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| **DEER MANAGEMENT PLAN Ver.3 .09/18** |  |
| CLIENT:NATIONAL PARKS & WILDLIFE SERVICE | SITE: GLENVEAGH NATIONAL PARK |
| Plan author: T.D.Burkitt PhD., Dip.Field Ecol.  DEER MANAGEMENT SOLUTIONS  **Description: Description: DMS JPEG3** | Date: September 2018  PLAN DURATION:  3 YEARS: 2018 – 2021 (With annual review)  VALIDITY PERIOD - *Active*: March 2018 *Expires*: February 2019  REVIEW: Yes / No  REVIEW DATE: February 2019 |

**PREAMBLE:**

This section sets out the processes and information required to develop a Deer Management Plan for GLENVEAGH NATIONAL PARK.

It is essential that Deer Management Planning is comprehensive in nature if the greatest benefits from it are to be realised. In order to accomplish this, planning should begin at a broad level and proceed to the design and implementation of specific tasks to support selected goals and objectives which requires it to be done along functional rather than administrative lines. It is the vehicle by which critical resource and data gaps are identified and a strategy developed to provide the required information. It is a continuing process which necessitates periodic updates and amendments as new information or research findings become available.

If there is one pre-requisite for planning, it is total commitment, which must be expressed forcefully in thought, work and action. Less than total commitment will result in a purely paper exercise – a shelved plan that is admirable to look at for a while and great to gather dust. Without total commitment from everybody concerned, the hard work and effort will result in a hot-and-cold approach to the problem, doing nothing more than confounding and frustrating the participants and adding fuel to the fires of sceptics and status–quo advocates.

Sustainable deer management cannot be carried out in isolation and the planning process involves where appropriate, bringing together all those in the locality involved with deer. It requires identifying specific objectives, recognising where the constraints and opportunities lie and agreeing to a defined set of actions.

## Deer are important to Ireland’s natural environment, culture and economy. They are managed for a diversity of reasons including conservation, grazing management, biodiversity enhancement, protection of agricultural and forestry interests, recreation, public safety and their own welfare. All of these are not mutually exclusive and balancing these different objectives presents a challenge for all those involved.

## UNDERLYING PRINCIPLES FOR SUSTAINABLE DEER MANAGEMENT

* To take an ecosystems approach and to maintain and enhance biodiversity
* To pre-empt unacceptable damage to habitats (to include designated habitats and species, priority habitats & species under EU Directives).
* To take account of all legislative provisions contained in EU Directives, Wildlife Acts and other relevant legislation.
* To achieve a balance between deer and their available habitat
* To promote and safeguard deer welfare at all times
* To adhere to and if possible exceed best practice guidelines at all times
* To integrate deer management with any other associated activity that takes place

**DEER MANAGEMENT PLANNING SHOULD SUPPORT:**

* the provision of a realistic, objective process for deer management decision making
* the basis for the integration of deer management with other land uses and activities
* the collection and assembly of all available information on the deer population and habitat condition be used to effectively make informed management decisions
* the methodology for regular data analysis and interpretation
* the basis for assessing the effectiveness or otherwise of deer management activities
* forward planning in all aspects of deer management to build confidence in a systematic approach to the concept of managing deer populations

**ASSESSMENT AND EVALUATON OF RESOURCES (HABITATS / SPECIES)**

POTENTIAL MANAGEMENT STRATEGIES

GOALS AND OBJECTIVES

EVALUATION OF PROGRESS

PLAN REVIEW

REAL-TIME ISSUES

SCALE

COMPLEXITY

IMPLEMENT WORK PROGRAMME

SPECIFIC MANAGEMENT APPROACHES

SPECIFIC GOALS AND OBJECTIVES

PRIORITISE WORK PROGRAMME

THE DECISION MAKING PROCESS

PREPARATION OF THE DRAFT PLAN

STRATEGY DEVELOPMENT

PART 1 - BACKGROUND INFORMATION

*1.1 Location*

*1.2 Management and staff structure*

*1.3Geology,*

*1.4Climate,*

*1.5Habitats*

*Wet Heath (HH3) /Upland Blanket Bog (PB2) - Brief past history and future objectives – Notable species*

