessed in accordance with a significance evaluation matrix, of the type set out in **Appendix C**. The matrix uses information on the magnitude or scale of effects and the sensitivity of identified environmental receptors or resources to determine whether the effects are likely to be significant. It should be noted that this approach is not applicable to all the topics in this appraisal process but will be used where it aids understanding and

[2] RPS, (2005) External Audit of Dartmoor Training Area's Environmental Management System.

comparison of the significance of the effects. Where possible the evaluation matrix will use common terminology to explain significance.

1.2.11 In discussion with the Dartmoor Steering Group (DSG)[3], DTE has established a process through which stakeholder comments on this Report and the EA will be collated, reviewed and taken into account as required. This process requires the DSG[4] to act in a similar way to a planning authority and/or an inspector at a planning enquiry. The DSG will assess the adequacy of this Report, the scoping opinion and the EA and make recommendations to the Secretaries of State for Defence and Environment on the sustainability of military training on Dartmoor.

1.2.12 In recognition of the resource implications involved in staffing the scoping and consultation phases of this process it has been agreed with the DSG that DTE and its advisers will undertake the following:

- distribution of this Report;
- organisation and running of exhibitions and public meetings (normally the responsibility of the developer for a planning application);
- collation, review and assessment of all responses to the consultation;
- preparation of the draft scoping opinion based on the responses from stakeholder consultation which will confirm or extend the scope of the Appraisal; (The reasoning for not extending the scope of the EA will be specified in accordance with criteria to be agreed with the key stakeholders.) and
- provision of copies of all documents to the DNP and DSG. The documentation (where this does conflict with the Data Protection Act), assessment criteria and the scoping opinion will be provided on the DTA website.

1.2.13 On completion of the draft scoping opinion, the DSG will confirm (or otherwise) that the scope of the EA has been correctly defined and that it takes proper account of all stakeholder responses.

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[3] The role of the DSG was set by Parliament in 1978. It requires the DSG to keep under review the progress made on the recommendations contained in the Sharp Report (Comnd 6837) and the best possible reconciliation of the requirements of military training, conservation and public access. The DSG also considers matters referred to it by the working party and any reports prepared by the working party. The DSG reports annually to the Secretaries of State for Defence and the Environment.

[4] If this were a statutory EIA process connected with a planning application, the preparation of the scoping opinion and determination of adequacy of the environmental statement (the product of the EIA process) would be the responsibility of the DNP authority as the designated planning authority

1.3 Report Structure

1.3.1 **Chapter 2** of this report provides a description of the background to, and need for, military training activities on DTA, and an overview description of DTA. This Chapter also summarises existing DTA management measures.

1.3.2 **Chapter 3** describes the planning policies relevant to each topic.

1.3.3 Chapters **4** to 14 outline the current conditions appertaining to each topic and the likely significant effects that may result from continuing military activities. For those effects that could be significant, the next steps in the EA process are identified.

1.3.4 **Appendix A** lists the organisations to which this report has been sent for consultation, **Appendix B** sets out a glossary of terms and abbreviations used in this report, **Appendix C** provides an illustrative significance evaluation matrix and **Appendix D** provides a list of the footnote references used in the Report.

2. Description of DTA

2.1 Outline Description of Dartmoor Training Area

2.1.1 DTA consists of approximately 13,000 ha of predominantly moorland in Devon, and is located approximately 20km west of Exeter, 15km north of Plymouth and approximately 320km southwest of London, as shown on **Figure 2.1** (next page). In addition to the 13,000 ha, there is traditional use of an additional 35,000 ha of unenclosed land for transit purposes, some sites with long-term agreements[5] and short term Traingin on Private Land (TOPL). There are five training areas; Okehampton, Willsworthy and Merrivale in the north; and Cramber and Ringmoor in the south. The local highway network within and around DTA includes the A30 to the north, the A386 to the west and the A38 to the south. There are few residential properties within DTA or close to the training areas.

2.1.2 DTA lies wholly within the DNP. Okehampton, Merrivale and Willsworthy form a contiguous entity in terms of training area in North Dartmoor, of which a large proportion is designated as North Dartmoor Site of Special Scientific Interest (SSSI) and Dartmoor Special Area of Conservation (SAC). Cramber and Ringmoor, which lie in South Dartmoor, are two areas of land that link along a small boundary and lie outside of, but adjacent to, the South Dartmoor SSSI and Dartmoor SAC.

2.1.3 DTA includes a significant archaeological landscape with elements dating back to Prehistory. Notable among these remains are the Dartmoor reaves, a series of Bronze Age land boundaries and associated settlement remains[6]. The wider landscape does not enjoy statutory heritage protection as no such framework exists, but individual components within the wider landscape are included on the Schedule of Ancient Monuments.

2.1.4 Several watercourses lie within DTA including parts of the catchment areas of the East Okement River, River Taw, North Teign River, River Dart, River Meavy, River Tavy, River Lyd, River Walkham and West Okement River.

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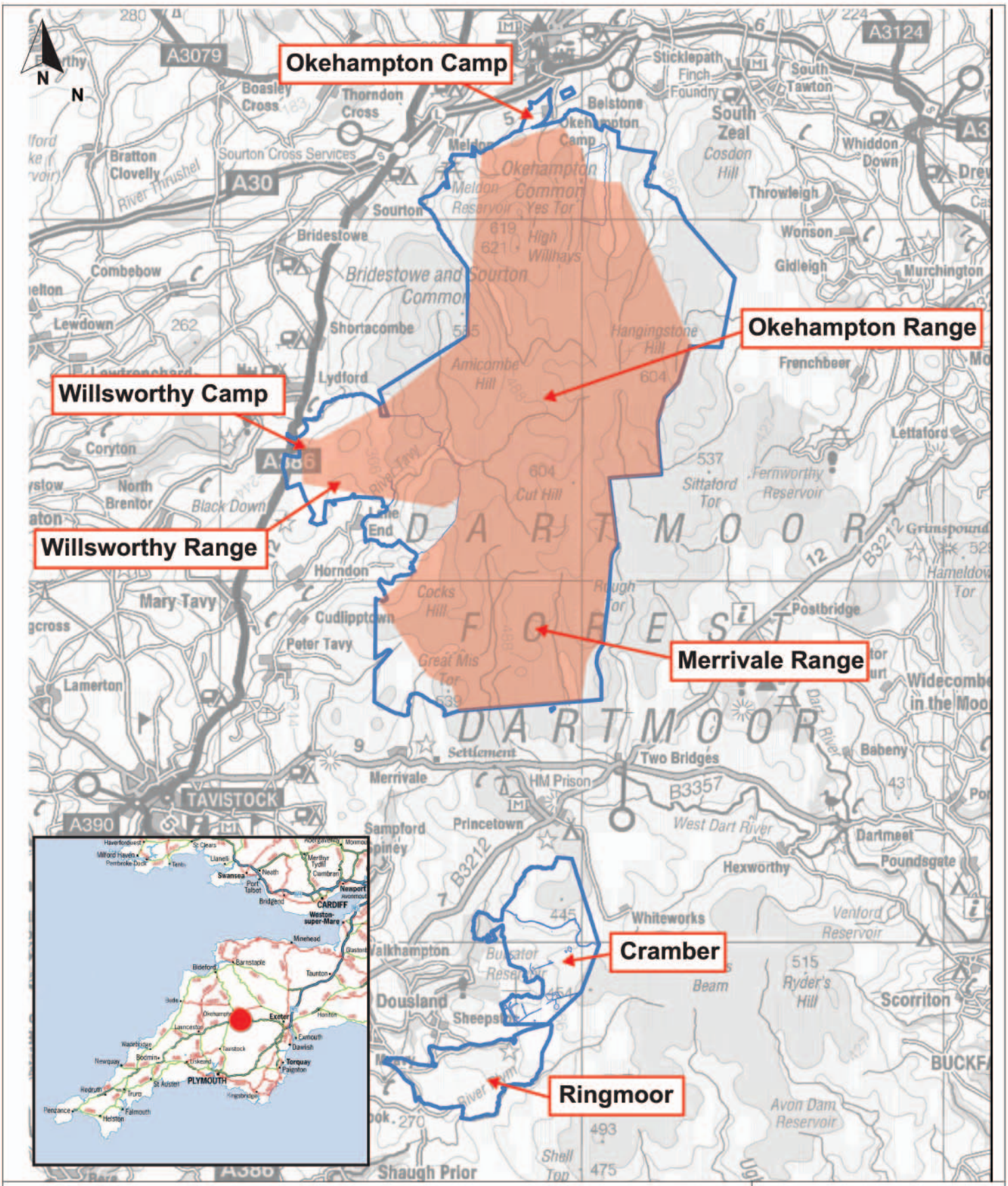
5 Dewerstone, Foggintor, Gidleigh Woods, Pridhamsleigh Caves, Sheepstor and Trowlesworthy.

6 Fleming A (1988) *The Dartmoor Reaves* London: Batsford.



Parts of the catchment areas for both the Meldon and Burrator Reservoirs lie within DTA.

2.1.5 DTA contains fixed and field firing ranges, dry training areas and two camps. The majority of DTA is licensed from the Duchy of Cornwall, the Maristow Estate and South West Water. The major part of Willsworthy Training Area is owned freehold by the MoD, amounting to some 1,356ha. DTA amounts to approximately 14% of the total area of the DNP and about 25% of the open moorland. Most of northwest Dartmoor is inaccessible except on foot or by helicopter, although some vehicular tracks exist, most of which provide access to the moor rather than across it. The uneven moorland plateau is surrounded by areas of enclosed land, most of which is more intensively grazed.

2.2 Description of DTA Military Training

2.2.1 Military training has taken place on Dartmoor since the early 1800's. Artillery firing started in 1875 and Okehampton Camp was built in 1893. The area was used intensively for tactical exercises with live ammunition during the Second World War. Willsworthy Camp was opened in 1995[7]. The Defence Lands Committee (Nugent Committee) undertook a complete review of the MoD land holding for defence purposes in 1973, including land within DNP. This was followed in 1975-76 by a non-statutory public inquiry, conducted by Lady Sharp, into the continued use of Dartmoor by the MoD for training purposes. Recommendations made in the Sharp Report[8] resulted in an area to the south of DTA, known as 'Southern Ringmoor' being replaced by dry training facilities around Cramber Tor.

2.2.2 DTA's terrain, climate and isolation all provide a challenging environment to teach and practice individual skills, including navigation, fitness, survival, self-reliance, fieldcraft, weapon marksmanship and first aid. Resource, initiative and leadership can also be developed by using adventurous activities such as caving, climbing, canoeing, hill walking and riding. Individual skills are developed through tactical training, which progresses through crew and team exercises up to occasional brigade operations involving thousands of

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7 Willsworthy Camp, at Beardown near Lydford, provides accommodation for up to 130 personnel. The single storey vernacular building, built on a low lying greenfield site purchased by MoD in 1987, opened in 1995 replacing an old hutted camp at Willsworthy, which was in dilapidated condition and visually intrusive on the skyline. In consultation with DNPA, the building was carefully landscaped into its surroundings and constructed of traditional stone under a slate roof. The surrounding area was landscaped as agreed with DNPA and the other part of the land retained in agricultural use. Where necessary, potential issues associated with this camp will be considered in the EA, however, given the age and planning history of this camp it is expected any such issues can be scoped out. For this reason, the camp is not discussed elsewhere in this Scoping Report.

8 Sharp (1977) The Continued Use of Dartmoor by Ministry of Defence for Military Training (Comnd 6837).

personnel. Live fire tactical training takes place using live ammunition against targets and helps to develop confidence in weapons and colleagues. Dry tactical training, which allows for two-sided exercises, is conducted using blank ammunition and pyrotechnics to represent the noise and friction of battle.

2.2.3 Parts of the three training areas on the north moor (Okehampton, Merrivale and Willsworthy) are used for live firing. These areas are known as Range Danger Areas (RDAs). When the land is not being used for live firing, it is available for individual skills, adventurous training and dry tactical training. The Armed Forces also carry out training, except live fire tactical training, on Cramber and Ringmoor Training Areas, both on the south moor.

2.2.4 Royal Marines and other light forces based in the southwest of England including territorial reserve forces and their cadet organisations are the primary users of DTA. However, in the same way that they need to train in terrain and climate not found near their home base, so other units come to tackle Dartmoor's challenges. All three Services, including their reserve and cadet forces, train on DTA. Commandant DTA (Comdt DTA) manages military activities.

2.2.5 Projectiles fired within Okehampton, Willsworthy and Merrivale RDAs include rifle and machine gun rounds, a small amount of light anti tank weapons (LAW), light mortar fire and occasional heavy mortar fire. Artillery is limited to firing smoke, illuminating or practice shells. A small arms round can travel 4,000 metres (m) and allowance has to be made for ricochets in siting fixed ranges and planning live fire tactical training.

2.2.6 All types of training on DTA are supported to some extent by military transport, Land Rovers, minibuses and four-tonne[9] vehicles; these are restricted to tarmac roads and specified hard tracks unless off road movement is essential. A limited number of exercises use a tracked articulated vehicle and aircraft.

2.2.7 In addition to training activities, there are several support activities associated with the military use of DTA. These include the provision of accommodation, messing, offices, stores etc and making available training areas, ranges and training facilities. Throughout this Report the term 'military activities' is used to refer to both training and support activities, and effects from both types of activities are considered.

[9] Four-tonne is the carrying capacity of the vehicle not its gross weight.

2.3 The Need for Continuing Military Training

2.3.1 A detailed investigation[10] on the continuing need for military training on DTA was reported in June 2005 and published on the DTA website in April 2006[11]. The 'Military Needs Paper' considered at a National level:

- the demand for light force training;
- the training resource, and
- the reconciliation of demand and supply.

2.3.2 Each topic was considered in the context of current and future policies for the development of Land Forces (Future Army Structures), where it is located (Super Garrisons), how it trains (collective training) and the balance between training simulation and live fire tactical training.

2.3.3 The Need Report concluded that the Land Forces (including Royal Marines) are likely to remain at similar size (approximately 100,000 personnel) and shape until 2050 although the training requirement is likely to be more demanding on the training estate as the range and capabilities of weapons and equipment increase. In addition, the number of personnel based in the UK will increase by 20,000 as the Army withdraws from Germany by 2030.

2.3.4 The demand for light force training stems from the need to train all infantry units[12] (41 units including the Royal Marines), combat support and combat service support units up to a level that enables them to carry out a spectrum of activities (individual and team skills, advance to contact, ambush, patrolling, attack, defence, relief in place and withdrawal). Training groups differ in size varying from sections (8 soldiers), platoons (30 soldiers) to companies (120 soldiers). This training enables units to join other units to take part in combined arms[13] battle group exercises.

2.3.5 There are three levels of collective training[14] (CT) that need to be achieved by light forces (CT 1 & 2) that have to be achieved by all 41 units annually. Ten of these infantry units also have to achieve CT3 annually.

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10 RPS (2005) The Continuing Need for Military Training on Dartmoor.

11 http://www.dartmoor-ranges.co.uk

12 Unit = Battalion (650 soldiers);

13 Infantry, engineer, air, artillery etc.

14 Collective training forms trained individuals into cohesive formations and units, and broadens individual experience. As combat is complex, so are the skills to conduct it. Such skills fade over time, both for individuals and units. Collective performance fades as individuals within units and formations forget, or move on. Training should therefore be individual and collective, progressive and frequent. Para. 0818, Army Doctrine Publications, Operation, May 2005.

2.3.6 By examination of the duration of the various training activities and the number of units that need to undertake each activity it is possible to calculate a training demand. The measure adopted for this demand calculation is sub unit training week[15]. Using this methodology the number of dry and live tactical training weeks was calculated as shown in **Table 2.1**.

Table 2.1 Demand for Light Force Training

	Annual Sub Unit Training Weeks			
Minimum Requirement	**No. of Weeks**	**No. of Sub Units**	**Dry Tactical**	**Live Tactical**
Platoon Rifle (including Company C2)	2	164	328	
Company Tactical (including Specialist Platoon Support)	2	164	328	
Company IFFC[16]	1	164		164
Battalion	3	36	108	
Commando Training Centre Royal Marines	2	23	46	46
Infantry light force training for other Combat Arms, Combat Support and Combat Service Support Units	1	228		228
TOTAL			**810**	**438**

2.3.7 In addition to the demand for light force training, the Need Report also examined the available training areas that could provide the necessary facilities for various activities prescribed in the three levels of collective training (CT1, 2 & 3). In establishing the available training areas the Need Report had regard to the:

- suitability and availability of the training estate (which included MoD freehold, leased and licensed land); and
- areas required for the different types of training activity.

2.3.8 The criteria used to assess the suitability of training areas to meet the specific requirements included:

- **location:** proximity to those units that need to use that resource;

15 Sub unit training week = number of units (Battalions) x number of companies in a Battalion (4) x number of weeks of training.

16 IFFC = Infantry Field Firing Camp

- **physical features:** required to provide the diversity and testing environment within which to train;
- **size and shape:** to meet the safety requirements of weapons and tactical options for the activities; and
- **facilities:** from fixed ranges to field firing areas and supporting infrastructure (accommodation etc).

2.3.9 This examination showed there were just six training areas that met the relevant criteria as shown in **Table 2.2**.

Table 2.2 Training Availability

Training Area	Priority [1]	Disruption	Limitation to CP1, CP2 (or equivalent) Light Force Training	Available Sub Unit Training Weeks [2] (Concurrent Live and Dry Training)	
				Dry	Live
Dartmoor Training Area	Commando Training Centre Royal Marines (CTCRM) Royal Marines (RM)	Low	Non firing days: Okehampton – 240 days Merrivale – 180 days Willsworthy – 120 days	472	106
Kirkcudbright Training Area (excluding TOPL)	Extended Periodic Operational Refresher Training (EPORT) Training for units based in NI Trials	Low	Trials – 72 days Accommodation for only 1 Coy. Proximity to NI	0	20
Otterburn Training Area	Bde Ex Artillery Schools (e.g. Army Air Corps)	Low	AS90/Mulit-Launched Rocket System (MLRS) – 55 days Non Firing – 70 days Apache – 84 days Joint forward Air Control Training and Standards Unit (JFACTSU) – 24 days	48	36
Sennybridge Training Area	Live Fire (LF) Bde Ex Infantry Battle School (IBS). Royal Military Academy Sandhurst (RMAS). RM Phase 3	High	Low Priority High use for Operational Training and Advisory Group (OPTAG) and IBS	0	0
Salisbury Plain Training Area	Trials/Tactical Engagement Simulation Exercise (TESEX) Arms Schools	High	No Coy Accom. Low Priority (22/26) High use for Armoured, TESEX and OPTAG	0	0
Stanford Training Area	Low Intensity OPTAG LF Bde Ex	High	Non Firing – 42 days Increasing use by 16 Bde	152	38
TOTAL				**672**	**200**

Notes
1: Priority 1 (Pre-Operational Training) will take precedence over these priorities as directed.
2: This represents a maximum availability but due to use of part weeks by existing priority users, adequate blocks of training may not be available to meet CP1, CP2 or CP3 requirements.

2.3.10 There are many demands on all the training areas in the UK. To balance these often conflicting demands, a booking system at Regional level is in place to allocate the training facilities. The allocation process has regard to:

- **Training Priority:** as set out in Land Command Standing Order 1406[17];
- **Disruption:** through needs for surge and pre operational training; and
- **Limitations to CP1[14] and CP2 (or equivalent) training:** arising from legislation, environmental management and present use.

2.3.11 The number of sub-unit training weeks available at each of the training areas, having regard to the allocation processes is set out in **Table 2.2**.
A comparison of the total training demand (**Table 2.1**) and availability (**Table 2.2**) shows that there is a national deficit of 138 sub unit training weeks and 238 sub unit training weeks for dry and live firing training respectively. However, due to the exceptional tempo of operations and the resulting lack of time available for units to train[18] this under supply has been tolerable.

2.3.12 It is also evident from **Table 2.2** that the facilities at DTA provide approximately 70% of the available dry training resource for light forces and 53% of the live firing tactical training resource. This reinforces the importance of DTA for the training of units in both the South-West and nationally.

2.3.13 The detailed study[10] concludes by saying that "DTA*… remains a key asset of the MoD estate*" and recommends that the licences with the Duchy of Cornwall and other landlords should be re-negotiated. The MoD is seeking a continuation of training at existing agreed levels, which occurs when there are low levels of overseas deployment, as this is the steady state required to meet the training need. The Appraisal will be based therefore on the premise that there will be no significant increase in levels of military activity or change to the number of live firing days currently (2006) permitted.

2.4 Potential Military Options

2.4.1 In the light of the conclusion and recommendation of the Military Needs Paper, DTE commissioned a review of potential military options for delivering military training on DTA. This Options Paper[19] concluded that while there might be some potential to improve the efficient use of DTA for military training, which could lead to improved public access, there were significant safety issues that needed to be addressed. Further risk appraisal studies would therefore be

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17 ATE (2004) Land Command Standing Order No 1406 Use of Army Training Estate Facilities July.