*Semi-natural Woodland (WN1) -Brief past history and future objectives – old woodlands, new woodlands, regeneration sites - Notable species*

*Dry Heath (HH1) / Acid Grassland (GS3) -Notable species*

*1.6*BOUNDARYS *Perimeter fence, Sheep fence, Castle Garden fence, Woodland enclosures*

PART 2 - BACKGROUND INFORMATION - Deer

# *2.1 Historical Management*

# *2.2 The current situation*

*2.3 Future management*

*2.4 Deer in the wider landscape*

*2.5 Threats from other species*

PART 3 - OBJECTIVES

*3.0 General Policy statement Overall objectives - Long term objective / vision*

*3.1Tasks and Responsibilities Year 1*

*3.2 Tasks and responsibilities Year 2*

*3.3Tasks and responsibilities Year 3*

PART 4 - MONITORING

PART 5 -REVIEW

PART 6 -APPENDIX

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| **CONTACTS** | **NAME** | **DETAILS** |
| Owner | National Parks & Wildlife Service | 7 Ely Place Dublin 2 |
| Management | D.Duggan – Divisional Manager  G.O’Donnell - Regional Manager  P.Vaughan - District, Conservation Officer | Glenveagh National Park, Churchill Letterkenny, Co.Donegal |
| Primary Contractors |  |  |
| Sub-Contractors |  |  |
| Other contractors |  |  |
| Government Departments | Dept. Culture, Heritage & Gaeltacht |  |
| Other relevant Agencies |  |  |

**DESIGNATIONS**

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| --- | --- | --- | --- |
| **SITE DESIGNATIONS (to which this plan relates)** | **DESCRIPTION** | **CODES** | **REFERENCE** |
| Special Area of Conservation | Under EU Habitats Regulations | SAC CODE 002047 | https//www.npws.ie |
| Wildlife Refuge |  | na | https//www.npws.ie |
| Special Protection Area | Under EU Habitats Regulations | SPA CODE 004039 | https//www.npws.ie |
| Natural Heritage Area | Under EU Habitats Regulations | na | https//www.npws.ie |
| Other relevant Designations |  | na |  |

PART 1 BACKGROUND INFORMATION

*1.1 Location*

Glenveagh National Park lies in the heart of the Derryveagh Mountains in north-west of County Donegal covering over 14,000 hectares and is made up of three separate areas. The largest of these is the former 6,547 hectare Glenveagh Estate, which is encompassed by a semi-intact 45 kilometre, 1.8 metre metal deer fence.

Glenveagh National Park comprises a large U-shaped valley running north-east to south-west with high mountainous peaks and glens, extensive tracts of Upland Blanket Bog, small mountain lakes, and scattered remnants of native woodland both east and west of the main valley. The steep sided valley holds the 5.5 kilometre long Lough Veagh with the cliffs of Keamnacally rising over 200metres above the lough on the western side. Lough Veagh roughly divides the National Park into two distinct areas. On the eastern side are the peaks of Kinnaveagh (384m), Lehanmore (442m) and Scollops (423m) along with 79 hectares of Mullangore oak woodland amounting to approximately 3,643 hectares in total. On the western side the peaks of Dooish (652m) and Staghall (486m) dominate with remnants of oak woodland at Derrylahan and Sruhanncullia amounting to approximately 2,904 hectares in all. The National Park contains a wide array of habitats and species many of which are protected (Annex I and Annex II priority habitats) under Irish and European law. Glenveagh is part of the large Cloghernagore and Glenveagh National Park SAC (Site Code 002047).

*1.2 Management and Staff structure*

The National Park is managed by the National Parks & Wildlife Service of the Department of Culture, Heritage and the Gaeltacht (CHG). Glenveagh National Park falls within the Northern Division, Northwest Region of the National Parks and Wildlife Service. Primary responsibility for the day to day administration of the National Park rests with the Regional Manager who is supported by the District Conservation Officer and other administrative staff ultimately reporting to the Divisional Manager. There no Conservation Rangers currently in post.

*1.3 Geology*

Glenveagh is a deep ice-scoured U-shaped valley carved by glaciers following the south-west to north east line of the Gweebarra Fault. The three main rock types found within the National Park are metamorphosed sedimentary rocks, granite and basalt. However, the main rock type is predominantly granite but also a large number of basalt dykes are common throughout the National Park.

*1.4 Climate*

The climate in Glenveagh is heavily influenced by the Atlantic Ocean which gives a narrow range of annual temperatures with mild winters and cool summers. Westerly and south-westerly winds bring frontal bands of rain and blustery showers and high atmospheric pressure giving warm settled conditions are relatively infrequent.

*1.5 Habitats*

Wet Heath (HH3) /Upland Blanket Bog (PB2)

*Description*

These habitats were exclusively Wet heath / Upland blanket bog (Plate 1.) and were all found at high elevations (>150m above sea level). Vegetation consisted of species such as Deergrass (*Tricophorum caespitorum*), Heath Rush (*Juncus squarrosis*), cottongrasses (*Eriophorum* spp.) and Purple Moor Grass (*Molinia caerulea*) in wetter areas, dwarf shrubs and heaths such as *Calluna vulgaris* and *Erica* spp*.* in drier areas. This habitat covers approximately 6,397 hectares or 97.1% of the total habitat available.

Glenveagh has had a long history of both deer and sheep grazing dating back to the 1800’s and during this time, numbers of grazers have fluctuated considerably giving rise to peaks and troughs of negative impacts on vegetation and associated communities and dependent species. As a result, it is likely that many species have been lost to the system and may never re-appear even under conditions of zero or near–zero grazing pressure. Nevertheless, habitats such as these have a relatively low species composition due to the elevation, low winter temperatures and poor waterlogged soils. In addition to grazing there has been a history of fires – some intentional some not and these fires are a consequence of the need for improved grazing during the early spring. Fires can have a positive effect on deer distribution and can if planned and executed effectively alter patterns of distribution if required or necessary.

*Notable species:* Bog Aspodel (*Nartheciumossifragum*), Bog Bean (*Menyanthestrifoliata*), Starry Saxifrage (*Saxifragastellaris*), Lesser Twayblade (*Listeracordata*). Raven (*Corvuscorax*), Merlin (*Falco columbaruis*), Golden Eagle (*Aquila chrysaetos*), Skylark (*Alaudiaarvensis*), Wheatear (*Oenantheoenanthe*), Meadow pipit (*Anthuspratensis*), Red Grouse (*Lagopusscoticus*), Hen Harrier (*Circus cyaneus*), Golden Plover (*Pluvialisapricaria*), Snow bunting (*Plectrophenaxnivalis*, Peregrine falcon (*Falco peregrinus*), Hare (*Lepustimidushibernicus*).

Semi-natural Woodland (WN1)

*Description*

These habitats are predominantly mature oak (*Quercus petraea*) woodlands with a mixed holly (*Ilex aquifolium*) birch (*Betula* spp.) and hazel (*Corylus* spp.) understory. Tree species diversity is generally low and ground/shrub layers sparse. Other species, such as beech (*Fagus sylvatica*), sycamore (*Acer pseudoplatanus*), alder (*Alnus glutinosa*) and occasional larch (*Larix* spp.), spruce (*Picea* spp.) and pine (*Pinus* spp.) are also present. This habitat accounts for approximately 100 hectares or 1.5% of the total habitat available.

In the past woodland management is likely to have been negligible apart from the introduction of some exotic species such as larch, spruce and beech. Due to the terrain, felling and extraction of timber would have been unlikely. More recently, as a result of research into the status and condition of the woodland in Glenveagh in the 1970’s and 1980’s, large enclosures have been established around existing woodland protected by deer fencing. In addition, new woodlands have been created by establishing deer–proof enclosures. Furthermore, a programme of rhododendron control has been in place since the early 1980’s.

*Notable species:* Redstart (*Phoenicurus phoenicurus*), Spotted Flycatcher (*Muscicapa, striata*), Sparrowhawk (*Accipiter nisus*), Kestrel (*Falco tinnunculus*), Crossbill (*Loxia curvirostra*). Stoat (*Mustella ermine hibernica*), Pine Marten (*Martes martes*), Leisler’s bat (*Nyctalus leisleri*).