18 SO1 Individual Training HQ LAND.

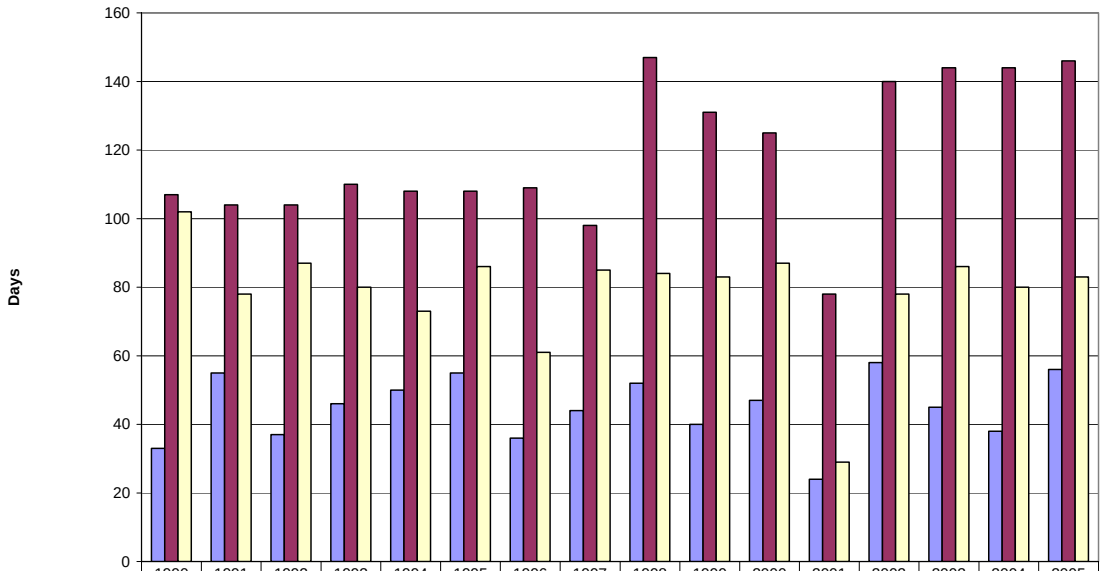
19 RPS, (2006) Dartmoor Training Area - Paper Informing Potential Future Military Options.

required before such changes could be introduced. These will form part of the EA.

2.5 Current Usage of the Training Area

2.5.1 There is no simple metric to describe the level of activity on military training areas as this will depend on the objectives, number and types of training that are carried out at any time. For the purpose of illustrating the general level of activity on DTA two metrics are commonly used, namely the number of days the training facilities are used and the number of man training days[20]. These metrics are helpful to set the likely significant environmental effects in this Scoping Report in context.

Figure 2.2 Annual Usage of Okehampton, Willsworthy and Merrivale Range Danger Areas

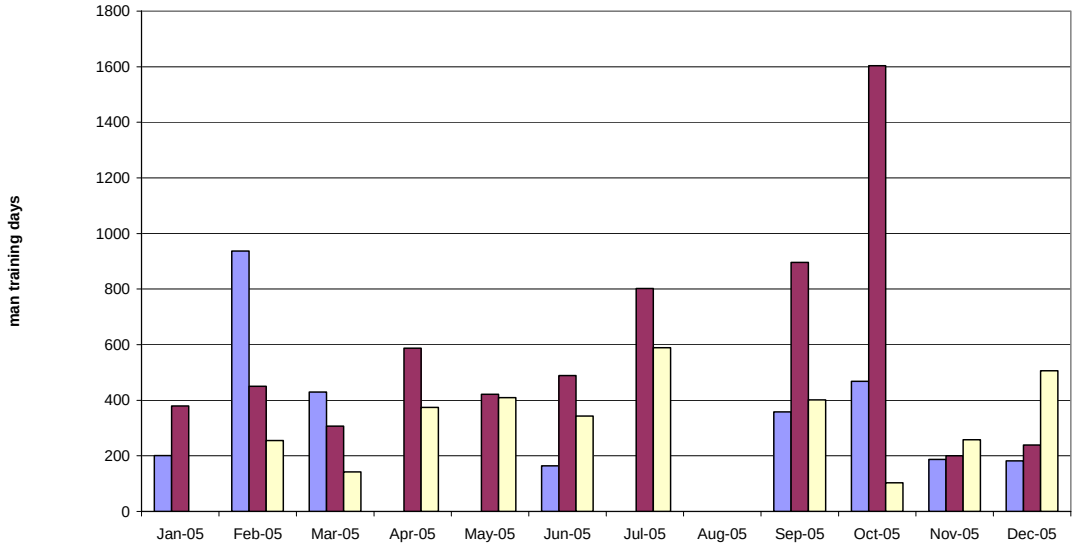


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Okehampton	33	55	37	46	50	55	36	44	52	40	47	24	58	45	38	56
Willsworthy	107	104	104	110	108	108	109	98	147	131	125	78	140	144	144	146
Merrivale	102	78	87	80	73	86	61	85	84	83	87	29	78	86	80	83

2.5.2 The number of days the RDAs are available is governed by the non-firing days set out in **Table 2.2**. **Figure 2.2** shows the number of days the three RDAs were used for live firing during the period 1990 to 2005. Over this period, their use has varied as would be expected; however, they show a consistency with only Willsworthy showing an increase in recent years. The low usage in 2001 reflects restrictions on training due to the Foot and Mouth epidemic.

20 The usage figures are derived from statistics agreed with DNPA.

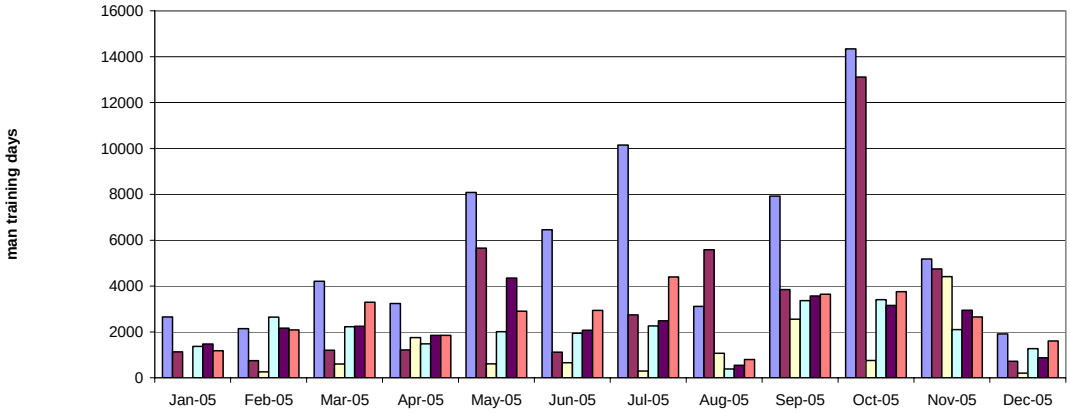
Figure 2.3 Total Live Firing Man Training Days by Month for Dartmoor Training Area in 2005



	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
Okehampton	201	937	429	0	0	164	0	0	358	468	187	182
Willsworthy	380	450	307	587	421	489	802	0	896	1604	200	239
Merrivale	0	255	142	374	409	343	589	0	401	103	258	506

2.5.3 For example, the number of man training days involving live firing at DTA is shown in **Figure 2.3** by Range Danger Area (RDA) and month for 2005. The guaranteed public access periods in April, May and July and first half of September (Okehampton) and August (all three areas) are evident.

Figure 2.4 Total Dry Man Training Days by Month for Dartmoor Training Area in 2005



	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
Okehampton	2652	2144	4209	3236	8080	6460	10147	3113	7921	14340	5179	1914
Willsworthy	1139	746	1201	1216	5654	1120	2743	5583	3844	13113	4745	725
Merrivale	0	262	600	1752	612	659	293	1075	2552	758	4416	205
Cramber	1369	2643	2231	1485	2011	1943	2264	390	3365	3409	2105	1271
Ringmoor	1478	2167	2244	1853	4345	2075	2484	540	3569	3154	2944	875
outside training	1183	2084	3294	1853	2905	2940	4401	797	3642	3757	2656	1603

2.5.4 The number of man training days involving dry training at DTA is shown in **Figure 2.4** by area and month for 2005. It is evident that while the majority of training activities take place within DTA's main training areas some adventurous type training takes place elsewhere within DNP. The figure demonstrates that training is roughly evenly spread throughout the year with some peaks particularly on Okehampton.

2.5.5 Further military training data will be prepared during the EA process to support the appraisal of effects in individual environmental subject areas that are taken forward in to the EA.

2.6 Description of Current Management Measures

2.6.1 From 1 April 2006, a new Defences Estates (DE) Directorate, the DTE, has managed DTA. DTE has been created in response to a recommendation from the Defence Estates Committee to separate the demand and supply of the training estate for all three Services in line with MoD's initiative of Smart Acquisition. DTE represents the supply side with Land Warfare Centre defining the demand.

2.6.2 DTE encompasses all of what was previously known as the Army Training Estate (ATE) as well as additional training areas. Within this organisation, DTA is part of the DTE South West region.

2.6.3 **Table 2.3** outlines an overview of the environmental management measures currently in place at DTA.

Table 2.3 DTA Environmental Management Measures

Environmental Issue	Management Measure
Air quality	Regular service and maintenance of generators, combined with infrequent use and limited deployment , use of LPG fuel in cookers, cookers switched off during the night, management system to ensure efficient use of heating systems in buildings
Air quality, noise	Regular servicing and maintenance of aircraft and vehicles
Air quality, traffic and transport, noise	Measures to minimise vehicle use including monitoring of mileage and measure to co-ordinate vehicle use and sharing
Nature conservation	Restrictions on type of ammunition to prevent holes being excavated in the ground, debris cleared and major holes backfilled, access limited to certain bird species nesting areas during breeding seasons, flora and fauna monitored, fire warning system used to highlight risk periods and notify users of additional controls which are needed during higher risk periods, clearance of stock from live firing areas when live firing is programmed - where possible live firing exercises are planned to enable stock to be moved to areas requiring grazing, management plan on Willsworthy Training Area (part of North Dartmoor SSSI)
Cultural heritage	Educational information provided to users, historic environment monitored, use of historic sites and tors as targets forbidden, maintenance of buildings of historic significance at Okehampton Camp
Geology, nature conservation, archaeology	Careful and appropriate selection of digging sites - requirement to backfill trenches and re-turf, areas of heather and blanket bog avoided
Geology, nature conservation, archaeology	Restrictions on military vehicle transit routes, vehicle movements off permitted tracks is limited to those having operational training need, rutting repaired, tracks and roads inspected and repaired, consultation with DNPA about routes for groups of more than 30 people outside training area, erosion of footpaths monitored
Landscape and visual	Litter and debris cleared by military personnel after training and periodically by staff, visual intrusion of supporting infrastructure (shelters, flag poles) minimised through use of appropriately coloured paint (green of grey) or construction using appropriate materials (granite), Landscape Management Plan implemented for Okehampton Camp, parking and access constraints implemented to limit and prevent vehicular access by both public and military, visual intrusion of Okehampton anti-tank training area minimised by incorporating into railway bank, portaloos sited in appropriate location to avoid visual intrusion where possible, new field portaloo design being developed,
Noise, recreation, nature conservation	Careful control of military aircraft activity which takes into account when activities will occur, number of aircraft, flying heights, which are normally limited - low flying requires prior authorisation. Helicopter pilots briefed to avoid habitation, riders and livestock
Noise, recreation	Range danger areas closed during live firing, blank firing and use of pyrotechnics prohibited within 100m and 200m of civilians respectively
Economy and employment	Military personnel and attendees to training and events such as Ten Tors instructed to avoid livestock. Ten Tors managers' weekend held annually – managers required to attend every 5 years. MoD pays for rights to train and provides compensation for stock injured or killed. Incident reports and complaints record maintained by MoD. Approximately 80 staff employed on DTA, preference given to local purchasing where cost effective. Local farmers employed for stock clearance.
Tourism and recreation	Leaflets and information boards used to encourage access outside live firing programme, information about guaranteed public access and firing programme made available on website, information boards, information centres on local radio and in military and civilian publications, cancellations of firing publicised in a similar way,
Waste, recreation	All general waste disposed of in accordance with regulations with some recycling in place. Military debris and civilian litter collected off moor, waste from ammunition (containers and cartridge cases) put into military salvage system

Environmental Issue	Management Measure
Water	Water management measures - some timed automatic taps, on site sewage treatment works, maintained and inspected in accordance with industry standards
Water, nature conservation, land quality	Spillage minimisation - prevention plan in place, bunding and interceptor tanks used in appropriate locations such as refuelling points, spill response kits, oil and grease traps, trained personnel.

3. Planning Background

3.1 Introduction

3.1.1 This Chapter provides an overview of the planning policy documents at the national, regional, county and local level that will be given due consideration through the EA process. The rationale behind the EA is discussed in Section 1.2.

3.1.2 Following the introduction of the Planning and Compulsory Purchase Act 2004, the Development Plan covering DTA will comprise two levels of document.

- A Regional Spatial Strategy (RSS) prepared by the South West Regional Assembly.
- Development Framework documents prepared by DNPA.

3.1.3 These Development Plan documents will be formulated in compliance with national planning policy and will form part of the DNPA Local Development Framework (LDF) along with their Local Development Scheme, Statement of Community Involvement and Supplementary Planning Documents.

3.1.4 For a transitional period, the Devon Structure Plan 2001-2016 and adopted Dartmoor National Park Local Plan 1995 – 2011 will remain in force until the new Plans replace them. Further details of these plans are given below.

3.2 National Planning Policy

3.2.1 Advice contained within Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) notes will be considered within the EA. Those deemed to be of relevance include:

- PPS 1: Delivering Sustainable Development;
- PPS 7: Sustainable Development in Rural Areas;
- PPS 9: Biodiversity and Geological Conservation;
- PPG 15: Planning and the Historic Environment;

- PPG 16: Archaeology and Planning;
- PPG 17: Sports and Recreation;
- PPG 21: Tourism; and
- PPG 24: Planning and Noise.

3.2.2 There are also a number of Circulars that need to be considered, including:

- Circular 12/96: Environment Act 1995, Part III National Parks;
- Circular 02/99: Environmental Impact Assessment; and
- Circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact within the Planning System.

3.3 Regional Planning Policy

3.3.1 The RSS provides a framework to inform the preparation of local development documents, local transport plans, and regional and sub-regional strategies and programmes that have a bearing on land use activities.

3.3.2 The current RSS, which covers DTA, is Regional Planning Guidance 10 (RPG 10) for the South West, published in 2001.

3.3.3 RPG 10 covers a broad spectrum of issues including a number of relevant policies relating to culture, leisure and sport, tourism and the environment.

3.4 County Planning Policy

3.4.1 The Devon Structure Plan 2001 to 2016 - 'Devon to 2016' (adopted October 2004) is the current Structure Plan for the whole of Devon, including DNP.

3.4.2 As required under the Planning and Compulsory Purchase Act 2004, the policies of the Structure Plan will eventually be superseded by policies in the RSS for the South West and the DNP Local Development Framework.

3.4.3 If these documents are not however, in place during the EA, policies contained within the Devon Structure Plan will need to be given due consideration.

3.5 Local Planning Policy

Dartmoor National Park Local Plan

3.5.1 The DNP Local Plan First Review 1995 – 2011 was adopted in August 2004.

3.5.2 Although work has commenced on the new LDF, its production is at an early stage, therefore at present the adopted Local Plan remains the basis against which the activities taking place within DTA should be assessed.

3.5.3 As relevant documents are produced during the development of the DNP LDF, these will be incorporated into the EA.

Dartmoor National Park Management Plan

3.5.4 The National Park Authority (NPA) is required, under Section 66(1) of the Environment Act 1995 to prepare and publish a National Park Management Plan and is expected to review this Plan every five years. The current DNP Management Plan (published in 2001) provides guidance on activities within DNP and seeks to encourage all those who have an interest in the National Park to work to common aims. The contents of this Plan will need to be given due consideration within the EA with particular regard given to Section 7.2 of the Plan which deals specifically with military activity within the National Park.

3.5.5 In Spring 2006 the NPA started a review of the Dartmoor National Park (DNP) Management Plan. Over the last five years, many new factors that affect Dartmoor have emerged which are likely to be reflected in the revised plan. It is expected that a plan for initial public consultation will be available at the end of the year. The emerging DNP Management Plan will also be considered in the EA and in the development of management processes subsequent to the EA.

4. Air Quality

4.1 Current Conditions

Data Sources

4.1.1 A review has been undertaken of readily available information. This has included a review of the Local Authority Air Quality Management process and air quality (AQ) reports relevant to the location of DTA. Information on predicted background AQ has also been considered. The following information was reviewed:

- West Devon Borough Council, 2005, Air Quality Report;
- West Devon Borough Council, 2003, Air Quality Review Updating and Screening Assessment; and
- information from the AQ archive website (http://www.airquality.co.uk).

Summary of Current Conditions

Predicted background pollutant concentrations

4.1.2 Information on predicted background concentrations of air pollutants are shown in **Table 4.1** together with the AQ Objectives.[21].

[21] SI (2000) 0928 The Air Quality (England) Regulations

Table 4.1 Predicted Background Air Pollutant Concentrations

Pollutant	AQ Objective	DTA (Average Value)	DTA (Maximum Value)
Benzene (Running Annual Mean to be achieved by 31 December 2010)	5 µg/m^3	0.1 µg/m^3	0.2 µg/m^3
1,3-Butadiene (Running Annual Mean to be achieved by 31 December 2003)	2.25 µg/m^3	0.0 µg/m^3	0.1µg/m^3
Carbon monoxide (Maximum daily running 8 Hour Mean to be achieved by 31 December 2003)	10.0 mg/m^3	0.2 mg/m^3	0.2 mg/m^3
Nitrogen dioxide (Annual Mean to be achieved by 31 December 2005)	40 µg/m^3	6.5 µg/m^3	11.1 µg/m^3
Nitrogen oxides (Annual Mean to be achieved by 31 December 2000)	30 µg/m^3 (V)	9.9 µg/m^3	16.9 µg/m^3
Particles (PM_{10}) (gravimetric) (Annual Mean to be achieved by 31 December 2004)	40 µg/m^3	15.2 µg/m^3	16.2 µg/m^3
Particles (PM_{10}) (gravimetric) (Annual Mean to be achieved by 31 December 2010)**	20 µg/m^3	14.2 µg/m^3	15.1 µg/m^3
Sulphur dioxide (Annual Mean to be achieved by 31 December 2000)*	20 µg/m^3 (V)	1.3 µg/m^3	2.4 µg/m^3

µg/m3 - micrograms per cubic metre

mg/m3 - milligrams per cubic metre

*AQLVR 2003 The Air Quality Limit Value Regulations 2003 SI no 2121

(V) This standard is adopted for the protection of ecosystems. All of the remainder are for the protection of human health

** Proposed new objectives for England of 20 µg/m^3 is given in the AQ Strategy but this has not been included in the Regulations

4.1.3 The information in **Table 4.1** would indicate that background AQ is good and falls well below current AQ objectives. These objectives are not likely to be exceeded in the future.

Local Authority air quality management

4.1.4 Since December 1997, each local authority in the UK has been carrying out a review and assessment of AQ in its area. This involves measurement of AQ and predicting how it may change in the next few years. The aim of the review is to make sure that the national AQ objectives[22] will be achieved throughout the UK by the relevant deadlines. These objectives have been set in regulations to protect people's health and the environment. If a local authority identifies an area where one or more of the objectives are not likely to be achieved, it must declare an Air Quality Management Area (AQMA) covering

22 DETR (2000) The Air Quality Strategy for England, Wales and Northern Ireland CM4548 and Addendum (2003).

the locality. The local authority will prepare a management plan in consultation with key stakeholders to improve the AQ - a Local Air Quality Action Plan.

4.1.5 West Devon Borough Council, the local authority area within which the entire DTA lies, has not declared an AQMA. South Hams District Council, to the south of DTA, has declared an AQMA around the A38 in Buckfastleigh. Teignbridge District Council to the east of DTA has declared AQMAs in Teignmouth, Newton Abbot, Dawlish and Kingkerswell. These AQMAs have been declared as exceedences of the AQ objectives are expected due to road traffic. All five AQMA are located more than 15km from DTA.

Potential air quality effects associated with military use of DTA

4.1.6 The baseline information outlined above would indicate that AQ in DTA is good. As military activities on DTA are not associated with large numbers of vehicles, travelling to the training estate or training within DTA, there is no reason to expect these training activities to have a measurable effect on AQ. Accordingly, the AQ objectives are not likely to be exceeded within and around DTA.

4.1.7 Potential effects associated with military activities comprise the following:

- direct effects associated with training (dust created by activities involving digging and vehicle movement); and
- indirect effects including effects from road traffic emissions associated with transport of personnel, emissions from support facilities such generators, boilers and cookers and emissions from helicopters.

4.1.8 Receptors, which are potentially sensitive to the above AQ issues associated with military activities, include residential and other sensitive properties (i.e. schools) around DTA and along roads used by military traffic, sensitive vegetation within DTA and walkers.

4.2 Scope of the Appraisal

Potential Effects Not Requiring Further Consideration

4.2.1 It is considered that the following effects do not require further appraisal.

- Direct effects associated with military activities: The amount of dust associated with digging activities, the use of vehicles on tracks and odour effects associated with smoke grenades are considered minor and not continuous effects. It is unlikely that there are any residential or other sensitive receptors, which would be affected by such activities. Therefore, this effect is scoped-out of the EA.

- Indirect effects associated with emissions from traffic supporting military activities on DTA: Baseline information demonstrates that AQ objectives within and around DTA are not being exceeded. This would indicate that road traffic associated with training activities using local roads is not creating significant AQ effects. Furthermore, management measures are in place to minimise vehicle movements, (i.e. through lift sharing schemes) and ensuring vehicles are well maintained. Therefore, this effect is scoped-out of the EA.
- Indirect effects associated with supporting facilities (generators, cookers and boilers): It is unlikely that the use of support facilities such as generators, cookers and boilers would produce significant emissions, which would threaten the achievements of the AQ objectives within DTA. Furthermore, management measures are currently in place to ensure that emissions are minimised as much as possible. These measures ensure that equipment is well maintained, used only when required and energy efficient fuel is used where appropriate. This effect is scoped-out of the EA.
- Indirect effects associated with the use of aircraft in support of ground troops: The quantity of aircraft training with ground troops is relatively small. Management measures are undertaken to ensure that aircraft are serviced and maintained efficiently. It is considered that the emissions from aircraft used in support of ground troops would not have a significant effect on AQ, and as background AQ is good and within the AQ objectives, this effect is scoped-out of the EA.
- Indirect effects associated with fuel burning (climate change): The emissions of greenhouse gases from military activities (including the use of aircraft) will remain a very small fraction of regional emissions. Hence, this effect is scoped-out of the EA.