Dry Heath (HH1) / Acid Grassland (GS3)

*Description*

These habitats were found on well drained, nutrient poor steep slopes on the valley sides of the Upper Glen, on the valley floors and along burn edges. Typical components of this habitat include heathers (*Calluna* and *Erica* spp), Bilberry (*Vaccinium myrtilis*) mixed with *Molinia* and other commonly occurring grasses such as sedges and bents. The most common species found in this habitat are *Agrostis* spp., Wavy Hair-grass (*Deschampsia flexuosa*) Mat grass (*Nardus stricta*) and fescues such as (*Festuca rubra* and *F. ovina*). Broadleaved herbs such as Tormentil (*Potentilla erecta*) and Sheep’s sorrel (*Rumex acetosella*) are also common. This habitat accounts for approximately 88 hectares or 1.36% of the total habitat available.

This habitat would be the most preferred grazing area for both sheep and deer due to its aspect, shelter, well drained mineral soil and vegetation components. It is also the habitat that has suffered most from the infestation of *Rhododendron ponticum*.

1.6 BOUNDARYS

*Main deer fence*

The 45 kilometre 1.8 metre deer fence around Glenveagh is a significant piece of engineering history. For most of its 45 kilometre length it is structurally intact (i.e. the strainers and standards are still in excellent condition and remain firmly in place). In some sections however, the fence has begun to disintegrate principally due to lack of investment and maintenance allowing the droppers to decay and the wires to become slack or broken. In other sections, notably from the Altan Gap to Croloughan, sections of the fence have completely collapsed due mainly to snow and ice during the winter months. The decision on the future of the deer fence rests almost entirely on the future management strategy that is adopted for the deer population in Glenveagh National Park.

*Sheep Fence*

Within the main deer fence a 5.8 kilometre a smaller “sheep fence” of the same general construction was erected in the 1950’s to facilitate a grazing agreement with neighbouring land owners in the Glendowan (east) side of Glenveagh.The purpose of this agreement was to allow a specific number of landowners access to grazing an agreed number of sheep at defined times of the year within the enclosed area. This fence encompassed an area in the southeast corner of Glenveagh of approximately 750 ha (1,800 acres) and it joins the main deer fence in Glendowan and runs north, then east to Claggan Lough. The fence is approximately 1.5m in height allowing free movement of deer into and out of the enclosed area. It is now only partially intact.

*Castle Garden fence*

Within the main deer fence is a second deer fence that encompasses the Castle Gardens to completely exclude deer from gaining access to the gardens. Constant vigilance is required to ensure that this fence is maintained as ingress from deer is a perennial problem.

*Woodland Enclosures*

Woodland enclosures are generally in better condition than the main deer fence. However, lack of maintenance has resulted in some enclosures becoming porous allowing deer ingress. The initial investment (financial and manpower) in these fences is immense and therefore they should be maintained until such time as they have achieved their specific objective. In general, woodland re-generation has been successfully achieved in most of the enclosures (e.g. Mullangore wood) and a decision is now required as to whether these fences should be retained or removed. A woodland enclosure survey is planned for 2018 to determine the status of the woodlands in each enclosure within the National Park.

Part 2 - BACKGROUND INFORMATION - Deer

# Deer management is essential to achieving the natural heritage objective of ‘continued enhancement of key habitats and species’ in Glenveagh National Park with particular attention to the restoration, expansion and enhancement of native woodlands.

For management purposes, Glenveagh National Park is divided into eight Deer Management Units (DMU) and 3 principal habitat zones – the Upland zone comprising approximately 6,300 hectares, a woodland zone comprising approximately 100hectares and a dry heath / acid grassland zone comprising approximately 88 hectares. DMUs vary in size from 460ha to 1,365ha. Deer density estimates have been and should continue to be assessed separately for each DMU and deer control should reflect these estimates. In practise, it is likely that most deer control will be in the main glen and in woodland enclosures and it is anticipated that limited deer control will be required in upland zones unless habitat condition deteriorates sufficiently to necessitate it. However, monitoring of habitats is an essential component of this plan and should be integral to the deer management planning process and as such, deer should be managed at levels that allow maintenance and if required restoration of habitats into favourable condition. Over the lifetime of the Deer Management Plan, deer control will continue to be based on productivity and habitat condition in each DMU and habitat zone. The aim of deer management in these zones is to achieve maintenance and enhancement of upland, woodland and dry heath ensuring a healthy deer population that is in balance with the carrying capacity of these habitats.