Potential Effects Requiring Further Consideration

4.2.2 It is considered that there are no AQ effects that require any further appraisal.

5. Cultural Heritage

5.1 Current Conditions

Data Sources

5.1.1 The archaeological landscape of Dartmoor has been extensively studied. Numerous antiquarian excavations have taken place on the moor and more recently, surveys have revealed the extent of human activity and settlement on Dartmoor. Studies[23] [24] have demonstrated the archaeological potential of the area and shown how extensive the well-preserved Prehistoric remains are.

5.1.2 Within the wider Dartmoor area, DTA also contains a number of significant archaeological remains. In recent years, English Heritage (EH) has undertaken a series of surveys across DTA, on behalf of DE. These surveys comprise monument condition baseline surveys, which were undertaken to ensure that DTA's management was satisfactory and to gather information in support of MoD's Annual Stewardship Report[25], which is prepared by DE in order to document the condition of the estate. EH surveyed Okehampton (2004)[26], Merrivale (2004)[27], Ringmoor (2005)[28] and Willsworthy (2001)[29] with a partial survey[30] (sample size 34 monuments) of Cramber in 2002. A full EH

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23 Fleming, A. (1988) *The Dartmoor Reaves* London: Batsford.

24 Gerrard, S., (1997) *Dartmoor* London: Batsford & English Heritage.

25. MoD (2005) Annual Stewardship Report.

26 Probert, S., (2004) *Okehampton Range: Monument Baseline Condition Survey May 2004* English Heritage ISBN 1478 7008: unpublished report.

27 Probert, S., (2004) *Merrivale Training Area Monument Baseline Condition Survey August 2003-May 2004*, English Heritage: unpublished report.

28 Newman, P., (2005) *Ringmoor Training Area: Monument Baseline Condition Survey March 2005* English Heritage: unpublished report.

29 Probert, S., (2002) *Willsworthy Training Area ILMP: Archaeological Baseline Condition Survey November 2000-September 2001*, English Heritage: unpublished report.

30 Wessex Archaeology (2002) *Cramber Tor Training Area, Dartmoor Devon*, Unpublished report 51646.

survey of Cramber Training Area has now been completed and the report is in production. The Willsworthy Training Area survey was completed to achieve the Willsworthy Integrated Land Management Plan (ILMP, 1999)[31] and Revised Action Plan (RAP, March 2001). This Plan identifies five tasks that cover the maintenance and assessment of the archaeological landscape as follows:

- Review the current maintenance condition survey programme for scheduled sites and revise if desirable.
- Produce and revise a threat assessment for all Scheduled Ancient Monuments and ensure that measures are in place to prevent damage.
- Extend threat assessment to cover non-scheduled sites.
- Develop a system for regular condition surveys of non-scheduled sites.
- Gather detailed information on potential vehicle damage to archaeological sites.

The programme of EH surveys and reports referred to in 5.1.2 were developed directly because of these recommendations and serve to address the five points set out above across the whole of DTA.

5.1.3 The methodology employed for the survey work was for the survey team to search the National Monument Record (maintained by EH) and the Devon Sites and Monuments Record. Following the initial identification, the sites were subject to condition surveys. Condition was assessed against previous condition reports using Royal Commission for Historic Monuments of England[32] criteria. Stability was also recorded to allow future monitoring of the monument. Following the fieldwork phase of the survey, reports were produced to present data to inform current management and to provide a benchmark against which future re-survey can be measured in order to assess the continued state of the historic environment on DTA.

5.1.4 The historic built estate within DTA includes structures associated with training and military accommodation, including engine houses for target railways and observation posts, and structures in Okehampton Camp dating from 1893. In 2001, Wessex Archaeology carried out a desk-based assessment and earthwork survey of the Camp[33] Following this survey ATE South West (SW) commissioned Paul Francis, who undertook the Camp survey, to carry out a

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31 DE (1999) *Willsworthy Integrated Land Management Plan*, November.

32 RCHM(E) (1993) *Recording England's Past: a data standard for the extended National Archaeological Record.* Royal Commission on the Historical Monuments of England and the Association of County Archaeological Officers.

33 Wessex Archaeology (2001) *Okehampton Camp*, Unpublished client report.

survey of structures on the Okehampton Training Area [34], including observation posts and target facilities. In addition periodic facility condition reports are prepared indicating the condition of structures and the works required. As a result, there is a good deal of information that is used to monitor the condition of these structures and to guide management of this cultural heritage resource.

Summary of Current Conditions

5.1.5 The conclusion drawn from the various, recent surveys of the historic environment of DTA is one of good health. The Okehampton Training Area survey, which included Duchy of Cornwall land within Willsworthy Training Area, was undertaken over 2003 and 2004. The survey reported that no instances of military damage had been recorded and that visitor damage appeared to pose a more serious threat to the archaeological resource than troops training across DTA.

5.1.6 It is evident from the surveys that in the past military activities were not undertaken on a sustainable basis and that damage to monuments, whilst not a regular occurrence did occur. In recent years, management measures have been improved. This in part reflects a wider conservation awareness in MoD in general and DTE in particular, but it also reflects recent initiatives to manage vehicle movement and to educate troops to the landscape around them, and its natural and cultural treasures. These measures appear to have brought about an improvement in the situation on the ground and, as a result, in the condition of monuments on DTA. For example, the EH view of the Willsworthy area was that *"…the MoD now presides over a mostly stable archaeological landscape"*[29]. Furthermore, this survey noted that, monument damage, where recorded, was considered the fault of visitors and stock, rather than the military.

5.1.7 In respect of military remains, EH believes Willsworthy Training Area to have a nationally important assemblage of military archaeology going back over a century[29] and similarly the Okehampton Training Area military landscape may be of international significance[26].

5.1.8 The Cramber Report[35] also identifies a stable environment with monuments mostly in either fair or good condition. Such damage as was recorded is primarily the result of stock but again some erosion is the result of visitors.

5.1.9 Ringmoor Training Area has the densest concentration of archaeological remains on DTA. The Ringmoor report[28] describes the majority of monuments as stable and in comparable condition to similar sites elsewhere across

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34 Francis, P (2002) *Okehampton Artillery Range*. Unpublished client report and photographic survey.

35 WSP (2002) Cramber Tor Training Area, Dartmoor.

Dartmoor and beyond DTA. No recent military digging was reported. A small number of monuments were noted as causes of concern but their situation appears relatively easily remedied and in at least one case is again the result of visitor erosion.

5.1.10 Merrivale Training Area presents the most concern of the areas surveyed. EH has made a targeted recommendation[27] concerning the exclusion of troops and unidentified civilian vehicles from specific monuments. However, in general Merrivale is said to possess "*a largely stable heritage resource*". Although some erosion has been identified in this area, it is felt to relate principally to stocking levels and as such, is not the responsibility of MoD.

5.1.11 DTA's Environmental Management System (EMS) has many procedures in place to prevent potentially damaging military activity including educating staff and exercising troops about the importance of the historic environment. A leaflet produced jointly with DNPA and posters assist briefings. DTE South West (SW) Standing Orders control all aspects of military training; its timing, location and conduct, the use of vehicles, limitations on digging, for example the use of historic artefacts as live firing targets is forbidden.

5.1.12 The EMS is monitored to ensure that the mitigation measures are effective. Surveys of the historic environment are carried out periodically in conjunction with local statutory bodies. From these findings, procedures are improved and implemented, and, where MoD's responsibility, repairs carried out or risk of damage reduced.

5.1.13 The Wessex Archaeology survey of Okehampton Camp[33] and the survey of the Okehampton Artillery Range[34] suggests that there is little cause for concern about care of these historic structures. However, the condition of the military structures at Willsworthy, will be addressed in the EA.

5.1.14 Overall, the surveys indicate that with current protective measures in place, the cultural heritage of DTA is not under serious threat but there are some areas of concern. Although the cause of damage is not always identifiable, there is little evidence of current damage from military activity. It is evident that there are some areas where unidentified civilian vehicles are a real threat. There are a few areas where stocking levels are identified as a cause of both erosion and concern; the same is true of erosion caused by visitors

5.2 Scope of the Appraisal

Potential Effects Not Requiring Further Consideration

5.2.1 Both the EH and the Wessex Archaeology surveys clearly demonstrate that the current training regime on DTA poses little threat to the historic environment. As previously stated, there is little evidence of current damage from military activities. To demonstrate that this is the case, information from

the recent and previous surveys on the condition of monuments and the likely causes of damage will be assessed.

Potential Effects Requiring Further Consideration

5.2.2 The following potential effects will be considered further in the EA:

- Effects from vehicles and troops on foot resulting in the erosion of monuments: Although currently there is little effect from military training on the archaeology there appear to have been instances in the past when it was more significant, including for example, the excavation of slit trenches in a monument on Ringmoor. Whilst not a recent occurrence, this does demonstrate the potential for damage even by dismounted troops.
- Effects from the possible use of stones from cairns or abandoned buildings as material for bivouacs.
- Effects on the historic built estate within DTA from military activities: The historic built estate at Willsworthy, which is unrecorded, will be assessed for significance and condition. Where possible the cause will be identified in order that the effects of military activities, if any, can be identified.

Appraisal Methodology

5.2.3 The EA will draw on data from the recent and previous surveys to demonstrate the current level of threat to the historic environment from military use of the land. A similar approach will be undertaken in order to assess the potential effects of military training on the historic built environment.

5.2.4 The EH condition surveys present a snapshot in time and Willsworthy will be re-surveyed in 2006/7 as five years have elapsed since the last survey. Following such survey work, the data between the previous and current surveys would be compared and conclusions concerning the effects of training on the cultural heritage interests identified.

Criteria for Evaluating Significance

5.2.5 Criteria agreed between DE Environmental Support Team (EST) Historic Environment Team and EH/RCHM(E) already exist to monitor the condition of monuments across the defence estate. These criteria, which guided compilation of the recent DTA condition surveys, will be used to determine the significance of effects on the archaeological resource. For effects on the historic built estate, a methodology exists using the DE monument condition survey forms and which draws significantly from the RCHM(E) methodology.

5.2.6 For a monument to be included on the Schedule of Ancient Monuments,[36] it should satisfy a number of criteria in respect of its rarity, group values, and

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36 http://www.culture.gov.uk/historic_environment/Scheduled_Ancient_Monuments.htm

historical and archaeological documentation[37]. These criteria are designed to be used in a set of specific circumstances but may also be adapted for local or regional use. It is also important to note out that, for a variety of reasons, not every monument that satisfies the criteria will be included on the Schedule.

5.2.7 The existing criteria outlined above will be used to develop a methodology for the EA to determine the sensitivity of cultural heritage resources present within DTA, for example, by considering whether each cultural heritage feature is important at an international, national, regional or local scale. The scale or magnitude effects associated with military activities will also be established. This information will be used to identify significant effects in accordance an evaluation matrix of the type outlined in **Appendix C**.

37 Darvill, T.C., Saunders, A., & Startin, B. (1987) A question of national importance: approaches to the evaluation of ancient monuments for the Monuments Protection Programme in England, *Antiquity,* **61**, 223, 393-408.

6. Landscape and Visual

6.1 Current Conditions

Data Sources

6.1.1 Information on current conditions has been collected by reference to the following documents and sources of information:

- External Audit of Dartmoor Training Area's Environmental Management System - Final Report (RPS Health, Safety and Environment, August 2005);
- Dartmoor Environmentally Sensitive Area Landscape Assessment (ADAS, 1994);
- The Evolution of the Dartmoor Landscape: Exploring Burrator. (Dartmoor National Park Authority. Devon County Council and Peter Keene 2001) http://www.dartmoor-npa.gov.uk/au-generalinformation;
- *The Character of England Landscape, Wildlife, Natural and Cultural Features.* (Countryside Agency et al., 2005);
- Countryside Character Volume 8 South West. (Countryside Agency, 1998) http://www.countryside.gov.uk/LAR/Landscape/CC/south_west/dartmoor.asp;
- National Landscape Character Typology (http://www.magic.gov.uk);
- Devon Structure Plan First Review 1995-2011. (Devon County Council) Adopted February 1999);
- Ordnance Survey 1:50,000 scale mapping;
- RPS, 2006, Dartmoor Training Area; Review of existing landscape data sources; and
- Okehampton Camp Landscape Plan, DE EST 2004.

6.1.2 An initial desktop review of the above information has been undertaken to assist in preparation of this Scoping Report.

Summary of Current Conditions

Landscape Character

6.1.3 DTA principally comprises of open, upland moorland located within the distinct landscape of DNP. Okehampton, Willsworthy and Merrivale Training Areas are located in the northern moorland plateau whilst Cramber and Ringmoor are located on the southern moorland plateau (the two being separated by the West Dart river valley).

6.1.4 Dartmoor as a whole is the most southerly upland landscape in England, rising over 615m (2000 feet) above sea level within DTA and contrasting strongly with the adjacent lowland landscapes of South Devon. A number of river valleys fed by the area's high annual rainfall dissect the irregular moorland plateau, which forms the majority of DTA.

6.1.5 The high moor is an open, 'wild' landscape with settlement and field enclosure confined to the peripheral upland valleys. Although there are access roads and tracks on the northern part of DTA and around the north and west boundary of Ringmoor, access to DTA is limited. Public roads mainly end at the upper end of valleys where enclosed agricultural land gives way to the open, grazed moor.

6.1.6 The pattern of moorland vegetation includes bogs, mires, heather, bracken and grasslands. Bare rock is frequently exposed, with the area's characteristic granite tors often visible over a wide area. On the exposed moorland, tree cover is limited to isolated trees distorted by strong winds, the lack of tree cover contributing to the sense of openness along with the extensive views. By contrast, within the sheltered upland valleys on the moorland edge, ancient woodlands are characteristic and in combination with the enclosing effect of the surrounding topography, views become generally more limited.

6.1.7 The upland valleys are also characterised by a mix of rough grassland and pasture. Where fields are present within the upland valleys, they are delineated by banked hedges and granite stonewalls, reflecting the underlying geology. Evidence of the underlying geology is a recurring feature, providing a unity to the wider landscape. Granite visible in rocky outcrops and tors on the open moorland is also used in buildings and walls in the surrounding upland valleys. Furthermore, the landscape is rich in archaeological features and history.

6.1.8 In the Character of England: Landscape, Wildlife, Natural and Cultural Features[38], DTA falls within the Dartmoor Character Area. The description of

[38] Countryside Agency et al., (2005). The Character of England Landscape, Wildlife, Natural and Cultural Features. Countryside Agency, Cheltenham.

Dartmoor is set out in *Countryside Character Volume 8 South West*[39] also published by the Countryside Agency. The key characteristics of Dartmoor are noted as follows.

- Strong contrasts between open, windswept moors with wide views and sheltered landscapes of valleys and fringes.
- Central high moorland with a wild landscape of tors, clitters, bogs, grassland, heather and bracken.
- Around the moorland core is a gentler landscape of small, irregular pasture fields with dry stonewalls and banks, cut by large, terraced, wooded valleys, which shelter farmsteads and hamlets. The valleys have steep-sided, fast-flowing streams and a network of sunken lanes.
- Main villages and towns lie beyond the outer edge of moor but are linked to it by ancient roads and lanes.
- Granite and slate in cottages, farmhouses, villages, walls and abandoned mine buildings, unifies the landscape.
- Mining industry has made a strong impact on the landscape, with dramatically sited spoil heaps and ruins.
- Very high historic interest from the Bronze Age onwards: particular features include highly visible features such as hut circles, standing stones, reaves, field systems, hillforts.

6.1.9 In the Draft National Landscape Character Typology[40] published by the Countryside Agency, DTA falls predominately within the 'HDO' landscape character type with the north and western extent of DTA abutting and sometimes extending into 'UDA'. These descriptions refer to the physiography, landcover and cultural pattern within each landscape character type. Further information is outlined in **Table 6.1.**

[39] Countryside Agency, (1999). Countryside Character Volume 8: South West the Character of England's natural and man-made landscape. Countryside Agency, Cheltenham.

[40] http://www.magic.gov.uk

Table 6.1 Definition of National Landscape Character Typology[40]

Attribute	'HDO' landscape character type	'UDA' landscape character type
Physiography: This comprises the underlying structure and physical form of land surface and is derived from the interpretation of the relationship between geological and contour data.	H: High Hills High land, mainly over 1000 ft, including high hills and ridges and mountains associated with Palaeozoic (Permian, Carboniferous, Devonian, Ordovician, Silurian and Cambrian) and earlier Pre-Cambrian rocks of sedimentary origin.	U: Low Hills Upstanding areas, mainly below 1,000 ft, including sloping low hills associated with Palaeozoic (Permian, Carboniferous, Devonian, Ordovician, Silurian and Cambrian) and Mesozoic rocks (mainly sandstones and limestones) of sedimentary origin.
Landcover: The nature of the ground in which terrestrial plants (natural and cultivated) grow. This description is derived from the interpretation of geological, soils and agricultural census data.	D: Heath and Moorland Land associated with nutrient-poor mineral and/or peaty soils supporting dwarf shrub heath, acidic grassland and bog habitats, or relic heathy/moorland vegetation (bracken/gorse etc). This ground type is normally associated with sandstone, or sandy drift in the lowlands, but it is widespread on mixed sedimentary and igneous rocks in upland/hard rock areas. Often marginal in agricultural terms.	
Cultural pattern: The structural component of the cultural landscape which is expressed through the historic pattern of settlement and land use.	O: Unsettled / open land Extensive areas of uncultivated, mainly unenclosed land (including moorland, heath and coastal grazing marsh) characterised by the virtual absence of human habitation.	A: Wooded – ancient woods Settled agricultural landscapes (dispersed or nucleated settlement) characterised be an assorted pattern of ancient woodlands which pre-date the surrounding enclosure pattern – in places associated with densely scattered hedgerow trees.

6.1.10 At a county level, a landscape character assessment was completed for Devon in 2002[41]. In this work the site falls within the local landscape character zone of Dartmoor and South Devon with the majority of the site lying within the 'Dartmoor - High Moor' zone with small parts of DTA falling within the 'Dartmoor – Enclosed zone'.

6.1.11 District landscape assessments have been undertaken for South Hams[42] and Teignbridge[43]. However, neither assesses the landscape within the National Park.

6.1.12 Most of DTA is designated as an Environmentally Sensitive Area (ESA), due to its high landscape, wildlife or historic value. The ESA Landscape Assessment confirms the existing conditions set out above by identifying two landscape types within DTA. The majority of DTA within the ESA is characterised as 'Open Moor and Heath' with 'Hill and Valley Farmlands' occurring on the edge of the moorland plateau.

41 Devon County Council, (2002) The Devon Landscape.

42 South Hams District Council, (2001) South Hams Landscape Character Assessment and Guidelines, July.

43 Teignbridge District Council, (2001) Teignbridge District Landscape Assessment (Excluding Dartmoor National Park).

6.1.13 A number of existing management measures on DTA seek to maintain the areas distinct landscape character and limit the impacts of military activity. These measures are briefly summarised at Table 2.2, Section 2.6.

6.1.14 A landscape management plan has been produced for Okehampton Camp.[44] The key recommendations relevant to Landscape are that visual intrusion of the Camp should be reduced by removing structures from the skyline, centralising functions (in particular catering and messing), reducing lighting levels, maintaining the grazing regime, and demolishing redundant structures. The Plan recognised that the historic structures of the original camp, constructed in 1893, should continue to be protected.

Visual Amenity and Key Views

6.1.15 The distinctive character and condition of the Dartmoor landscape is reflected in its National Park designation. The openness of much of the area results in potentially far reaching views from where the distinctive surrounding landscape can be experienced. 'Key viewpoints' towards or across DTA are available from various rights of way in the area. These are likely to include locations with relatively easy access, car parking or other facilities, which can be considered particularly sensitive to any impact from military activity due to their role in enabling the surrounding landscape to be experienced.

6.2 Scope of the Appraisal

6.2.1 Landscape and Visual Effects will be reported on separately; however, the analysis of the landscape baseline will also be used in the visual effects appraisal, supplemented by the identification of key views and visual receptors.

Potential Effects Not Requiring Further Consideration

6.2.2 At this stage, and subject to further baseline analysis, few potential effects have been noted that can be scoped out of the EA. It is however anticipated that the scope of the visual effects appraisal will be limited in terms of geographic area, following a high-level analysis to establish the current extent of visibility of military activity.

6.2.3 There are also a number of uncertainties in terms of the significance of individual effects, although it might be judged that cumulatively, these effects become of sufficient significance to warrant consideration of further mitigation measures (through DTA's EMS).

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[44] DE EST, (2004) Okehampton Camp Landscape Management Plan.

Landscape Effects

6.2.4 The following landscape effects have been scoped out of the EA and will not be considered further:

- Effects on landscape character due to changes in settlement patterns: this type of effect is not applicable to the EA as the main built element within DTA is Okehampton Camp and any construction or demolition would be considered through the planning control process. Furthermore, no significant redevelopment of this facility is anticipated in the near future.
- Effect on the prevailing landscape character due to changes in watercourses and other water bodies: no redevelopment of existing military facilities that could have a potentially significant effect on hydrology is anticipated in the near future.

Visual Effects

6.2.5 In considering the potential visual effects from military activities in DTA, three types of receptor, which could be affected by visual intrusion, have been identified. These are:

- recreational users of tourism locations, users of public footpaths, bridleways and other publicly accessible areas (including the majority of DTA):
- residential receptors; and
- users of transport routes near DTA.

6.2.6 The following visual effects have been scoped-out of the EA and will not be considered further.

- Effects on residential and recreational receptors and users of adjacent transport routes, due to visual intrusion from the Ten Tors event: this event lasts for three days and occurs once a year. As effects from this event are short-term and temporary, they will not be considered further.
- Effects on residential and recreational receptors and users of transport routes due to visual intrusion arising from permanent training support facilities at Okehampton Camp: this type of effect is not applicable to the EA as any construction or demolition would be considered through the planning control process.

Potential Effects Requiring Further Consideration

Landscape Effects

6.2.7 The following landscape effects will be considered further in the EA:

- Effects on prevailing landscape character due to changes to features of cultural heritage importance (archaeological artefacts and buildings): these

may be positive, due to management measures or negative where loss or damage of cultural heritage features has occurred because of military activity. (Direct effects from military activities on cultural heritage features are addressed in **Chapter 5**).

- Effects upon prevailing landscape character due to loss of, or modification, to vegetation patterns.
- Effects on prevailing landscape character due to damage and/or erosion caused by military activities.
- Loss of tranquillity and consequent effects on landscape character due to visual and noise intrusion arising from military activities including helicopters in support of ground troops, vehicles, personnel movements, dry training, blank firing and pyrotechnics, and live firing.

6.2.8 The extent of the above effects is uncertain and therefore further appraisal is required. This will involve reviewing baseline conditions and identifying key areas of military activity. Tranquillity mapping will be undertaken as part of baseline studies using an adapted methodology based on previous studies, such as the methodology completed for Northumberland National Park, which covered the Otterburn Training Area[45]. The tranquillity mapping will inform the assessment of effects on landscape character.

Visual Effects

6.2.9 The following visual effects will be considered further in the EA:

- Potential effects on recreational and residential receptors due to activities associated with training activity on foot: views from residential properties are likely to be very limited due to viewing distance, however, this needs to be confirmed following further baseline work. Recreational users of DTA and its environs may experience visual intrusion that could be judged 'significant' from certain vantage points. However, it is likely that training manoeuvres on foot will not result in significant visual effects given the scale of activity evident within the wider landscape context.
- Potential effects on receptors as a result of visual intrusion due to infrastructure such as warning signals, lighting, signage, clearers' shelters and stables etc: The extent of these effects is not yet clear and certain key tourism viewpoints could be affected. However, few residential receptors or users of transport routes are likely to be close to these features.

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[45] Macfarlane R, Haggett C, Fuller D, Dunsford H and Carlisle B, (2004) Tranquillity Mapping: developing a robust methodology for planning support, Report to the CPRE, Countryside Agency, North East Assembly, Northumberland Strategic Partnership, Northumberland National Park Authority and Durham County Council, Centre for Environmental and Spatial Analysis, Northumbria University.

- The potential for views from the transport routes passing DTA: This is likely to be limited due to viewpoint distances and intervening topography and vegetation. As such, any visual intrusion caused by training activity on foot is unlikely to be significant, but requires further, more detailed consideration during the assessment.
- Potential effects on residential and recreational receptors and views from adjacent transport routes, causing visual intrusion due to activities associated with military activities (vehicle movements and other similar support activity). The extent of these effects is uncertain but they may be locally intrusive in some views, particularly where skyline area is affected. The temporary nature of such activity will reduce overall effects, particularly for residential receptors and users of local transport routes.

6.2.10 Key viewpoints will be identified as part of the EA. The Appraisal will also identify residential receptors using Ordnance Survey mapping. Residential receptors at an appropriate distance from DTA will be appraised in the EA under both daytime and nighttime conditions.

6.2.11 Appropriate mitigation measures are already in place as part of DTA's EMS Landscape Plan for example, grazing at Okehampton Camp to allow assimilation of camp open spaces with moorland surroundings and painting buildings in recessive colours.

Appraisal Methodology

6.2.12 The methodology for the Landscape and Visual Effects Assessments will be based upon the following guidelines:

- Guidelines for Landscape and Visual Assessment 2nd Edition 2002 (Landscape Institute, Institute of Environmental Management and Assessment).
- Countryside Agency and Scottish Natural Heritage (2002). *Landscape Character Assessment Guidance for England and Scotland.* Countryside Agency, Cheltenham.
- Countryside Agency and Scottish Natural Heritage (2004). *Landscape Character Assessment Guidance for England and Scotland Topic Paper 6* Techniques and criteria for judging capacity and sensitivity. Countryside Agency, Cheltenham.

6.2.13 Tranquillity mapping will be included as part of the landscape character baseline. In order to assess effects on tranquillity, as a 'perceptual' attribute, key principles will be drawn from both the Council for the Protection of Rural England (CPRE) and Countryside Agency (1995)[46] Tranquillity Mapping

[46] CPRE and the Countryside Commission, (1995) Tranquil Areas - England Map

exercise and Centre for Environmental and Spatial Analysis study into tranquillity Mapping[45].

6.2.14 In accordance with the above guidance, Landscape Effects and Visual Effects will be reported upon separately. In summary, the following tasks will be completed:

- Review and confirm Landscape 'baseline' to establish current conditions in terms of landscape sensitivity to change.
- Identify visual receptors and visual sensitivity.
- Record the 'predicted magnitude of change' to the landscape resource and to views towards military activities.
- Evaluate the significance of effects (considering temporary, permanent, indirect and direct effects, which may be positive or negative).
- Identify opportunities for mitigation (where not already included in DTA's EMS) and report on the predicted residual effects following implementation of mitigation measures.

Significance Evaluation Criteria

6.2.15 The 'magnitude of change' and 'sensitivity' of landscape resource (or visual receptor) will be rated from 'high' to 'negligible' and combined in order to judge the 'predicted' level of effect. The 'predicted' landscape (or visual) effect is based upon professional judgement and will be reported using seven descriptions which span from 'substantial' to 'negligible'. For example, 'substantial' effects result from a combination of a high magnitude of change and a landscape resource or visual receptor of high sensitivity. 'Significant' landscape and visual effects resulting from military activities will be those judged likely to result in a 'substantial' or a 'moderate/substantial' effect. This information will be incorporated using an evaluation matrix of the type outlined in **Appendix C**. In determining the threshold for significance the assessment will take into account the likely sensitivity of visual receptors, the existing baseline landscape resource and in particular, the landscape's inherent capacity to accommodate military activities.

7. Land Use

7.1 Current Conditions

7.1.1 Eight thousand years ago most of Dartmoor was covered with trees and scrub. By 1500BC the majority of the scrub had been cleared and grazing animals prevented any re-growth. Since then man has continued to use the moor, creating the cultural heritage, environment and landscape found today. Each land use is considered below in turn, concluding with farming.

Conservation

7.1.2 Protection of cultural heritage, the natural environment and the landscape is the primary purpose for which the National Park was designated in 1951. Dartmoor's special qualities have also been recognised by the scheduling of ancient monuments and the designation of SACs and SSSIs. Traditionally landowners and farmers have cared for their land as a means of protecting their assets and livelihood. More recently, the concepts of conservation, environmental protection and sustainability have been introduced and today, care of the environment is given prominence. MoD takes forward its statutory and local responsibilities through high level strategies and site EMS (compliant with ISO 14001) and specific issue management plans, prepared in consultation with relevant stakeholders, for various aspects such as the rural estate, energy conservation and landscape.

Materials and Mineral Extraction

7.1.3 Historically, granite has been removed from Dartmoor for use in construction[47], initially through surface extraction and later by mining. The last granite quarry closed in the mid 20th Century. Today some of these derelict quarries provide sites for abseiling and climbing. Sand has also been extracted from the moor to build roads and for mortar. Today the derelict pits provide the military with terrain features and useful cover from view.

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47 Sale R (2000) Dartmoor The Official National Park Guide, ISBN 1 898630 12 7.

7.1.4 Since the 12th Century tin has been extracted[48] from pits and rivers, later by streaming water and then by open cast, tunnel and shaft mining. Extensive works developed to provide tin for the manufacture of pewter, solder and bronze. Other minerals, including copper, lead, zinc, silver and iron were mined on a lesser scale but most of this industry declined by the late 19th Century. Today, only china clay continues to be extracted. While the scars from mining provide variety that is useful for military training, soldiers are advised of the importance of not damaging industrial archaeology.

Military Training

7.1.5 The militia and regulars have trained on Dartmoor since the beginning of the 19th Century. Artillery practice started in 1875, with Okehampton Camp built in 1892-4 and the infantry training area at Willsworthy purchased at the beginning of the 20th Century. Today Dartmoor provides light force training primarily for the Royal Marines and others based in the South West.

Peat Cutting

7.1.6 Peat was cut for fuel until the mid 20th Century with some industrial scale operations to extract naptha, in places such as Kitty Tor. Today the extensive scars of the cuttings, which cover much of the moor, are most obvious from the air. Removal of the peat has affected vegetation, and promotes water run off and the drying out of the blanket bog.

Recreation

7.1.7 Hunting deer on the Royal Forest and probably some poaching are perhaps the earliest recreational activities on Dartmoor. However its popular use can be traced back to the 19th Century's 'Romantic' period typified by the Lake District poet Wordsworth, the Widgery painters and Sir Arthur Conan Doyle's tales. Guides took people onto the moor and marvelled at its wildness.
The right to walk and ride on common land was recognised by the Dartmoor Commons Act 1965 and on other open moorland by Countryside Rights of Way (CROW) Act 2000. Use of the open moorland is regulated by DNPA Byelaws. Today, Dartmoor is used for canoeing, climbing, cycling, dog walking, hang gliding, letterboxing[49], geocaching[50], parascending, riding and

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48 Greeves A. P (1986) Tin Mines and Miners of Dartmoor, ISBN 0 86114 766 9.

49 Letterboxing is a recreational activity involving individuals or small groups of people walking over Dartmoor, and using predetermined clues and navigational skills to locate boxes placed on the Moor by others. These boxes normally contain a visitors' book and a rubber stamp. On finding the box, hunters use the stamp to record the find in their own books or on a series of cards, and then mark the visitors' book in the box with their own personal stamps.

50 Geocaching is an adventure game for global positioning system (GPS) users. Individuals and organisations set up caches, containing a log book, all over the world and share the locations of these caches on the internet. GPS users can then use the location coordinates to find the caches. Once found, the finder is asked to replace the items found in the cache, if something is found in the first place. (http://www.geocaching.com/faq/)

walking. The majority of visitors limit themselves to the moor's edge, close to car parks or near roads, with only the few venturing deep into the open moor. The military recognise that they share Dartmoor and are considerate of other users. Indeed the public add to Dartmoor's training value because soldiers need to practice care for non-combatants or to avoid them if infiltrating. When live firing is programmed, military byelaws restrict access to RDAs for the public's safety. At all other times the public enjoy unrestricted access.

Timber Production

7.1.8 Starting in 1919, large areas of Dartmoor were planted as coniferous plantations to provide timber. Today, by arrangement with the landowners, these are used by the military for limited periods to achieve specific training objectives.

Vegetation

7.1.9 Historically, Dartmoor's vegetation has provided income and service. For example, Whortleberries have been picked for jam making and subsequent sale, bracken has been cut for stock bedding and during the 1st World War Sphagnum Moss was collected for use as a sterile wound dressing. Today, these uses of Dartmoor's vegetation have ceased.

Warrening

7.1.10 Rabbits are thought to have been introduced to Dartmoor in the 12th Century[51] but it is unclear as to when the farming of rabbits started. Artificial mounds (buries) were created such as those at Ditsworthy Warren House and the rabbits netted, paunched and sold at market. The trade fell away in the early 20th Century. Today the military avoid damaging the buries and vermin traps, whilst Ditsworthy Warren House is used as field accommodation.

Water Extraction

7.1.11 Streams and rivers provide water for the downstream population; features such as leats and reservoirs have been constructed to facilitate the movement and provision of water for public supply. Today, Dartmoor remains an important source of water for the Region. By arrangement with the owners, Meldon Reservoir and Wheal Jewel are used to achieve water related training objectives. Military activities are managed to avoid contamination of water supplies.

Farming

7.1.12 In Medieval times, farming was controlled by the monasteries and later by large landowners such as the Duchy of Cornwall. Ancient farmsteads were

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51 Weir J (1987) Dartmoor National Park, ISBN 086350 139 7.

passed on or sold, increasing in size as the new tenant enclosed more land. This resulted in much moorland being enclosed and passing out of Duchy control. In the 18th Century, large tracts of open moorland were also taken over by agricultural improvers[52] who sought to provide for the growing population but many of these farms did not succeed against Dartmoor's climate and terrain.

7.1.13 In the early 20th Century, farming on Dartmoor was based on sheltered homesteads, surrounded by small fields of improved grassland usually enclosed by stone walls with open access to the moor for summer grazing. The majority of the occupants of these homesteads had Commoners Rights, which were formalised in 1965[53]. On the commons, which cover 35,882ha, there are 92 separate common land units coming under 54 different owners with about 850 registered commoners[54] of which the large majority are inactive in that they no longer release stock on to the moor or practice other Commoners Rights. In 1985[55], the Commoners Council was set up for *the maintenance of and promotion of proper standards of livestock husbandry*. In recent decades farms have amalgamated, houses and buildings have been sold off to non-farming families, and some of those farmers who remain supplement their income through diversification.

7.1.14 Dartmoor is mostly grazed by commoners: however, some open moorland is not common land. Cramber is grazed under licence from its South West Water owners and on the 1,356ha military freehold estate at Willsworthy, where the commoner's rights were bought out in 1908, grazing is by licence or by stock straying from the adjoining commons. As the MoD holds land for military training purposes and not for a commercial return, agriculture is a secondary land use to maintain the estate.

7.1.15 During and after the 2nd World War Government policy and subsidies encouraged increased food production. In the last 40 years, changes in farming practices have involved the intensification of the peripheral hill land, with an increase in beef, milk and fat lamb production and the loss of employed labour. This has led to a gradual decline in the quality and area of the heather moorland. In grassland areas, these changes have led to the enlargement of fields and the loss of traditional boundaries. These threats were countered by the designation of the Dartmoor ESA[56] in 1993 to conserve and enhance the landscape, wildlife and historic interest of the area. The

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52 Stanbrook E (1994) Dartmoor Forest Farms, 1994, ISBN 086114 887 8.

53 Commons Registration Act 1965.

54 DNPA (2006) Dartmoor Commons Factsheet, June.

55 Dartmoor Commons Act 30 October 1985.

56 Agriculture Act 1986 (Section 18).

Scheme is designed to secure environmental benefits principally through grazing management. In return for an annual payment, farmers and commoners agree to manage their land in ways that will help to achieve the aims of the scheme.

7.1.16 Stock levels registered under the Commons Registration Act 1965 are generally higher than the stocking levels required to deliver habitat improvement as set out under the ESA. Consequently commoners have been compensated under the ESA[57] to reduce the numbers of both sheep and cattle and required to enter into management agreements requiring that stock be leared and shepherded to benefit the vegetation.

7.1.17 The effect of stock grazing on the moor is monitored by the Commoners Associations and Department for Environment, Food and Rural Affairs (defra)'s Rural Development Service (RDS) and stock levels adjusted accordingly, in order to favour flowering heathland species. Under certain grazing regimes Molinia can build up to form a mat which smothers heathland species, however the withdrawal of grazing on Willsworthy indicates that, in six years the heathland species grow through Molinia and, it is hoped, will begin to dominate. However dead Molinia provides fuel for wild fires, which damage those heathland plants, which the ESA is trying to benefit. This would indicate that a reduction in grazing could lead to a change in herbage and therefore of habitat. Subsequently a loss of some of the existing species might occur, particularly those on the fringe of extinction and selected for particular attention under the Dartmoor Biodiversity Action Plan (BAP).

7.1.18 Local farmers, employed by MoD's Commercial Partner, clear the stock on horseback with trained dogs from those parts of the RDA programmed for use prior to the commencement of live firing. This clearance takes sheep, cattle and ponies from their 'lears', concentrating them and causing uneven grazing. This may compromise ESA objectives, which promote heathland species over Molinia in order to encourage moorland regeneration. Although no firing occurs on any range in August, and on Okehampton RDA there is no firing in May or July, outside of these dates there is insufficient time for the limited numbers of stock to graze the Molinia during its first flush when it is most palatable in favour of the heath plants. In order to manage the growth of Molinia, the grazing period could be extended further into the autumn and winter months, but the Molinia is then less palatable. To assist moorland management, by agreement with defra and Commoners Associations, clearers move stock to areas identified by defra as requiring grazing in support of the ESA management plans. Whilst clearing stock the clearers assist farmers by informing them of any fallen or injured stock and help with gathering.

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[57] ESA Management Plans for each Common agreed between defra RDS and the Commoners Association.

7.1.19 Until 1995 all stock was moved out of the RDA. Stock is now only moved out of the exercise danger areas, resulting in far less disturbance and less uneven grazing. To reduce stock movement still further, an assessment is being made of the risks of leaving stock within the exercise danger areas with the intention of clearing only those stock for which the risk of injury is too high. This will reduce further the impact on grazing and the possibility of creating paths or causing erosion from movement.

7.1.20 The military byelaws[58] restrict access when live firing is programmed but do not apply to anything done in pursuance of any right of common existing in respect of any common land included within the RDA. Consequently, MoD has agreements with active graziers and Commoners Associations to allow stock to be driven out of the weapon danger areas and for commoners to accept the restrictions on access.

7.1.21 On the MoD freehold at Willsworthy responsibility for the management of the estate is shared with agricultural tenants and licensees, who have been granted agreements for areas of land. These agreements cover both the in-bye and the majority of the unenclosed moorland.

7.1.22 On Okehampton Training Area, East Okement Farm is a secure farm tenancy including farmhouse and buildings within a stock proof boundary wall and completely surrounded by common. Of the 121ha within the farm tenancy, 81ha are open moorland.

7.2 Scope of the Appraisal

Potential effects from land use other than farming

7.2.1 Potential effects from land use other than farming are considered as part of the relevant subject areas covered elsewhere in this Scoping Report.

Potential effects not requiring further consideration

7.2.2 It is considered that the following effects do not require further appraisal:

- Potential effects from grazing Willsworthy in-bye land and moorland: The majority of the SSSI moorland on the MoD freehold has been upgraded to ‘unfavourable recovering’ indicating that the management regime is satisfactory. The in-bye land is mostly in ESA schemes is monitored by RDS.

Potential effects requiring further consideration

7.2.3 It is considered that the following effects require further appraisal:

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58 MoD (1979) Military Byelaws for Okehampton [SI(1980)949], Willsworthy [SI(1980)950] and Merrivale [SI(1979)1721]

- Potential effects on the local economy as a result of employment to clear stock and people from the RDAs before life firing takes place: Local farmers are employed to clear stock and people from the RDAs before life firing takes place. Approximately twenty clearers have been employed for this purpose. It is considered that this form of employment supplements the income of existing farmers and commoners on DTA. Therefore, this effect will be considered as part of the potential effects on the local economy (see **Chapter 11**).
- Potential effects on local economy as a result of payments associated with military activities: Landowners receive payment for the MoD's right to train. Commoners affected by clearance and training receive payments from MoD. This may affect the income of local people and therefore will be considered further as part of the assessment of socio-economic effects (see **Chapter 11**).
- Potential effects on nature conservation as a result of stock clearance from RDAs: The effects of stock clearance on nature conservation and the achievement of the ESA objectives will be considered further under the nature conservation chapter (see **Chapter 8**).

Appraisal Methodology

7.2.4 The appraisal methodologies are set out in the socio-economics and nature conservation chapters (Chapters **8** and **11** respectively).

Significance Evaluation Criteria

7.2.5 The significance evaluation criteria are set out in the socio-economics and nature conservation chapters (Chapters **8** and **11** respectively).

8. Nature Conservation

8.1 Current Conditions

Data Sources

8.1.1 The data sources that have been used in compiling this chapter are as follows:

- Dartmoor National Park Authority and English Nature, 2001, The Nature of Dartmoor; A Biodiversity Profile, (2nd Edition) ISBN 0 905981 52 9;
- Action for Wildlife The Dartmoor Biodiversity Action Plan (BAP), 2001, ISBN 0 905981 53 7;
- English Nature, 1989, North Dartmoor Site of Special Scientific Interest (SSSI) citation;
- English Nature, 1989, South Dartmoor Site of Special Scientific Interest (SSSI) citation;
- Joint Nature Conservation Council (JNCC), 2002, Dartmoor Special Area of Conservation (SAC) site selection criteria;
- J.J.Kaczanow, 2002, MoD:Okehampton Training Camp, Chiropteran Appraisal;
- Rodwell *et al* (1991), British Plant Communities;
- RPS Planning, Transport and Environment, 2006, Dartmoor Training Area; Ecological Review;
- Gregory *et al* (1996, 1997) The Breeding Bird Survey 1994 – 1995. British Trust for Ornithology;
- Dartmoor Steering Group (1987), the Environmental Baseline; first resurvey of the Crater Zone Plots;
- Cramber Training Area National Vegetation Classification (NVC) Survey 2002; and
- Defence Estates (2002), NVC Survey of Willsworthy Training Area, Dartmoor, WSP Environmental UK.

Summary of Current Conditions

8.1.2 Okehampton, Merrivale and Willsworthy, form a contiguous entity in terms of training area in North Dartmoor, of which a large proportion is designated as North Dartmoor SSSI and Dartmoor SAC. Cramber and Ringmoor, which lie in South Dartmoor, are two areas of land that link along a small boundary and lie outside of but adjacent to the South Dartmoor SSSI and Dartmoor SAC. Effects from military activity on statutory nature conservation sites are therefore primarily issues for the Okehampton, Merrivale and Willsworthy areas of DTA. MoD only has the freehold for Willsworthy, with the remainder held under licence. Therefore, the maintenance of semi-natural (plagioclimax) habitats and control of agricultural livestock management and intensity of grazing is outside MoD's responsibility.

8.1.3 The overall current status (at 1st June 2006) of the North Dartmoor SSSI is that 81.29% is meeting the Public Service Agreement (PSA) target (23.19% 'favourable' and 58.10% 'unfavourable recovering') and 18.71% is failing to meet the target (17.55% 'unfavourable no change' and 1.17% 'unfavourable declining'). Of this area only one section of 'unfavourable no change' is found on Willsworthy (on MoD freehold land). This has resulted from long-term overgrazing which has reduced the abundance of key species in the sward.