# *2.1 Historical Management*

# The early management of deer in Glenveagh followed the trends of many Scottish deer forests in the 19th century where deer were primarily “managed” for sporting purposes which largely enabled the shooting of “trophy” stags. The first recorded introduction of organised deer stalking was in the late 1890’s but prior to this red deer had been re- introduced from England, Scotland and Ireland. Red deer were known to have been formerly abundant in the Bluestack Mountains although the native red deer was presumed to have become extinct in Donegal by 1856 although there is little evidence to support this presumption. In 1891, two stags and four hinds were introduced from Glenartney Deer Forest in Perthshire and one stag and nine hinds from Langwell Deer Forest in Caithness into a deer fenced enclosure that had been constructed in Derrylahan while the main deer fence was being completed. Further introductions took place between 1894 and 1949[1]. Once the main fence was complete, the deer were released from the Derrylahan enclosure into the remainder of the estate and deer stalking began in earnest reaching a peak in about 1902 but declining until the outbreak of the First World War in 1914. During the period 1914 to 1925 little or no deer stalking took place in Glenveagh and the deer fence had been looted for its wire during the Civil War. Estimates of numbers in Glenveagh were recorded in about 1916 when a grand total of 1,948 deer were believed to be present, made up of 809 stags, 939 hinds and 200 calves [2]. However, in 1925 Glenveagh was rented to a stalking tenant (Captain Gaythorne-Hardy) who held the lease from 1925 until 1928. In 1929 new owners took on the estate and set about repairing the deer fence. By 1950 the numbers of deer in Glenveagh were estimated to be around 1,100 (480 stags, 650 hinds) but the severe winter of 1951-52 had reportedly reduced the stock of deer in Glenveagh to about 750. However, from about 1929 until 1955 no deer management took place in Glenveagh and it wasn’t until 1959 that the first organised count took place and approximately 700 red deer were counted. Thereafter, organised counts were held annually from 1959 until 2010 with peak numbers recorded in 1986 of 973 and the lowest recorded number in 2010 of 229 [3]. One subsequent count was held in 2014. Deer were also culled annually beginning in 1959 and for the period 1959 until 1979, an average of 51 deer was removed. During the following 20 years (1980 – 2000) the average number of deer removed annually doubled to 104 while between 2001 and 2010 the average number of deer removed per annum declined to 62 [4]. The mean rate of cull (%) between 1959 and 1979 was 8.0% and this rose to 17.4% between 1980 and 2000. From 2001 to 2010 the mean rate of cull (%) rose again to 21%.

# *2.2 The current situation*

The most recent population estimate of red deer in Glenveagh was carried out in the autumn of 2017 resulting in a total population estimate of 5.67± 1.15 km2 or 359 ± 70 deer [5]. No red deer have been culled on a systematic basis since 2010 apart from occasional animals removed from the Castle gardens and other locations.

*2.3 Future management*

It is the objective of the management team in Glenveagh National Park that this Deer Management Plan will be the basis for the future management of deer within the National Park for at least the next three years. The general policy statement and overall objectives will provide the necessary guidance to allow the specific tasks and responsibilities to be implemented and accomplished in a professional and effective manner. It is hoped that follow on Deer Management Plans will succeed the current Plan into the future.

*2.4 Deer in the wider landscape*

It is likely that red deer were never completely extirpated in Donegal and that at least some individuals remained in the vast mountainous areas of the Derryveagh and Bluestack mountains. However, because of the inherent structural deficiencies of the perimeter deer fence around Glenveagh and that over the last 118 or so years it has been damaged or fallen into disrepair, deer have inevitably escaped into the wider landscape on numerous occasions. This has led to the establishment of multiple new populations of red deer within a radius of 40 – 60km of the National Park over the last 100 years or more. Many of these populations are now well established in commercial forestry plantations owned by Coillte and other landowners.