8.1.4 The Dartmoor Biodiversity Action Plan is relevant to the entire DTA. Again, although MoD actively supports the Plan, it does not have responsibility for environmental management except on its freehold at Willsworthy.

8.1.5 The Environmental Impact Assessment[59] supporting the planning consultation for military training on Cramber (outside the designated areas of the SSSI and SAC) indicated that the primary areas of concern in terms of features highlighted by the statutory designations and the BAP were limited to habitat features and possibly common birds. A high proportion of the species issues highlighted by the Biodiversity Action Plan are associated with habitats occurring on the unimproved in-bye land off the open moor and outside the areas used by the military.

8.1.6 In-bye land is enclosed moorland that historically was used extensively but controlled by individual farmers unlike the open moor. It forms part of the core of a farm holding, but in a typical upland farming system, it usually remains in use as permanent pasture or meadow. The land is usually located on lower ground and as a result of a variety of factors such as soil conditions, micro-climate and historic management, the land often supports habitat which are botanically rich, providing it has not been changed by modern farming. The land often contains water features (e.g. flushes) which are circum-neutral, and support rich invertebrate communities, e.g. populations of Marsh Fritillary butterfly or the rarer odonata.

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59 WSP (2002) *Cramber Tor Training Area Dartmoor Environmental Statement.*

8.1.7 As a result of Dartmoor's designation as a National Park, full surveys of habitats and species within the area have been undertaken on a regular basis by a variety of organisations and this process is continuing. The areas in question are therefore well surveyed.

Okehampton and Merrivale

8.1.8 Okehampton and Merrivale are largely unique compared to the rest of Dartmoor in that they are on the highest part of the moor and the remotest in terms of access irrespective of constraints on access resulting from its use for military training. The primary driver of the state of the vegetation and the knock-on effects on species of conservation interest is its pastoral agriculture. Here the military impact has been to move stock off the RDAs when in use such that there has been a constraint to some extent on grazing pressure. While Government agricultural policy since the 2nd World War has driven farm production and led to over grazing the moor, the military constraint on agriculture, remoteness (in terms of distance from farm holdings), vegetation (blanket bog) and topography have contributed to unique conditions where some key biodiversity species have survived, especially bird species.

8.1.9 Okehampton and Merrivale support small populations of Red Grouse, Dunlin and Golden Plover plus Ring Ouzel all species of upland and/or montane habitats. These species occur here at the very southerly edge of their range. In part, the available habitat dictates a small population but again agricultural grazing pressure has probably been the main driving force for the decline in at least the grouse population as grazing pressure impacts on the abundance of heather, which is the grouse's primary foodplant. Stocking density could also have affected habitat characteristics for the other wader species as well as trampling of nests, which with such a low population could have been important. The longer-term effects of climate change cannot be ruled out as key habitats such as blanket bog may be lost or degraded. The weighting of how important each factor is in affecting such small populations of birds is difficult to quantify but general habitat degradation by grazing livestock is probably the key effect and the new agri-environment policy tools i.e. environmental stewardship could well be the tool to remove this aspect from the equation though only time will tell.

8.1.10 The habitats of Okehampton and Merrivale that are covered by the European and National legislation are:

- Northern Atlantic wet heaths with *Erica tetralix* (ref: H4010) defined by the NVC as M15, M16 and M21 communities;
- **European dry heaths (ref: H4030)** defined by the NVC as H4 and H12 communities; and
- **Blanket bogs (ref: H7130)** defined by the NVC as M17.

8.1.11 The SSSI supports the wider extent of habitats as does the BAP. For the habitats covered by both, there is an intention stated in CROW Act 2000 to enhance certain degraded habitats. Past surveys have not quantified the extent of each habitat and MoD is in the process of delivering a full and detailed quantification of the extent of the key communities that need to be considered within the MoD licensed area. To date 50% of the Okehampton and Merrivale areas of DTA have been surveyed.

8.1.12 It has been suggested that past shelling of areas of blanket bog was damaging to this habitat however, the use of artillery high explosive shells ceased in 1989. Assessments[60] of its ecological impact indicated that it might have been important in creating the spatial diversity by providing wet areas required for key species of biodiversity importance, especially where large areas of uniform *Molinia* dominated vegetation existed.

8.1.13 The key ecological issues within Okehampton and Merrivale Training Areas are habitat issues and some key bird issues. Generally, there are no significant issues in relation to the species present within the in-bye habitats or on the edge of the moor, though some Biodiversity Action Plan species are present

8.1.14 An appraisal of the bat species in and around Okehampton Camp was undertaken in 2002. Brown Long-eared, Common Pipistrelle, Daubenton's, Noctule, Pipistrelle sp., Soprano Pipistrelle, Natterer's and Whiskered/Brandt's bats were found. It is likely that the habitat on Dartmoor's fringes are important for these species in providing feeding areas but generally it is considered that military activities do not effect these species. There are no records for key species such as Greater Horseshoe Bat, in terms of roosting or breeding sites, on the Okehampton and Merrivale areas of DTA.

Willsworthy

8.1.15 The majority of Willsworthy is freehold, however a small part on the northeastern side is licenced. Most of the holding, lying on the periphery of Dartmoor, has been subject to the intensive grazing typical of the area. It therefore has vegetation, which has been degraded to some extent by its agricultural use such that in simple terms about half is grass-dominated communities. The dry heathland vegetation types account for about a quarter of the vegetation types. The more distant northeastern and eastern parts of Willsworthy have been less intensively affected by agricultural use when compared to other margins of Dartmoor. In character, this quarter starts to support some of the wetter habitats more typical of Okehampton and Merrivale.

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[60] Dartmoor Steering Group (1987) The Environmental Baseline; First Re-survey of the Crater Zone Plots.

8.1.16 The NVC Report[61] of Willsworthy identified no rare or scarce plants. The only BAP species is Heather. However, this survey did not cover lichens or bryophytes except where covered by the NVC hence only the key species were identified.

8.1.17 Five farms[62] fall within the Willsworthy holding and support some more interesting wet flush communities.

8.1.18 Tavy Cleave has long been renowned as a site for Ring Ouzel.

Cramber

8.1.19 Assessment work completed as part the Cramber EIA included an NVC survey to identify the habitats present. Bird surveys are being undertaken in order to try to identify if there are any differences in bird abundance compared to areas outside of DTA. No other species of biodiversity interest on Cramber were identified.

8.1.20 The results of the NVC survey were used to identify abundances of food-plant or potential habitats which might have supported some overlooked areas for key biodiversity species for example Marsh Fritillary (*Eurodryas aurinia*) and Southern Damselfly (*Coenagrion mercuriale*) respectively. No further colonies of BAP listed invertebrates were found.

8.1.21 Following the NVC survey, a number of plant communities typical of Dartmoor as a whole were identified. As expected, plant communities, which are a product of agricultural management over centuries of pastoral and historical industrial use, were also found. There was no evidence of disturbance communities, which might have been indicative of the effects of military activity.

Ringmoor

8.1.22 Ringmoor has not been covered by MoD in the recent surveys of vegetation but the requirements for appropriate surveys will be will be looked at as part of the EA. The breeding bird survey has incorporated Ringmoor and will be analysed as part of the EA.

Management Measures

8.1.23 DTA's EMS has many procedures in place to prevent potentially damaging military activity including training on foot, which has similar impact to casual recreation use. DTE SW standing orders control all aspects of military training; its timing, location and conduct, the safety of live firing, the use of

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61 DE (2003), NVC Survey of Willsworthy Training Area Dartmoor, survey of vegetation and the impact of land use, WSP Environmental UK.

62 Bearwalls, Doe Tor, Reddaford, Standon and Yellowmead.

vehicles, limitations on digging, avoidance of bird breeding sites For example it has been agreed with DNPA through the DSG that specified areas be avoided during the bird breeding season.

8.1.24 The EMS is monitored to ensure that the mitigation measures are effective. Surveys, often in conjunction with local statutory bodies, have been carried out of tracks and erosion, the effect of shell craters, vegetation distribution, heather growth etc. Following these surveys, management procedures have been improved and implemented.

8.2 Scope of the Appraisal

8.2.1 The primary issues to consider are the habitats and communities, which may be affected by military activities and defining the habitats available for key species, i.e. those that might be affected by military activities. The key aim of the EA will be to investigate whether there are any different effects on key species or habitats on the military training areas compared to areas outside the defined training areas.

8.2.2 Surveying is being undertaken to provide information about the key habitats that are covered by statutory definitions and about the key areas for other species dependent upon these habitats. This will indicate if there is any effect of military activity on habitats as this would manifest itself as disturbance communities. The survey work may also indicate other potentially damaging activities that are not related to military activities.

8.2.3 The relevant changes in bird species on DTA have been regularly monitored. The changes in population have been slow and are probably associated with subtle environmental and ecological changes as discussed above. However, the wider issue of populations of common birds and any potential impacts of military activities on these populations has not been considered. Therefore, a Bird Survey has been commissioned with Royal Society for the Protection of Birds to provide information about the populations of bird species that commonly occur on DTA. The EA will consider whether there is any difference in the abundance of birds on DTA compared to similar areas outside of DTA. Comparison will also be made with previous surveys to examine any changes in population.

8.2.4 The remaining habitats and species covered in the BAP have been surveyed and have limited representation on DTA. It is not intended to undertake further survey/research on these species though in the light of the NVC survey a targeted search for species will be undertaken where potential habitat has been identified.

Potential Effects Not Requiring Further Consideration

8.2.5 For certain elements of military activity it is known that there is no effect with regard to habitats and species as in general there has been no indication that

potentially damaging activities are occurring. Therefore, the following effects and issues will not be considered further:

- Species that are covered by the BAP, which are known not to occur on DTA, will not be considered in the EA. Habitats identified by the NVC survey, which may support unknown colonies of BAP species, will be considered further in the EA.
- The nature conservation effects associated with deterioration in surface water quality will not be considered any further, as there is no record of any ecological effects associated with the silting of watercourses (see **Chapter 13** for further information).
- Potential effects of military activities on Golden Plover, Dunlin and Red Grouse: activities in the key areas where the few remaining birds occur are controlled through DTA SW Standing Orders. Due to this, and the small numbers of birds present, further information regarding this issue will not be obtained and will not be considered further in the EA.
- Potential effects from military activities on bats: While a number of bats species are known to be present on DTA it is considered that training on foot is unlikely to have an effect upon such species. A survey would however be required if buildings or similar structures were planned to be demolished. The effect of military activities on bats has been scoped out of the EA
- Potential effects on otters from military activities: otters are present on Dartmoor and utilising suitable habitat. Such habitat (river or stream habitats) is not frequently disturbed by military activity. The effect of military activities on otters has been scoped out of this EA.
- Potential effects from military training on water voles: this species may potentially be present on any suitable watercourse, As no change in the type of training to be undertaken on DTA is proposed and the use of vehicles will remain limited, the effects of military training on water voles has been scoped out.
- Potential effects from military activities on amphibians and reptiles: these species are likely to be widespread and activities on foot are unlikely to have a major impact due to the short-term nature of the activities. As there is no change in the type of training to be undertaken on DTA the effects of military activities on amphibians and reptiles has been scoped out.

Potential Effects Requiring Further Consideration

8.2.6 The following potential effects will be considered further in the EA:

- Potential effects of military activities on vegetation: activities could be resulting in the disturbance of vegetation such that its composition has changed to the point that it is outside the span of normal stable Dartmoor

plant communities. The extent of any digging by troops training will be re-assessed, though initial survey work of the botanical communities has not highlighted any evidence of this over extensive areas of North Dartmoor (approximately 5,000 ha). With both the NVC survey and the bird survey it may be possible to examine whether other ecological patterns of distribution can be identified that are associated with distributions of species of interest. This would mean that it would be possible to explain patterns of distribution due directly to known ecological reasons as opposed to speculative reasons. For example, sward height, mostly governed by grazing pressure, affects distributions of Meadow Pipit and Skylark.

- Potential effects of disturbance from military activities on populations of common (widespread) birds: the EA will aim to identify the differences that can be attributed to activities associated with public access, farming and military activities.

Appraisal Methodology

8.2.7 There is a clear hierarchy to the evaluation of the importance of the features on North Dartmoor. Priority lies in the status of the features covered by the SAC, followed by the extra features covered by the SSSI, the Dartmoor BAP and finally other species covered by legislation, which fall outside the formal designation of areas.

8.2.8 Assessment of the condition of the features in the SAC and the SSSI has been updated recently (1st June 2006), by English Nature (EN)[63]. This assessment has highlighted that 17.81% of the site is in 'unfavourable' condition. The approach to isolating any effects from military activities will be to try to identify whether any of this unfavourable condition is attributable to military activities. Supplementing existing data, two recent NVC surveys will assist the EA.

8.2.9 The NVC Survey which will help to answer whether or not military activities effect Dartmoor's vegetation and secondly, to identify habitats that might support BAP species. The Survey should indicate whether there is any evidence of the development of disturbance communities, which are an indication of the effects of military activities. It will also provide information on key habitats that will be used to identify the potential location of key foodplants of BAP species or habitats used by key species. The NVC survey will allow investigation of the potential for recovery of habitats with respect to the favourable condition of the habitat present on North Dartmoor and confirm the assessment undertaken by EN. It is neither intended to compare this Survey with previous NVC surveys (as the old data is incomplete or uses different

63 http://www.english-nature.org.uk/

categorisation) nor with similar areas outside of the training area boundary, as grazing is the primary cause of vegetation condition.

8.2.10 The Bird Survey, which has used the Breeding Bird Survey methodology, will provide information about the bird populations and distributions and help to assess the presence of common birds. It is designed to provide data to allow comparison of areas within DTA with those outside to isolate effects of military activities and to compare against previous surveys to identify any change. The Survey will also collect relevant environmental data that may provide causal ecological reasons for observations made of any differential that have a foundation in the ecological requirements of specific species.

Significance Evaluation Criteria

8.2.11 Evaluation criteria relating to the magnitude of nature conservation effects from military activities and the sensitivity of ecological receptors will be developed further as part of the EA. The criteria will take into account the scale, duration and nature of military activities, evidence of change associated with military activities within DTA and the sensitivity of the receptors experiencing any change because of military activities. The nature conservation survey work undertaken at DTA will be used in determining these criteria. The significance of nature conservation effects will be determined in accordance with an evaluation matrix of the type outlined in **Appendix C**.

9. Noise

9.1 Current Conditions

Data Sources

9.1.1 Preliminary baseline information has been obtained from the Ordnance Survey GSGS5295 Map Sheet Dartmoor 1:50000. Aerial photographs of the site and surrounding area were obtained from http://www.multimap.co.uk. In addition, reference has been made to the following documents:

- Cramber Tor Training Area, Dartmoor. Volume 1 Environmental Statement; WSP Environmental, September 2002;
- Report on HVM Firing Noise Measurements at Manorbier Ranges. Hoare Lea Acoustics, September 2005;
- External Audit of Dartmoor Training Area's Environmental Management System: Final Report. RPS Health, Safety & Environment August 2005;
- The Sustainability Handbook for the MoD Estate.v3.1, October 2003; and
- The Control of Noise at Work Regulations 2005.

Summary of Current Conditions

9.1.2 Noise sources within and around DTA (other than noise associated with military activities) include road traffic noise from the A30 dual carriageway, which bounds the site to the north, the A386 to the west and the A38 dual carriageway to the south. The B3357 and the B3212 roads bisect the northern and southern training areas. The nearest railway to DTA is approximately 1km north of Okehampton Camp on the northern fringe of DTA. The nearest major airports to DTA are adjacent to Plymouth and Exeter. Substantial china clay workings operated by Imerys and WBB Minerals are approximately 1 km south of Ringmoor and there is a large active quarry at Meldon on the northern boundary of Okehampton Training Area

9.1.3 The noise environment around the southern part of DTA was characterised during the EIA for the Cramber Training Area. Measured background noise levels at six locations around the Training Area were within 27 to 41 decibels

(dB) $L_{A90, 15mins}$[64]. The dominant source of noise was described as *"naturally occurring such as birdsong and vegetation moving in the breeze"*. Aircraft activity was observed including civilian fixed wing and helicopters, and police helicopters. Very few man-made noise sources were perceived and localised road traffic was described as "*infrequent".* This type of noise climate is likely to be typical for other areas around DTA away from main roads and areas of habitation.

9.1.4 Sensitive receptors, which have the potential to experience noise effects resulting from the continuation of military use of DTA, comprise mainly of residential properties close to DTA. Properties in larger villages and towns are further away from the main areas of DTA and will experience higher background noise levels than those measured during the Cramber study. The closest village or hamlet to DTA from which there have been occasional concerns regarding noise is Lydford, approximately 1 km to the west of the Willsworthy Training Area. Any surrounding industrial premises (including the china clay operations to the south) and farms are not normally considered sensitive receptors; as such sites are themselves commonly sources of noise.

9.1.5 The use of DTA has a current noise effect on the surrounding area particularly during noisier training activities such as live firing and dry tactical training and the use of associated pyrotechnics, vehicle and helicopter movements. There are several management controls in place for existing operations at DTA to manage these effects.

9.1.6 DTE Noise Policy[65] limits noise emissions to 130 dB at training area boundaries with a maximum upper limit of 139 dB for exceptional operational reasons. These noise levels are measured as linear (un-weighted) peak levels. The EA will demonstrate that DTE noise policy is achieved on DTA.

9.1.7 DTA's EMS and the DTE SW have set rules for military activities in order to provide a safe environment for service personnel and the local communities. Noise risk is regularly assessed, complaints are recorded and analysed, and control procedures reviewed. Examples of existing control measures are:

- the regulation of military aircraft activity by Headquarters (HQ) DTA ensuring there is co-operation with ground troops. Dates of training, number of aircraft, flying heights, areas used for tactical flying and transit routes are also regulated;
- a requirement for helicopters to avoid riders and stock where it is safe to do so;

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64 The noise level exceeded for 90% of the 15 minute measurement period

65 ATE (2004) HQ ATE 919 dated 21 October 2004.

- authorisation (by a senior officer) of low flying to achieve operational capability. If not authorised, aircraft must transit with 76m (250 feet) Minimum Separation Distance;
- the closure of RDAs during live firing;
- the consideration of civilian users is required during military training;
- the prohibition of blank firing and use of pyrotechnics within 100m of civilians and within 200m of habitation; and
- the consideration by HQ DTA of the times and locations when intense firing activity is likely to cause inconvenience.

9.1.8 Due to the inherent danger of live firing, the RDAs are subject to Military byelaws, which prohibit the public from entering when live firing is notified. The RDAs are clearly marked on the ground and on Ordnance Survey maps. These control measures are designed to ensure that the public do not enter the RDA while live firing is occurring for their own personal safety. As a consequence of this, the public are also safeguarded from the noise levels associated with live firing. In addition, exercises are planned to ensure that the MoD noise policy level of 130dB at the RDA boundary is not exceeded. The measures are further enhanced by publishing the dates that live firing will take place in the local newspapers, on Radio Devon and on the DTA web site. These message sites are well known by locals and visitors alike who appear to check them before setting out to visit Dartmoor, as indicated in recent studies.[66]

9.2 Scope of the Appraisal

Potential Effects Not Requiring Further Consideration

9.2.1 It is considered that the following effects do not require further appraisal:

- Potential noise effects associated with the majority of training activities: The majority of the activities associated with the above training including, for example running, crawling, digging, walking, camping are all inherently quiet and will have no effect on the noise climate of nearby sensitive locations in the vicinity of DTA.
- Noise effects associated with the use of wheeled vehicles on public roads: This has not been perceived as an issue historically and has therefore been scoped-out of the EA.

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66 Tourism Associates (2006), Sustainable Military Training on Dartmoor, Draft Final Report Exter Enterprises, University of Exeter Innovation Centre.

- Vibration effects associated with military activities: No significant vibration sources have been identified.

Potential Effects Requiring Further Consideration

9.2.2 It is considered that the following effects do require further appraisal:

- Noise effects outside of the RDA associated with live fire tactical training: This mainly includes the firing of rifles, machine guns and Light Anti-tank Weapons, the use of pyrotechnics and the shouting of battle orders. On a limited number of occasions, supporting mortars and artillery may also be used.
- Noise effects from dry tactical training on members of the public visiting DTA: Dry training mirrors live fire training with the exception that live rounds are not fired. The significant difference between dry training and live firing is that during the former the public have unrestricted access to DTA. It is likely that any potential nuisance would be restricted to a startle effect rather than exposure to hazardous levels of noise for any significant period of time.
- Noise effects from off-road vehicle and helicopter movements: Noise effects from the use of helicopters supporting ground troops and the infrequent off-road use of vehicles within DTA will be considered in the appraisal. .

Appraisal Methodology

9.2.3 The first element of the appraisal will be to identify key noise sensitive receptors close to DTA. These are likely to include a combination of the nearest isolated residential properties to each training area and a representative location in the closest villages/hamlets to DTA. For example, looking at the Willsworthy Training Area, the closest properties would probably include Lane End/Willsworthy (to the south), Prescombe/Watervale (to the west) and Ingo Brake on the eastern fringe of Lydford village. A similar spread of locations would be chosen around the other training areas making up DTA

9.2.4 The final monitoring locations will be determined after consultation with DTA and the local Environmental Health Officer (EHO). The measurement and appraisal methodologies will also be agreed beforehand with the relevant EHO(s). Noise levels would be measured at each location during selected daytime, evening and nighttime periods to ensure that variations in noise levels at different times of the day are characterised. The monitoring will comprise of a combination of 15-20 minute manned measurements, undertaken on a circuit basis around selected receptors and the use of fixed monitoring locations at which unmanned noise logging instrumentation will be installed to monitor noise levels over longer periods of time. Initially this will be for about one week. During this extended period of monitoring, noise

levels due to the presence and absence of training activities on DTA will be measured.

9.2.5 At sample locations on (or near) the boundary of the training area(s) suitable instrumentation will also be used to measure the linear peak noise levels during training packages. It is likely that this instrumentation will be different from that used for the environmental noise monitoring exercise so that it is capable of measuring linear noise levels in excess of 139dB and down to frequencies less than 10 Hertz (Hz). This will be used to confirm that DTA is complying with HQ DTE's noise policy limits, which limit noise emissions to 130 dB at training area boundaries with a maximum upper limit of 139 dB for exceptional operational reasons.

9.2.6 A review of existing data from previous studies for both DTA and other training areas will be undertaken to provide information on noise levels associated with the various activities at DTA. Where required, noise levels from various activities undertaken within DTA will be measured. Sufficient acoustic data will be collected (in a safe manner) to enable predictions of noise from typical training activities to be made to locations both within and out with DTA. This is likely to be undertaken by measuring noise levels from the use of various weapons, such as the Rifle, Light Support Weapon, Sniper Rifle, General Purpose Machine Gun (GPMG), high explosive grenade and associated pyrotechnics, LAW, mortars and artillery. Noise from the passage of military transport such as Land Rovers, four-tonne vehicles, tracked articulated vehicles and helicopters would be measured. If at all possible A-weighted and linear data will be collected from both live firing and dry training activities to allow prediction of noise levels associated with a selection of training activities within DTA.

9.2.7 The prediction exercise will include the use of LimA noise prediction software, which will also provide, if required, 'typical noise contours' for a selection of training exercises. The aim will be to be able to predict noise levels from typical military activities on areas of DTA both in isolation and combined.

Significance Evaluation Criteria

9.2.8 Whilst there is no specific guidance or noise criteria applicable to training area noise there are several general guidance documents including PPG 24 and the World Health Organisation publication 'Guidelines for Community Noise' 1999 which contain useful general advice. In addition, the intermittent nature and low number of helicopter flights negates the use of the normal criteria for assessing helicopter noise, which is based on exposure to many flights rather than sporadic, individual movements.

9.2.9 The main method of appraisal of environmental noise will be to determine the increase in ambient noise levels resulting from military activities within DTA. In addition, an appraisal of the compliance with the HQ DTE noise level policy will also be undertaken.

9.2.10 The magnitude of change in noise is determined by two key factors, namely the amount of increase (or decrease) in noise levels due to the military activities, and the total amount of noise that will occur (or has been predicted to occur).

9.2.11 In terms of the amount of change in noise levels, this will only potentially become significant if the change is perceptible. **Table 9.1** below, summarises typical responses to changes in noise levels, and relates these to criteria ranging from low to high.

Table 9.1 Summary of Noise Magnitude Criteria

Noise Issue	Low	Medium	High
Operational Noise	<1 dB(A) increase in noise levels	1 - 3 dB(A) increase in noise levels	>3 dB(A) increase in noise levels

9.2.12 Any increases in ambient noise levels associated with the operation of DTA will be assessed using the above methodology and an evaluation matrix of the type outlined in **Appendix C**.

10. Public Access

10.1 Current Conditions

Data sources

10.1.1 The following data sources have been used in completing this chapter:

- Dartmoor Commons Act (1985);
- Countryside Rights of Way (CROW) Act 2000;
- Dartmoor National Park Local Plan 2001;
- Cramber Tor Visitor Survey, January 2002;
- Willsworthy Visitor Survey, February 2002;
- Public Access Consultancy for the Army Training Estate, December 2003;
- External Audit of Dartmoor Training Areas Environmental Management System, August 2005;
- Military Options Paper March 2006;
- Sustainable Military Training on Dartmoor -Socio Economic Survey, April 2006;
- DTE SW Standing Orders ;
- Ordnance Survey GSGS5295 Map Sheet Dartmoor 1:50000;
- http://www.dartmoor-npa.gov.uk; and
- http://www.dartmoor-ranges.co.uk.

Summary of Current Conditions

10.1.2 DTA consists of approximately 13,000 ha of moor, which contains fixed and field firing ranges, dry training areas and two camps. An additional 35,000 ha of unenclosed land can be used for transit purposes. Only Willsworthy Training Area is owned freehold by the MoD, amounting to some 1,354 ha. The remainder of DTA is licenced from the Duchy of Cornwall, the Maristow Estate, South West Water and others.

10.1.3 DTA amounts to just under 14% of the total area of the DNP, with most of the northwest of Dartmoor inaccessible except on foot or by helicopter, although some tracks exist. It is surrounded by areas of enclosed land, the whole being more or less intensively grazed. The majority of tracks tend to provide access to the moor rather than across it.

10.1.4 The Dartmoor Commons Act 1985 allows public access by foot or horse for recreational purposes over all unenclosed common land on Dartmoor.

10.1.5 The majority of DTA is identified as either open country or registered common land under the CROW (2000) Act. Most of the land comprising the Okehampton and Merrivale Training Areas is shown as registered common land, whilst that comprising Willsworthy, Cramber and Ringmoor is predominantly depicted as open country (mountain, moor, heath or down). However, military byelaws exempt the RDAs from the provisions of the Act and consequently, for uniformity across the UK, the RDAs are not shown as CROW access land on Ordnance Survey mapping. Nevertheless, the level of access provision on DTA is unchanged, since the Dartmoor Commons Act 1985 recognised a right of public access to the unenclosed moorland. Under the military byelaws, access to the RDAs is restricted when live firing is notified.

10.1.6 In addition to the general right of access, there are six bridleways and one footpath in the southern Training Areas (Cramber and Ringmoor); three bridleways and two footpaths within Merrivale; and two footpaths within Willsworthy. In total, there are some 724km of Public Rights of Way (PRoW) across the whole of the National Park.

10.1.7 The Loop Road from Okehampton provides access 5km into the northern part of DTA. Some argue that the Loop Road allows vehicles to penetrate too far into Dartmoor's wild open spaces. Others argue that the Loop Road enables people to access and enjoy the moor. Farmers point out that the Road and MoD maintained tracks enable them to clear and care for their stock deeper on the moor. The MoD licence from the Duchy of Cornwall for the use of Dartmoor for military training requires that the Loop Road as far as East Okement Farm, a working farm, be maintained for two-wheel drive vehicles and allows the remainder of the Road to be maintained to the standard required for military two-wheel drive vehicles. Other tracks may be maintained by MoD to the standard required for four-wheel drive vehicles. A policy of managed decline, developed with the relevant local statutory bodies, requires MoD to allow the Loop Road and tracks to deteriorate to the minimum standard required thus limiting access. In 1998, the Dartmoor Commons Byelaws were amended to control off-road mountain biking, which is now restricted to bridleways, byways and routes agreed with the landowners.

10.1.8 Public access to DTA is managed in a similar fashion to other parts of the Dartmoor with unrestricted access to the moor for the majority of the time. Restrictions are only imposed when there is live firing and then only to the

specific RDA being used. There are periods, particularly holidays and at weekends, when there is guaranteed access. These periods are published widely and are shown in **Table 10.1**.

Table 10.1 Dates for Unrestricted Access to DTA Live Firing Areas (2006)

Time of year	Okehampton	Merrivale	Willsworthy
Jan	1st - 3rd	1st - 3rd	1st - 3rd
Feb			
Mar			
Apr	1st – 30th	12th – 17th	14th – 17th
May	1st – 31st		
Jun			
Jul	1st – 31st		
Aug	1st – 31st	1st – 31st	1st – 31st
Sep	1st – 15th		
Oct			
Nov	11th – 20th	11th – 20th	.
Dec	20th – 31st	20th – 31st	20th – 31st
Every Month	Every Saturday, Sunday and Monday and Public Holidays	Every Saturday, Sunday and Monday and Public Holidays	Every Saturday, Sunday and Monday and Public Holidays except the weekend which contains the second Sunday in the month

10.1.9 Each year the public have guaranteed access to Okehampton RDA on approximately 253 days, Willsworthy RDA on 135 days[67]. and Merrivale RDA on 195 days. In addition, approximately a third of 'firing' days become available for access once detailed military planning has taken place. Details are published six weeks in advance on the DTA website and on firing notices displayed where people gather.

10.1.10 Subsequently one third of the published days become available at short notice, mostly because poor visibility prevents observation of the RDA, others because good weather permits training objectives being achieved more quickly and some due to users cancelling at short notice due to operational commitments or other reasons beyond their control. Wherever possible, cancellations are announced by 1600 hrs the previous day and the public

67 The number of days may vary slightly each year depending on the dates of public holidays

informed through the DTA web site, DNPA Information Centres and Radio Devon.

10.2 Scope of the Appraisal

10.2.1 Military activity on DTA has a significant effect on the quantity, quality and certainty of access and recreation available on the moor.

10.2.2 The EA will therefore consider the quantity, quality and certainty of access onto the training area and how current levels of military activity effect access and recreation for members of the public. It will also take into account the potential effects of military activity on tranquillity and the effects associated with unexploded ordnance. These issues are also considered in chapters **7** and **12**, respectively.

Potential Effects Not Requiring Further Consideration

10.2.3 No potential effects have been scoped-out of the EA.

Potential Effects Requiring Further Consideration

10.2.4 Further assessment will be undertaken to understand fully the demand for access and recreation by members of the public within DTA and the relationship between the demand for access and current levels of training.

10.2.5 The Military Options[19] Paper has identified that there may be some potential to improve the efficient use of DTA for military training which could lead to improved public access. There are significant safety issues associated with this, which need to be addressed further as part of a risk assessment. Should the findings of the risk assessment reveal that improved public access is viable and safe then the effects associated with this will be assessed as part of the EA.

Appraisal Methodology

10.2.6 Understanding the demand for access and recreation is the key to the EA. It will examine the level of demand for greater access, and the preferred visitor locations, which are currently unavailable for access during live firing. The EA will examine the findings of the External Audit of DTA's EMS and carefully consider the Socio-economic Survey, which addresses the issue in a broad manner (see **Chapter 11**).

10.2.7 The EA will examine the management techniques and mechanisms applicable to access and recreation to assess whether improvements could be made. There are two principal reports, which consider DTA, and access and recreation; the Public Access Report[68] that lists a series of future

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68 RPS (2004) Public Access Consultancy Report 2001-2004.

opportunities/issues, which should be addressed with a view to ensuring public access to DTA is optimised when available. The Military Options Paper[19] that lists key elements that should be considered as part of any future management control procedure. The EA will examine the relevant issues identified from both reports which are shown below:

- DTA's EMS, which was audited in 2005, should continue to monitor public access, check that effective policies are in place and audits are conducted.
- Opportunities for easy access routes should be considered and where practical continue to adhere to the requirements of the Disability Discrimination Act 1995.
- As a result of the recommendations of the Report[68], firing notices are now published earlier (six weeks notice) to enable the public to plan walks and access.
- The DTA Intervisibility Study[69] should be completed, the recommendations examined within the DSG, and those agreed and supported by DNPA implemented.
- The public information publications and notices should continue to advise the guaranteed public access periods and cancellations.
- The DTA website (http://www.dartmoor-ranges.co.uk) should be developed to include more public access information and links to other websites.
- The freephone (0800 4584868) firing information should be updated daily to include any further opportunities for public access due to cancellations. (This has since been actioned.)
- The effort to reduce the disparity between live firing published and actual firing should continue. The statistical summary should continue to be made available to the public.
- The proposed move of the Okehampton and Merrivale RDAs boundaries to allow easier access to Cut Hill via the North West Passage, when the Okehampton RDA is not active, has been implemented as a result of recommendations, taking note of EN's concerns regarding proximity to sundew[70].
- Amendments to procedures to reduce the number of training days lost due to live firing being prohibited when bad visibility precludes observation of the RDA boundary. This would provide benefits to both military utility and

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69 Designed to determine the ability of the lookouts to observe the RDA boundaries to ensure public and stock safety and to propose an improved capacity with reduced prominence as a basis for improving safety with reduced visual intrusion.

70 Insectivorous plant found in bogs and wet ground.

potentially increase the number of days available for the public to access DTA.

- Amendments and improvements to the booking process to take account of these changes to procedures.
- A reduction and/or re-location of lookout shelters should risk assessments demonstrate that this is consistent with public and stock safety responsibilities and taking account of associated socio-economic issues. This would benefit the integration of military structures within the National Park.
- Amendments to, or fine tuning of existing procedures or RDA boundaries to provide enhanced public access opportunities to key high points on the northern moor.

Significance Evaluation Criteria

10.2.8 The significance criteria will consider the proportion of visitors to Dartmoor and DTA that are effected in terms of the quantity, quality and certainty of their public access and recreation to DNP in general and to the area covered by DTA in particular. If possible, this information will be used to identify significant effects in accordance with an evaluation matrix of the type outlined in **Appendix C**.

11. Socio-Economics

11.1 Current Conditions

Data Sources

11.1.1 Data for this section of the Scoping Report has been drawn from a number of published sources:

- The Army website, http://www.army.mod.uk;
- The Dartmoor Society (2003), The 6th Dartmoor Society Debate, 'The Military on Dartmoor', Buckfast Abbey, Saturday 27 September 2003;
- Devon County Council (2006), *State of the Devon Economy*, January 2006;
- Devon County Council (2004), 'Tourism Trends, Devon and Districts- Distribution of Tourists by District, Peak of 2003 Season', Source: Corporate Consultation Services;
- National Statistics, 'Economic Activity - All People (KS09A)', NeSS Geography Hierarchy, April 2001;
- National Statistics, 'Age Structure (KS02)', NeSS Geography Hierarchy, April 2001;
- National Statistics, 'Industry of Employment (UV34), NeSS Geography Hierarchy, April 2001;
- South West Tourism and South West of England Regional Development Agency (2005), *Towards 2015- Shaping Tomorrow's Tourism*, January 2005; and
- Tourism Associates (2006), *Sustainable Military Training on Dartmoor*, Draft Final Report, 2006.

Summary of Current Conditions

11.1.2 The military use of DTA may affect a number of the socio-economic characteristics of the area, including tourism, agriculture, employment and income, and the quality of life of local residents.

11.1.3 Tourism is a significant industry across the South West region, and one of the key attractions is DNP. The South West attracts 26 million visitors, who generate more than £8 billion for the economy and create employment for 300,000 people[71]. At the peak of the holiday season in 2003, there were over 70,000 visitors in West Devon, Teignbridge and South Hams Districts; the Districts covering DNP[72]. DTA falls solely within West Devon Borough Council's (WDBC) area.

11.1.4 The strategy for tourism in the South West recognises the value of tourism, but also the threats that it brings[73]. As a result, it aims to break the traditional link with quantity, and put a greater emphasis on quality and sustainability. It hopes to include the value of visitors rather than simply the volume, create quality jobs, include local people in key decisions, and work with the industry to alleviate the environmental and social impacts.

11.1.5 Employment of the economically active population within the districts including Dartmoor is relatively high, with fewer than 2.5% of people unemployed, lower than the average for the county, region or England.

Table 11.1 Percentage of People Between 16 And 74 in Employment, Unemployed, and Economically Inactive[74]

	Full-time Employees	Part-time Employees	Self-Employed	Unemployed	Full-time Student	Economically Inactive
England	40.81	11.81	8.32	3.35	2.58	33.13
South West	39.08	13.23	10.08	2.57	2.55	32.48
Devon	34.36	13.38	12.6	2.54	2.38	34.74
South Hams	32.93	13.24	15.19	2.31	2.18	34.14
Teignbridge	35.26	13.62	11.78	2.3	2.15	34.88
West Devon	32.71	13.33	15.51	2.4	1.78	34.28

11.1.6 The percentage of people who are economically inactive is broadly similar in the three districts to Devon, the South West and England. However, this conceals a different balance, with a greater percentage of retired people and a lower percentage of students within this category. This reflects the age profile of the three districts, as shown in **Table 11.2**. Devon as a whole and the three

71 South West Tourism and South West England Regional Development Agency, (2005).

72 Devon County Council, (2004).

73 South West Tourism and South West England Regional Development Agency, (2005).

74 National Statistics, (2003).

districts in particular, has a relatively high proportion of people over the age of 65.

Table 11.2 Age Profile of Districts Including Dartmoor National Park[75]

	0-17	18-24	25-44	45-64	65-74	>75
England	22.7	8.4	29.3	23.8	8.3	7.5
South West	21.5	7.7	27.0	25.2	9.4	9.2
Devon	20.4	7.3	24.7	26.6	10.5	10.5
South Hams	20.8	5.9	23.9	28.6	10.5	10.3
Teignbridge	20.9	6.0	24.6	26.7	10.8	11.1
West Devon	20.9	5.7	24.2	29.4	10.2	9.6

11.1.7 The economic base of Devon and the districts including Dartmoor is relatively broad, with the largest sector (wholesale and retail) employing less than 20% of people. Agriculture, hotels and restaurants, and health and social work, all account for a higher proportion of employment than occurs nationally. These all reflect the character of the area, with agriculture intrinsically linked to the identity of the county, hotels and restaurants catering to an important tourist industry, and health and social work meeting the needs of the community. On the other hand, fewer people are employed in manufacturing, and in real estate and business.

75 National Statistics, (2003).

11.1.8 **Table 11.3** shows the proportion of people employed in each industrial sector.

Table 11.3 Percentage of People Employed by Industry[76]

	A: Agriculture	B: Fishing	C: Mining and quarrying	D: Manufacturing	E: Electricity, gas and water	F: Construction	G: Wholesale and retail	H: Hotels and restaurants	I: Transport and communications	J: Finance	K: Real estate and business	L: Public administration	M: Education	N: Health and social work	O: Other community	P: Private households	Q: Extra-territorial organisations
England	1	0	0	15	1	7	17	5	7	5	13	6	8	11	5	0	0
South West	2	0	0	14	1	7	17	6	6	4	11	7	8	11	5	0	0
Devon	5	0	0	12	1	8	17	7	6	3	10	7	8	12	5	0	0
South Hams	4	0	0	12	0	7	16	7	5	2	11	8	9	12	5	0	0
Teignbridge	3	0	1	11	1	8	19	6	5	2	10	6	8	14	5	0	0
West Devon	7	0	0	12	1	7	15	7	5	2	10	7	9	12	5	0	0

11.1.9 Devon's productivity remains significantly below the national average[77]. This reflects patterns of employment set out above, since there is higher than average employment in sectors with relatively low productivity and salaries. There are fewer jobs in high value sectors, particularly in the knowledge economy, which reflects in the county's contribution to the national economy. However, although a large gap exists between Devon and the rest of the country, the economic contribution per head is growing at a rate similar to the rate of growth elsewhere, so that the gap is not increasing.

11.2 Scope of the Appraisal

Potential Effects Not Requiring Further Consideration

11.2.1 No socio-economic effects have been scoped-out of the EA.

Potential Effects Requiring Further Consideration

11.2.2 The following effects will be considered further as part of the EA:

- Effects on tourism: The main socio-economic argument against the military use of DTA relates to the impact on tourism. Further consideration is

76 National Statistics, (2006).

77 Devon County Council, (2006).

needed in order to assess whether DTA has a significant effect on tourism and the nature of that effect. It is argued by some that military use limits access for tourists, thereby reducing the potential contribution of tourism to the local economy. The link is also made to environmental issues with the concern that the Military's maintenance of roads allow tourists to penetrate too far into natural areas. However, the Military may also affect tourist interest in the area by providing an attraction for those interested in military history and training activities, and by providing access to an area that has a more limited tourist availability than other parts of the DNP.

- Effects on the local economy: The Military use of the training area affects the local economy directly and indirectly. It generates employment within the military and in organisations with contracts to support DTA. However, if military use of the training area reduces the number of tourists visiting Devon or the South West and DTA it may also have a detrimental effect on employment and income in sectors catering for tourists, such as hotels and restaurants. These potential effects will both be considered as part of the EA.
- Effects on the local agriculture economy: The Land Use chapter (**Chapter 7**) has identified that military activities have indirect effects on the local agriculture economy as local farmers are employed by MoD to clear livestock and also receive compensation when appropriate. These effects will be appraised as part of the EA.
- Nuisance effects on local people: The Military use of Dartmoor has effects on local people through its effects on noise, the landscape, traffic, and access to open space. These impacts vary and in most cases, their exact nature and scale are not clear at present. As such, the EA will consider the effects on community wellbeing and the quality of life of local residents.

Appraisal Methodology

11.2.3 The effects of the military use of DTA on tourism will be assessed referring to other documents that highlight the potential scope of impacts in order to identify the spectrum of potential effects of the military activities on tourism. Work undertaken by Tourism Associates[66] considered the stated preferences of the visitors for change in the use of DTA and the stated impact of DTA on their visit. This will be compared to information on the current visitor numbers to assess the impact of the training area on tourism in DNP.

11.2.4 In order to consider the potential effects on income and employment, information will be taken from the finalised Tourism Associates' report and additional survey data on soldier expenditure. The EA will consider employment directly attributable to military use of DTA, rather than splitting the employment into direct (military) employment, indirect employment in contractors and suppliers, and induced employment as the money filters through the economy. The EA will be undertaken using information such as

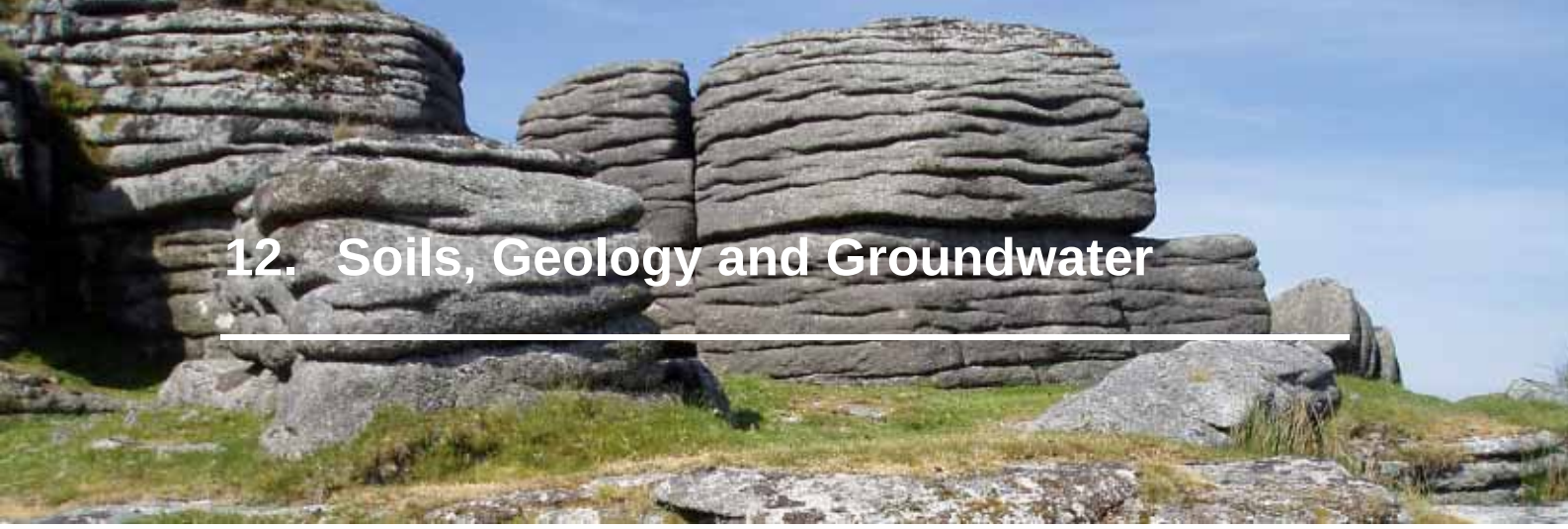
quantitative estimates of the scale, composition and geographical location of expenditure by soldiers, training area staff and facilities, from the Tourism Associates report, where available. The Tourism Associates' report considers the direct contribution of MoD contracts and procurement on the local economy and employment, as well as the number of people directly employed by the MoD in the operation of DTA.

11.2.5 The EA of the potential effect on quality of life will rely on the appraisals made in other chapters of the EA, including noise and landscape/visual effects. Many of the environmental issues are of interest in part because of their implications for local communities.

11.2.6 The Tourism Associates' report will be set in a local and regional context using publicly available data. Certain surveys undertaken by Tourism Associates will, be repeated to expand and complement the original datasets. The Tourism Associates' report will be updated with expenditure on DTA for 2005/06 and additional data on soldier expenditure.

Significance Evaluation Criteria

11.2.7 The significance of the potential effects will be considered, based on the potential scale of impact using professional judgement. This approach is in line with the method used in other socio-economic assessments. (In this case incorporation of information into an evaluation matrix of the type outlined in **Appendix C** is not appropriate.)



12. Soils, Geology and Groundwater

12.1 Current Conditions

Data Sources

12.1.1 The following data sources have been used in assessment of soils, geology and groundwater:

- British Geological Survey (1969), Geological Map Sheet 324, Okehampton (Solid and Drift Edition);
- British Geological Survey (1977), Geological Map Sheet 338, Dartmoor Forest (Drift Edition);
- British Regional Geology (1975), South-West England, Fourth Edition;
- Groundwater Vulnerability Map 49, Dartmoor, 1:100 000;
- RPS (2005), External Audit of the Dartmoor Training Area Environmental Management System;
- Defence Estates Construction Support Team – Environmental Management Group, Sutton Coldfield (telephone communication 25 May 2006);
- West Devon Borough Council (2003) Contaminated Land Inspection Strategy; and
- Devon County Council (2000), Index of Geological Sites.

Summary of Current Conditions

12.1.2 The geology underlying DTA is predominantly granite, with western-most areas of Willsworthy Training Area underlain by metamorphosed shale and grit, the metamorphic aureole surrounding the igneous granite intrusion. The granite is locally overlain by peat with water-lain alluvium in valley bottoms.

12.1.3 The granite has limited weathering and fissure development and is classed as a minor aquifer with low leaching potential. As a minor aquifer, this formation will seldom produce large quantities of groundwater for abstraction. However, it can be important both for local supplies and in supplying base flow to rivers.

12.1.4 From discussion with Environmental Management Group at HQ DE, Sutton Coldfield, it is understood that they are not aware of any land quality assessments for DTA or any of its component camps or sub-areas. There is therefore no detailed baseline assessment against which potential historical land quality issues can be identified and the potential implications of continued current practices assessed.

12.1.5 Current practices and controls are documented in DTA's EMS, which was audited by RPS in 2005. Geology, groundwater and contaminated land issues were addressed in the following sections of the audit:

- Water and Drainage: WD2 (Sewage works discharge), WD3 (spillage in camp) and WD4 (spillage on training area).
- Waste: W1 (disposal of general waste, including munitions waste) and W2 (disposal of hazardous waste). This section logically includes effects of the degradation in the ground of waste including munitions, particularly in the prevailing acidic conditions giving rise to increased degradation, solubility and mobility of metals.
- Geology and Soils: GS1 (spillage of oil/diesel in camp), GS2 (spillage of oil/diesel on DTA), GS3 (digging on DTA) and GS4 (military vehicles and other activities causing tracks and paths).
- Biodiversity and Nature Conservation: BNC06 (unexploded ordnance).
- Landscape: L1 (military debris).

12.1.6 Following 200 years of military training on Dartmoor there is a residue of shrapnel and shells, some still containing explosive - unexploded ordnance (UXO). Use of the whole of Dartmoor was particularly intensive during the Second World War when munitions were less reliable and safety did not have the priority it has today.

12.1.7 Surface searches by the military after each training package locate, identify and where safe to do so, clear military debris including residual ordnance. When beyond the competence of local staff, specialists make UXO safe, sometimes by blowing up UXO in situ. The quantity found in 2006 is massively reduced from that located 20 years ago, however some still appears at the surface, particularly after a period of dry weather. Clearance has taken place of some areas assessed to be of higher risk due to the quantity of rounds thought to have been fired into an area and the likelihood of visitor concentrations around the edge of DTA. Consideration has been given to clearing larger areas of metal objects including UXO, but this is limited by existing locating techniques, technical difficulties; digging in mires and deep peat together with conservation issues; the disturbance of historical artefacts and damage caused by extensive digging or blowing up of UXO. On balance, the present policy is to leave the residual military debris where it lies, under the surface, and to deal with any surfacing munitions as they are located.

12.1.8 DTA's EMS has many procedures in place to prevent potentially damaging military activity including training on foot, which has similar impact to casual recreation use. DTE SW standing orders control all aspects of military training; its timing, location and conduct, the use of vehicles, limitations on digging etc.

12.1.9 The Contaminated Land inspection strategy issued by WDBC correctly identifies that if locations within DTA were inspected and designated as contaminated land under Part IIA of the Environmental Protection Act 1990, they would be categorised as a Special Site. Therefore, inspection would be progressed by the Environment Agency on behalf of WDBC. In practice the EA often offer their assistance with inspecting potential special sites without designation. No information is available on whether WDBC has undertaken any inspection of DTA under the contaminated land regime or whether the Environment Agency has undertaken this on its behalf.

12.1.10 Potential methods of off-site dispersal of materials from DTA are water and wind. The radial drainage pattern of Dartmoor will potentially disperse water-borne materials (e.g. particulates, floating and dissolved substances) generally to areas outside DTA. The prevailing winds are southwesterly.

12.2 Scope of the Appraisal

12.2.1 The EA will identify potential effects of site use that may affect the areas of geological character, which have designated status. It is anticipated that the current risks to geological outcrops are adequately managed by DTA's EMS and requirements of both the DNPA and Devon County Council.

12.2.2 Effects on groundwater and land quality are closely linked. Any adverse effects from historical use of DTA have not been identified and therefore the implications for continuation of current activities cannot be established. Potentially contaminating activities are noted and managed by DTA's EMS. The extent to which these effects can be scoped out will depend on establishing the land quality baseline for the site derived from understanding historical, recent and current uses. The significance of these effects will depend on this contextual assessment. It is anticipated that as the environmental impacts of DTA's use have become better managed, the significance of their impacts will have been reduced.

Potential Effects Not Requiring Further Consideration

12.2.3 The following potential effects will not be considered further in the EA:

- Potential effects from military activities on geological outcrops: Such effects are managed through the EMS, which includes measures to prevent damage to outcrops, and areas of educational importance. These outcrops are included (by the County Council) on the Educational Register of Geological Sites in the county. Effects on locations that are used for

adventurous training have been scoped out of the EA on the basis that standard climbing practices are used, which prevent permanent damage to outcrops.

- Potential soil erosion effects from use of military vehicles: Vehicle use off road is limited and any ruts resulting from the use of vehicles are repaired. The majority of military training is on foot and there is no empirical evidence of significant footpath erosion being caused by military activities. Therefore, erosion effects have been scoped out of the EA.
- Groundwater and land quality contamination resulting from wind-blown dusts: Wind blown dust is not a significant source of groundwater and land quality contamination inside or outside DTA and has therefore been scoped out of the EA.

Potential Effects Requiring Further Consideration

12.2.4 The context for assessment of land quality and groundwater effects has not been defined in any detail and therefore historical site use may be having residual effects, which are not related to current land uses. Therefore, the following potential effects will be considered further in the EA:

- Effects from the historical and/or current storage and loss of motor fuels, aviation fuels, heating oils and other hydrocarbons;
- Effects from the historical and/or current disposal of waste including broken/surplus material and explosive ordnance remnants (as both a detonation risk and a toxicity risk);
- Effects from the historical and/or current use, storage and disposal of any other potential contaminating materials with potential for contamination of soils; and
- Effects from the historical and/or current shallow digging.

12.2.5 Potential receptors to be considered are mostly, people operating on the camps and training area, groundwater and surface water.

Assessment Methodology

12.2.6 The assessment methodology for assessment of potential land quality issues arising from historical, recent and current use of DTA would be the standard Defence Estates Phase One Land Quality Assessment using a spread of information to understand and document site use together with contaminant – pathway – receptor assessment of potential pollutant linkages. The impact of current activities will be part of that assessment. The Land Quality Assessment would provide a baseline against which current and future activities would be evaluated.

Significance Evaluation Criteria

12.2.7 Significance criteria for evaluation of potential pollutant linkages will be in terms of the assessment of significance under the regulatory regime for contaminated land (Significant Harm and the Significant Potential for Significant Harm) which both have formalised definitions within Annex 3 of Part IIA of the Environmental Protection Act 1990.

13. Surface Water

13.1 Current Conditions

Data Sources

13.1.1 Information on current conditions has been collected by reference to the following documents and sources of information:

- Ordnance Survey 1:50000 scale mapping;
- Aerial photography from Google Earth;
- *Cramber Tor Training Area, Dartmoor. Volume 1 Environmental Statement*, WSP Environmental, September 2002;
- *External Audit of Dartmoor Training Area's Environmental Management System: Final Report – Impact Assessment, Gap Analysis and Recommendations for Improvement.* RPS Health, Safety & Environment August 2005;
- *Dartmoor Training Area: Ecology Review DRAFT.* RPS Planning, Transport & Environment. 2006; and
- Water quality data from the Environment Agency's website.

13.1.2 An initial desktop review of the above information has been undertaken to assist in preparation of this Scoping Report. A comprehensive review of detailed information on surface water quality from the Environment Agency and South West Water will be completed at the baseline stage of the EA. To date no field survey specific to surface water issues has been undertaken.

Summary of Current Conditions

13.1.3 The high ground of Dartmoor forms the principal watershed in Devon, with rivers draining the area running to both the north and south Devon coasts.

13.1.4 The northern part of Okehampton Training Area drains northwards via the East and West Okement Rivers, which flow into the River Torridge. The Torridge and the Taw discharge on the north Devon coast through a combined estuary between Bideford and Barnstaple. The West Okement River valley

includes Meldon Reservoir, a public water supply reservoir forming part of the Training Area boundary.

13.1.5 The central part of Okehampton Training Area, Willsworthy Training Area and part of Merrivale Training Area drain westwards via the River Tavy and via the River Lyd, a tributary of the River Tamar. The Tavy and Tamar discharge into the sea on the south Devon coast via Plymouth Sound.

13.1.6 The south eastern and eastern parts of Okehampton and Merrivale Training Areas drain towards the south east, via the River Teign and the River Dart, with its tributaries the East and West Dart, Blackbrook River and Cowsic River. The Teign and Dart drain to the English Channel at Teignmouth and Dartmouth respectively.

13.1.7 The western part of Merrivale Training Area drains to the south west via the River Walkham, a tributary of the River Tavy.

13.1.8 Cramber and Ringmoor Training Areas drain to the River Plym and its tributary the River Meavy. The Plym enters the sea at Plymouth. Burrator Reservoir is a public water supply owned by South West Water on the River Meavy.

13.1.9 DTA does not form part of the catchment of the Fernworthy Reservoir, situated on the South Teign River.

13.1.10 The catchments within the Training Areas comprise mainly open peaty moorland and blanket bog, resulting in naturally low pH[78] in many of the rivers leaving the moor. The geology results in the water being 'soft' with little capacity to buffer the effects of acid rainfall and this may reduce the pH further.

13.1.11 Results of chemical analysis of monthly samples collected by the Environment Agency over the three year period 2002-2004, for their general quality assessment (GQA), for rivers leaving DTA, are given in **Table 13.1**. These cover 'sanitary' parameters (biochemical oxygen demand [$BOD_{5(atu)}$][79], ammonia, dissolved oxygen), which are indicative of organic pollution such as sewage, as well as pH, copper and zinc and the plant nutrients nitrate and phosphates. Results quoted are mean values across all the samples and are the most recent data available on the Environment Agency's website.

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78 pH is a measure of whether the water is acidic (pH less than 7) or alkaline (pH greater than 7). A pH of 7 is described as neutral.

79 BOD is biochemical oxygen demand. The analysis involves direct measurement of the uptake of oxygen by bacterial and chemical activity in a sample maintained at a set temperature (usually 20°C) for a set time (usually 5 days). Thus it reflects the proportion of the organic content of the sample that is likely to exert oxygen demand in a real environmental situation. The demand exerted by ammonia can be included or excluded (by use of an additive, which inhibits the activity of nitrifying bacteria). The consent conditions and all analytical results in this case refer to the 5-day BOD measured with nitrification suppressed by addition of allylthiourea - denoted as $BOD_{5\ (atu)}$.

13.1.12 All of the rivers listed have a water quality objective of RE1, the highest quality objective in the Rivers Ecosystem Classification[80], which takes into account the sanitary parameters and copper and zinc. RE1 represents water quality high enough to support a good salmonid fishery. Five rivers comply with this objective while a further six fail simply on the pH criterion. These are indicated by shading in the pH results column in **Table 13.1**. One river fails marginally on dissolved oxygen (again indicated by shading). Note that failures are based on percentage compliance data, full details of which are omitted from the table for clarity.

[80] The Surface Waters (River Ecosystem) (Classification) Regulations S.I. 1994:1057.

Table 13.1 Environment Agency Routine River Monitoring Data, 2002-2004

Location	NGR	BOD mg-O_2/l	Ammonia mg-N/l	Dissolved oxygen %	pH	Dissolved Copper mg/l	Total Zinc mg/l	Nitrate mg-N/l	Phosphate mg-P/l	Biology no. of taxa (grade)	Biology ASPT (grade)
North Dartmoor (Okehampton, Merrivale and Willsworthy Training Areas)											
East Okement River u/s of Okehampton	SX604946	1.08	0.016	98	7.0	0.79	8.59	0.66	0.01	31 (a)	7.13 (a)
River Taw at Sticklepath	SX644940	0.84	0.015	96	7.0	0.14	3.61	0.18	0.01	32 (a)	6.19 (b)
North Teign River at Gidleigh Park Hotel	SX678879	0.72	0.016	96	6.8	0.09	1.22	0.19	0.01	27 (a)	6.04 (c)
East Dart River at Postbridge	SX648789	0.96	0.015	98	6.4	0.02	1.24	0.15	0.01	24 (b)	6.96 (a)
Cowsic River at Beardown Farm	SX603753	0.74	0.015	97	6.1	1.30	4.09	0.18	0.01	25 (a)	6.76 (b)
Blackbrook River at Tor Royal NB d/s of Princetown sewage works	SX602738	1.20	0.043	98	6.8	0.25	3.96	0.96	0.03	33 (a)	6.42 (b)
River Walkham at Merrivale Bridge	SX550751	0.73	0.016	95	6.5	0.15	1.89	0.16	0.01	22 (b)	6.86 (a)
River Tavy at Hill Bridge	SX532804	0.98	0.016	96	7.2	1.43	5.13	0.45	0.01	21 (b)	6.62 (b)
River Lyd at Lydford	SX520845	0.73	0.015	97	7.2	0.53	2.47	0.33	0.01	26 (a)	6.73 (b)
West Okement River at Meldon reservoir inflow	SX555906	0.80	0.016	96	6.0	0.24	3.40	0.13	0.01	14 (d)	6.64 (b)
South Dartmoor (Cramber and Ringmoor Training Areas)											
River Meavy at weir above Burrator Reservoir	SX567693	0.83	0.016	92	6.8	0.37	2.71	0.19	0.01	24 (b)	6.88 (a)
River Plym above Blackbrook	SX565645	0.78	0.018	93	6.3	2.06	2.94	0.27	0.04	2 (c)	6.55 (b)

13.1.13 Nutrient levels are all in the 'very low' category used in the Environment Agency's GQA classification system, with the exception of the sampling point on the Blackbrook River, reflecting its location downstream of entry of treated effluent from Princetown sewage treatment works.

13.1.14 The low pH on the River Meavy above Burrator Reservoir is an expected phenomenon from a moorland catchment such as DTA and does not indicate contamination that could have arisen from military training. The isolated dissolved oxygen failure probably relates to low summer flows and high temperatures affecting the sampling point, which is at the bottom of an impounded river section. Thus, there is no indication at all from these data of any contamination or adverse impact arising from military training on DTA.

13.1.15 The results indicate that there is no significant sanitary pollution and probably no natural metalliferous pollution from metal bearing rocks in the area, as copper and zinc levels are very low, although no data have yet been examined on other heavy metal contaminants.

13.1.16 **Table 13.1** also shows the results of biological analysis of macroinvertebrate sampling data for a single year in the period 2002 to 2004. The results show the number of taxa (in this case biological families from a selected list) and the average score per taxon (ASPT) using the Biological Monitoring Working Party system. These values are compared with expected values predicted by the RIVPACS[81] computer programme, based on physical and basic chemical characteristics of the river at the sample point. The comparison of 'observed' data with 'expected' results gives a grading from (a) to (e), which is also shown.

13.1.17 Most results fall into categories (a) 'very good' or (b) 'good'. Bearing in mind that low-pH, nutrient-poor waters tend to have a naturally low productivity and a restricted fauna, the few lower categorisations are not unexpected and the overall pattern remains one of high water quality.

13.1.18 Good quality is also demonstrated by reports from DTE personnel and by RPS that streams within DTA are populated by brown trout and some migratory salmonid fish.

13.1.19 There are also artificial leats built for collecting and transporting water from the moor. The Prison Leat collects water from the upper valley of the Blackbrook River and Devonport Leat collects water from the upper catchments of the West Dart River and the Cowsic River, in the Merrivale Training area. Reddaford Leat collects water from Willsworthy to feed Wheal Jewel Reservoir and the Mary Tavy hydro electric power station.

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81 The River Invertebrate Prediction and Classification System.

13.1.20 Mire areas along Sheepstor Brook have been reported to support scarce and rare species of dragonfly, the larvae of which are water dependent[82]. Presence of freshwater pearl mussel (*Margaritifera margaritifera*) has also been reported in the vicinity of the Cramber and Ringmoor Training Areas[83].

13.1.21 Existing management measures, currently in operation under DTA's EMS, that help to protect the surface water environment include:

- on-site sewage treatment works at Okehampton and Willsworthy Camps treat sewage to the required level to ensure environmental protection and, at Okehampton, discharge it to river under Environment Agency consent, which is designed to protect the receiving water. The foul water processes are managed to industry standard by Brey Utilities under MoD's Project Aquatrine;
- measures are in place to minimise risk to surface waters arising from accidental spillages in Okehampton Camp, including preparation and dissemination of a spillage plan, provision of spill control kits, provision of oil interceptors on surface water drainage from main vehicle parking area and from helicopter and vehicle refuelling areas, installation and maintenance of oil and grease traps, an inspection regime for the refuelling point and locking of refuelling facilities when not in use. The surface water processes are managed to industry standard by Brey Utilities under MoD's Project Aquatrine;
- the use of self-contained portable toilets on the ranges, whose contents are disposed of appropriately by licensed specialist contractors;
- clearance of unexploded ordnance;
- use of modern ordnance that does not leave toxic residues;
- minimising refuelling on DTA but, where it is necessary, providing spill kits for user/operator and imposing HQ control of locations for any refuelling other than jerry can refuelling of individual vehicles;
- proper control of the collection and disposal of all waste;
- strict limits on off-road vehicle use; and
- repair of any rutting caused on- or off-road.

13.1.22 The gap analysis undertaken by RPS resulted in recommendations for:

- improved collection of military debris;

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82 WSP (2002) Cramber Tor Training Area, Dartmoor. Environmental Statement, September.

83 RPS (2006) *Dartmoor Training Area: Ecology Review DRAFT.*

- improved waste management and salvage (subsequently addressed in a waste management report[84] by Enviros); and
- improved storage procedures for storing cooking oils, which might pose a risk to surface waters if a spillage occurred.

13.2 Scope of the Appraisal

13.2.1 This section considers surface waters only. For groundwater considerations see **Chapter 12**.

13.2.2 There appear to be no components of the military activities as currently undertaken on DTA that could significantly affect the overall quantity of water running off Dartmoor, so this can be scoped out. The focus below is on potential water quality and rate of run-off issues.

13.2.3 Potential sources of environmental effects on surface waters due to use of DTA for military activities have been identified as:

- local changes to the run-off regime by creation of deeply rutted tracks or paths that could act as water channels and increase run-off rates during heavy rain, with a potential increase in sediment washed into streams and deposited further downstream;
- potential drainage of peat pools or disruption of flushes due to rutting of tracks or by digging activity;
- damage to riverbeds and sediment mobilisation arising from driving vehicles through streams;
- contaminants entering watercourses from use of ordnance;
- inappropriate disposal of liquid wastes, including waste from chemical toilets;
- entry to watercourses of fuel from spillages during refilling tanks on mobile plant and generators;
- pollution of watercourses due to spillages of any other chemicals used on the site;
- entry to watercourses of fuel spillages or contaminated run-off from the camp areas; and
- disposal of waste water from the camps, particularly Okehampton (including foul sewage and surface water run-off from parking areas or locations used for refuelling vehicles, helicopters or other mechanical plant).

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84 Enviros (2006) in preparation.

13.2.4 Potential receptors would include:

- water dependent habitats and their flora and fauna, both in watercourses and in flushes and pools;
- public water supplies fed from Burrator and Meldon Reservoirs; and
- anglers and other recreational users of water.

These may be within or downstream of DTA.

Potential Effects Not Requiring Further Consideration

13.2.5 The following effects are not considered significant and therefore will not be considered any further in the EA:

- Potential changes to run-off rates are not expected to be significant due to the very restricted use of vehicles overall within DTA, the EMS limitations on off-road use and the requirement to repair any damage.
- Potential drainage of pools and effects on flushes due to rutting caused by vehicle activity and effects of vehicles on streambeds can be scoped out for the reasons stated above.
- It is considered that procedures already followed under the EMS to minimise spillages and to mitigate their adverse effects are adequate, so no further appraisal is required.
- Chemical toilet waste is disposed of off-site by a licenced specialist contractor, so there will be no local effects requiring consideration in the EA.

Potential Effects Requiring Further Consideration

13.2.6 It is considered unlikely that, with current mitigation in place, the potential effects from training activities are significant. The following will, however be undertaken as part of the EA in order to determine that this is the case.

- The extent of digging and its potential effects on standing waters in bog areas needs further investigation, although it is anticipated that existing EMS controls are sufficient to eliminate the possibility of significant effects.
- Further information on possible contaminants will be sought by inspection of raw water data from South West Water for abstractions from Burrator and Meldon Reservoirs. These analyses are likely to include additional parameters to the Environment Agency data presented above. If significant concentrations of contaminants are revealed, further appraisal will be necessary to identify any links with military activities on DTA and their importance in relation to users of the public water supply. Appraisal will also be made of any likely effects on aquatic flora and fauna, including fish.

- More recent routine sample analysis data will be obtained directly from the Environment Agency to check that the conclusions above are still valid.
- Further information will be gathered to clarify the relationship of Devonport Leat to Cramber and Ringmoor Training Areas and to assess the sensitivities of both the Prison Leat, Reddaford Leat and Devonport Leat to effects of military activities.
- Confirmation will be sought from the Environment Agency that treated sewage discharges from the camps are controlled appropriately.
- Details of mitigation measures regarding surface water run-off at the camps will be obtained, assessed and reported. It is likely that existing infrastructure and measures in the EMS are sufficient to prevent adverse effects.

Appraisal Methodology

13.2.7 The principal approach to determining significance of effects on water quality will be to compare data obtained with accepted Environmental Quality Standards (EQS) and environmental action limits designed for general ecosystem protection or to protect specified uses of the water. These will include:

- EQS set under *The Surface Waters (Dangerous Substances) (Classification) Regulations*[85];
- DoE Circular 7/89[86], which sets EQS for 'List II' substances defined by EEC Directive 76/464/EEC as amended;
- *The Surface Waters (Fishlife) (Classification) Regulations*[87] (giving EQS which only apply formally to designated waters but which provide appropriate guidance for unpolluted watercourses generally);
- EQS set by the *The Surface Waters (Abstraction for Drinking Water) (Classification)* Regulations[88] (for watercourses supplying abstractions for public drinking water supply, e.g. via Meldon and Burrator Reservoirs); and

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85 SI (1998) 389, The Surface Waters (Dangerous Substances) (Classification) Regulations 1998,
SI (1997) 2560, The Surface Waters (Dangerous Substances) (Classification) Regulations 1997
SI (1992) 337, The Surface Waters (Dangerous Substances (Classification) Regulations 1992
SI (1989) 2286, The Surface Waters (Dangerous Substances) (Classification) Regulations 1989

86 DoE (1989) Circular 7/89. *Water and the environment - the implementation of European Community Directives on pollution caused by certain dangerous substances discharged into the aquatic environment.*

87 SI (1997) 1331, The Surface Waters (Fishlife) (Classification) Regulations 1997 as amended by SI (2003) 1053, The Surface Waters (Fishlife) (Classification) (Amendment) Regulations 2003

88 SI (1996) 3001, The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996

- the Environment Agency's River Water Quality Objectives set under the River Ecosystem Classification system described above.

13.2.8 The nature of any contaminants detected in rivers leaving DTA will determine the likely sources and will drive the methodology for further investigation.

13.2.9 It is anticipated that consultation will be required with technical staff from the Environment Agency, Project Aquatrine (Brey Utilities) and in South West Water.

Significance Evaluation Criteria

13.2.10 The criteria used will be the limits specified by the various Environmental Quality Standards designed to protect specified uses of the water.

14. Traffic and Transport

14.1 Current Conditions

Data Sources

14.1.1 No survey work has been undertaken to inform the Scoping Report. It is not considered necessary to collate and review baseline traffic flow data at this stage. Information on the local highway network has been taken from Ordnance Survey mapping.

Summary of Current Conditions

14.1.2 The local highway network within and around DTA includes the A30 Trunk Road to the north, the A386 to the west and the A38 Trunk Road to the south. Whilst some vehicular tracks exist within DTA, these generally provide access rather than through-routes. The level of vehicular access to DTA is generally very low.

14.1.3 Most of the training activities carried out within DTA are on foot with little need for vehicles. Traffic levels estimated at 200 journeys per day[89], on the public roads generated by military activities are therefore generally not considered to be significant. Vehicles numbers within DTA are estimated to average 10 per day, with occasional (i.e. annual) events such as the Commando Logistic Exercise (100 vehicles) and Ten Tors Challenge Weekend (2400 participants) generating larger numbers of vehicles but over a very short period.

14.1.4 Despite very low traffic generations relating to training activities, environmental management measures are in place to reduce environmental effects relating to traffic and transport. These include measures to monitor vehicle mileage, coordinate vehicle use and vehicle sharing, limitations on the use of some narrow lanes and restrictions on the use of vehicles off track.

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89 This includes an estimate for traffic movements associated with people travelling to and from work within DTA.

14.2 Scope of the Appraisal

Potential Effects Not Requiring Further Consideration

14.2.1 It is considered that the following traffic and transport effects, which are based on the potential effects[90] from traffic associated with military activities, do not require further consideration in the EA:

- Potential severance effects on the local community: Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. It may result from the difficulty of crossing a heavily trafficked existing road for example, or as a result of a physical barrier created by the road itself. However, there are no predictive formulae, which give simple relationships between traffic factors and levels of severance. Nevertheless, the Institute of Environmental Assessment's *'Guidelines for the Environmental Assessment of Road Traffic'* guidelines suggest that only changes in traffic flow of 30% or more are likely to produce changes in severance. Given that no changes in traffic flow are predicted, and that the existing levels of traffic generation are low and unlikely to be causing severance issues, this effect is scoped-out.
- Delays to drivers using the local highway network: Delays to existing traffic on the network can occur due to the additional traffic generated by the proposed activity. The Institute of Environmental Management and Assessment (IEMA) guidelines note that these additional delays are only likely to be significant when the traffic on the network in the study area is already at, or close to, the capacity of the system. Given that the existing network within and around DTA is generally not at capacity, this effect is scoped-out.
- Pedestrian delay: Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads and therefore result in pedestrian delay. In general, increases in traffic levels are likely to lead to greater increases in pedestrian delay. However, given that, no changes in traffic flow are predicted, and that the existing levels of traffic generation and pedestrian activity are both low, this effect is scoped-out.
- Pedestrian amenity: This is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic. The IEMA guidelines note that changes in pedestrian amenity may be considered to be significant where the traffic flow is halved or doubled. However, given that no changes in traffic flow are predicted, and that the existing levels of

[90] Institute of Environmental Assessment (1993) [Now the Institute of Environmental Management and Assessment (IEMA)] *Guidelines for the Environmental Assessment of Road Traffic.*

traffic generation and pedestrian activity are both low, this effect is scoped-out.

- Fear and intimidation effects on the local population as a result of intimidation from military traffic on local routes: The scale of fear and intimidation experienced by pedestrians is dependant on the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths. Whilst there are no commonly agreed thresholds by which to determine the significance of the impact, no changes in traffic flow are predicted, and the existing levels of traffic generation and pedestrian activity are both low. Furthermore, the vehicles in use by the Armed Forces are generally smaller than private HGVs using local roads and are therefore less likely to result in intimidation effects. This effect is therefore scoped-out.
- Accidents and safety issues for local pedestrian and drivers: due to the numerous local causation factors involved in personal injury accidents, the IEMA guidelines do not recommend the use of thresholds to determine significance. However, given that no changes in traffic flow are predicted, and that the existing levels of traffic generation are low, this effect is scoped-out.

Potential Effects Requiring Further Consideration

14.2.2 No environmental effects are considered to require further consideration in the EA.

Appendix A
Consultation list

The following list of organisations will either be sent a copy of the Scoping Report for comment or will be provided information as to where a copy of the Scoping Report can be viewed.

Organisation
STATUTORY BODIES
Devon County Council
Mid Devon District Council
South Hams District Council
Teignbridge District Council
West Devon Borough Council
Government Office for the South West
The Countryside Agency
English Nature
The Environment Agency
The Highways Agency
The Historic Buildings and Monuments Commission for England (English Heritage)
The South West Regional Assembly
The South West of England Regional Development Agency
The South West Peninsula Strategic Health Authority
The Strategic Rail Authority
South West Highways
South West Water
Department for Education and Skills
Department for Transport
Department of Trade and Industry
HM Prison Princetown
Home Office
Dartmoor National Park Authority
Department for Environment, Food and Rural Affairs
defra State Veterinary Service
defra RDS
Department for Work and Pensions
Department for Constitutional Affairs
Department for Culture, Media and Sport

Organisation
MINISTRY OF DEFENCE
Flag Officer Sea Training
Comd 3 Commando Brigade
Cdre RNAS Culdrose
Cdre RNAS Yeovilton
Comdt CTCRM
Director General Training Support
GOC 5 Div
Comd 43 (Wx) Bde
Station Comd RAF St Mawgan
Defence Estates
GENERAL CONSULTATION BODIES
Okehampton Town Council
Belstone Parish Council
Bridestowe Parish Council
Burrator Grouped Parish Council
Dartmoor Forest Parish Council
Gidleigh Parish Council
Lydford Parish Council
Mary Tavy Parish Council
Okehampton Hamlets Parish Council
Peter Tavy Parish Council
Sourton Parish Council
South Tawton Parish Council
Throwleigh Parish Council
Plymouth City Council
Dartmoor Commoners Council
Belstone Commoners Association
Bridestowe and Sourton Commoners Association.
Forest Commoners Association
Gidleigh Commoners Association
Lydford Commoners Association
Mary Tavy Commoners Association
Okehampton Borough Commoners Association
Okehampton Hamlets Commoners Association
Peter Tavy Commoners Association
Shaugh Prior & District Commoners Association
Sheepstor Commoners Association

Organisation
Sourton Commoners Association
South Tawton Commoners Association
Throwleigh Commoners Association
Walkhampton Commoners Association
Whitchurch Commoners Association
Association of National Park Authorities
Buckfast Residents' Society
Byways and Bridleways Trust
Central Council of Physical Education
Council for National Parks
Council for the Protection of Rural England
Citizens Advice West Devon
Citizens Advice Tavistock
Community Council of Devon
Dartmoor Countryside Access Group
Countryside Access Group
Dartmoor Preservation Association
Dartmoor Commons Owners Association
Dartmoor Society
Devon Archaeological Society
Devonshire Association
Devon Association of Parish Councils
Devon Buildings Group
Devon Conservation Group
Devon Playing Field Association
Devon Wildlife Trust
English Sports Council (SW)
Groundwork Trust
Field Studies Council
Forestry & Timber Association
High Moorland Community Action
Land Access and Recreation Association
Moretonhampstead Development Trust
Open Spaces Society
Shelter
South Brent Community and Action Group
Teignbridge Council for Voluntary Service
South Hams Council for Voluntary Service

Organisation
West Devon, Council for Voluntary Service
Plymouth Guild of Voluntary Service
Ramblers Association
South West Tourism (WCTB)
Devon Youth Parliament
Youth Councils
West DEN (West Devon Environmental Network)
Organisations which represent the interests of business people in the National Park
Business in the Community
Business Link Devon and Cornwall
Chamber of Commerce
National Farmers Union
Country Land and Business Association
Dartmoor Tourist Association
Devon and Cornwall Business Council
Forest Enterprise
Forestry Commission
The Prince's Trust
Wessex Reinvestment Trust
West Devon Business Information Point
OTHER ORGANISATIONS AND INDIVIDUALS
Army Benevolent Fund
Bagga Tor owners
British Canoe Union
British Geological Survey
British Horse Society
British Mountaineering Council
Centre for Ecology and Hydrology
Civil Aviation Authority
Devon Birdwatching and Preservation Association
Devon Wildlife Trust
Devon and Dorsetshire Regimental Association
Duchy of Cornwall
Duke of Edinburgh's Award Scheme
Forestry Commission
Friends of the Earth
Lord Lieutenant
Maristow Estate

Organisation
National Trust
Okehampton Park Estate
Pridhamsleigh Caves owner
Royal British Legion
Royal Marine Association
Royal Society for the Protection of Birds
Sheepstor's owner
South West Water
SSAFA
SWW Lakes Trust Director

Appendix B
Glossary

AQ	Air Quality
AQMA	Air Quality Management Area
ASPT	Average Score Per Tax
BAP	Biodiversity Action Plan
CPRE	Council for the Protection of Rural England
CROW	Countryside and Rights of Way Act
CT	Collective Training
dB	Decibel
DE	Defence Estates
DE EST	Defence Estates Environmental Support Team
defra	Department of Environment, Food and Rural Affairs
defra RDS	Department of Environment, Food and Rural Affairs Rural Development Service
DNP	Dartmoor National Park
DNPA	Dartmoor National Park Authority
DSG	Dartmoor Steering Group
DTA	Dartmoor Training Area
DTE	Defence Training Estate
DTE SW	Defence Training Estate South West
EA	Environmental Appraisal
EH	English Heritage
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EN	English Nature
ESA	Environmentally Sensitive Area
EST	Environmental Support Team
GQA	General Quality Assessment
HQ	Headquarters
IEMA	Institute of Environmental Management and Assessment
ILMP	Integrated Land Management Plan
LAW	Light Anti Tank Weapon
LDF	Local Development Framework
MoD	Ministry of Defence
NPA	National Park Authority
NVC	National Vegetation Classification

PPG	Planning Policy Guidance
PPS	Planning Policy Statement
RDA	Range Danger Areas
RIVPACS	The River Invertebrate Prediction And Classification System
RPG	Regional Planning Guidance
RSS	Regional Spatial Strategy
SAC	Special Area of Conservation
SSSI	Site of Special Scientific Interest
TOPL	Training on Private Land
WDBC	West Devon Borough Council

Appendix C
Significance Matrix

Table C.1 illustrates a matrix, which shows the interaction between sensitivity of the receptor and magnitude of the effect, and how this can be used to determine the significance of effects.

Table C.1 Significance Matrix

Magnitude of Change	Receptor Sensitivity			
	High	**Medium**	**Low**	**Negligible***
High	Significant	Significant	Not significant	Not significant
Medium	Significant	Not significant	Not significant	Not significant
Low	Not significant	Not significant	Not significant	Not significant
Negligible	Not significant	Not significant	Not significant	Not significant

Appendix D
List of Footnote References

1. Light force training takes place essentially on foot in groups of up to 650 soldiers (battalion strength). This training activity can involve limited use of vehicles (Land Rovers, four-ton trucks and light tracked articulated vehicles (BV206)) largely on tracks. Helicopters can be used to move troops especially to remote areas of DTA.

2. RPS, (2005) External Audit of Dartmoor Training Area's Environmental Management System March

3. The role of the DSG was set by Parliament in 1978. It requires the DSG to keep under review the progress made on the recommendations contained in the Sharp Report (Comnd 6837) and the best possible reconciliation of the requirements of military training, conservation and public access. The DSG also considers matters referred to it by the working party and any reports prepared by the working party. The DSG reports annually to the Secretaries of State for Defence and the Environment.

4. If this were as statutory EIA process connected with a planning application the preparation of the scoping opinion and determination of adequacy of the environmental statement (the production of the EIA process) would be the responsibility of the DNP authority as the designated planning authority

5. Dewerstone, Foggintor, Gidleigh Woods, Pridhamsleigh Caves, Sheepstor and Trowlesworthy.

6. Fleming A (1988) *The Dartmoor Reaves* London: Batsford

7. Willsworthy Camp, at Beardown near Lydford, provides accommodation for up to 130 personnel. The single storey vernacular building, built on a low lying greenfield site purchased by MoD in 1987, opened in 1995 replacing an old hutted camp at Willsworthy, which was in dilapidated condition and visually intrusive on the skyline. In consultation with DNPA, the building was carefully landscaped into its surroundings and constructed of traditional stone under a slate roof. The surrounding area was landscaped as agreed with DNPA and the other part of the land retained in agricultural use. Where necessary, potential issues associated with this camp will be considered in the EA, however, given the age and planning history of this camp it is expected any such issues can be scoped out. For this reason, the camp is not discussed elsewhere in this Scoping Report.

8. Sharp (1977) The Continued Use of Dartmoor by Ministry of Defence for Military Training (Comnd 6837)

9. Four-tonne is the carrying capacity of the vehicle not its gross weight

10. RPS (2005) The Continuing Need for Military Training on Dartmoor

11. http://www.dartmoor-ranges.co.uk

12. Unit = Battalion (650 soldiers)

13. Infantry, engineer, air, artillery etc

14. Collective training forms trained individuals into cohesive formations and units, and broadens individual experience. As combat is complex, so are the skills to conduct it. Such skills fade over time, both for individuals and units. Collective performance fades as individuals within units and formations forget, or move on. Training should therefore be individual and collective, progressive and frequent. Para. 0818, Army Doctrine Publications, Operation, May 2005

15. Sub unit training week = number of units (Battalions) x number of companies in a Battalion (4) x number of weeks of training

16. IFFC = Infantry Field Firing Camp

17. ATE (2004) Land Command Standing Order No 1406 Use of Army Training Estate Facilities July

18. SO1 Individual Training HQ LAND

19. RPS, (2006) Dartmoor Training Area – Paper Informing Potential Future Military Options

20. The usage figures are derived from statistics agreed with DNPA

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33. Wessex Archaeology (2001) *Okehampton Camp*, Unpublished client report

34. Francis, P (2002) *Okehampton Artillery Range*. Unpublished client report and photographic survey

35. WSP (2002) Cramber Tor Training Area, Dartmoor. September

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42. South Hams District Council, (2001) South Hams Landscape Character Assessment and Guidelines, July

43. Teignbridge District Council, (2001) Teignbridge District Landscape Assessment (Excluding Dartmoor National Park)

44. DE EST, (2004) Okehampton Camp Landscape Management Plan

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49. Letterboxing is a recreational activity involving individuals or small groups of people walking over Dartmoor, and using predetermined clues and navigational skills to locate boxes placed on the moor by others. These boxes normally contain a visitors' book and a rubber stamp. On finding the box, hunters use the stamp to record the find in their own books or on a series of cards, and then mark the visitors' book in the box with their own personal stamps.

50. Geocaching is an adventure game for global positioning system (GPS) users. Individuals and organisations set up caches, containing a log book, all over the world and share the locations of these caches on the internet. GPS users can then use the location coordinates to find the caches. Once found, the finder is asked to replace the items found in the cache, if something is found in the first place. (http://www.geocaching.com/faq/)

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70. nsectivorous plant found in bogs and wet ground

71. South West Tourism and South West England Regional Development Agency, (2005)

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73. South West Tourism and South West England Regional Development Agency, (2005)

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78. pH is a measure of whether the water is acidic (pH less than 7) or alkaline (pH greater than 7). A pH of 7 is described as neutral.

79. BOD is biochemical oxygen demand. The analysis involves direct measurement of the uptake of oxygen by bacterial and chemical activity in a sample maintained at a set temperature (usually 20°C) for a set time (usually 5 days). Thus it reflects the proportion of the organic content of the sample that is likely to exert oxygen demand in a real environmental situation. The demand exerted by ammonia can be included or excluded (by use of an additive, which inhibits the activity of nitrifying bacteria). The consent conditions and all analytical results in this case refer to the 5-day BOD measured with nitrification suppressed by addition of allylthiourea – denoted as $BOD_{5\ (atu)}$.

80. The Surface Waters (River Ecosystem) (Classification) Regulations S.I. 1994:1057

81. The River Invertebrate Prediction and Classification System

82. WSP (2002) Cramber Tor Training Area, Dartmoor. Environmental Statement, September

83. RPS (2006) *Dartmoor Training Area: Ecology Review DRAFT.*

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