*2.5 Threats from other species*

At the time of writing (July 2018) there are no immediate threats from other deer species entering Glenveagh or its immediate environs. Whilst there have been recent reports and sightings of fallow deer (*Dama dama*) within 5-6 km of the National Park and muntjac (*Muntiacus reevesi*) within 15 km, neither of these species poses an immediate threat to the red deer and both are unlikely to survive the harsh mountainous environment of the National Park. However, sika deer (*Cervus Nippon nippon*) are known to be present in the vast Lough Derg forest complex situated 40km southeast of Glenveagh along the Tyrone and Fermanagh border. Sika deer can pose a significant threat to the genetic integrity of red deer through hybridisation. Hybrid red x sika crosses have been reported in Fermanagh in the last decade but there is little data on abundance or specific locations of sightings.

PART 3 - OBJECTIVES

## GENERAL POLICY STATEMENT

*“To promote the sustainable management of the deer population in order to enhance ecosystem biodiversity within the National Park”*

OVERALL OBJECTIVES

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| OVERALL OBJECTIVES |
| **1.To maintain the deer population at its’ current level of approximately 5.0–6.0km2to enhance biodiversity and reduce negative impacts on habitats & dependent species**  **2. To ensure all future deer management activity conforms to best practice over and beyond the lifetime of the Plan**  **3. Set specific timetable to achieve management objectives.**  **4. Keep all records relating to deer management activities and update on a systematic basis.** |

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| LONG TERM OBJECTIVES / VISION |
| **1. To maintain the red deer population at sustainable densities within Glenveagh National Park and in the wider landscape.**  **2. To minimise negative impacts on habitats by allowing the positive effects of deer herbivory to drive the natural regenerative process.**  **3. Consider fencing only as a short-term protective strategy designed with the sole purpose of protecting vulnerable habitats / sites from deer.**  **4. Initiate and enter into collaborative deer management agreements with relevant neighbours if and when required**  **5. Ensure all future deer management activity conforms to best practice over and beyond the lifetime of the Plan.** |

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| **HABITAT MANAGEMENT** | **OBJECTIVES** |
| UPLAND | To improve the condition of the upland heath and bog communities by reducing grazing and trampling pressure if and where necessary.  Otherwise let natural processes shape upland communities.  Monitor grazing / deer densities |
| WOODLAND | To increase the area of native woodland by re-generation or creating new woodland with the assistance of woodland enclosures  Monitor deer densities closely |
| BIODIVERSITY | To maintain and enhance biodiversity, especially habitats and species that are both locally and nationally important |
| RESEARCH, SURVEY & MONITORING | To facilitate research, survey and monitoring to inform future management.  To contribute to local and national research programmes |

YEAR 1

TASKS and RESPONSIBILITIES: YEAR 1 (2018 – 2019) **\***Note – Year begins in March and ends in February

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| --- | --- | --- | --- | --- | --- | --- |
| **TASKS** | **START**  **Date** | **FINISH**  **Date** | **DURATION** | **RESPONSIBILITY** | **DESCRIPTION OF WORK** | **COMPLETED Y/N** |
| **ENCLOSURE SURVEY** | SPRING 2019 |  | 1 week | **?** | COMPLETE BASELINE INVENTORY / SURVEY OF WOODLAND ENCLOSURES + REPORT |  |
| **ENCLOSURE MAINTENANCE** | MONTHLY |  | 1 week | **NPWS** (Subject to staff availability) | CHECK & MAINTAIN ENCLOSURE FENCES  ENSURE DEER DO NOT GAIN ACCESS |  |
| **NON-FENCED WOODLAND** | BI-ANNUAL |  | 2-3 days | **NPWS** (Subject to staff availability) | MONITOR CONDITION OF NON-FENCED WOODLAND |  |
| **PERIMITER FENCE** | ANNUAL |  |  | **NPWS** (Subject to staff availability) | MONITOR CONDITION OF PERIMITER FENCE AS NECESSARY |  |
| **UPLAND HABITATS** | BI-ANNUAL |  | 10 days | **NPWS** (Subject to staff availability) | MONITOR GENERAL CONDITION OF UPLAND HABITATS |  |
| **DEER DENSITY ASSESSMENT** | SPRING 2019 | SPRING 2019 | 2 - 3 weeks | **?** | REPEAT FSC COUNTS @Level 1 TO ASSESS EFFECTIVENESS OF DEER CONTROL & ASSESS DEER CURRENT DENSITY. | **Y** - 2017 |
| **RECORD NET PRODUCTIVITY** | SPRING 2019 | SPRING 2019 | 1 week | **?** | MONITOR PRODUCTIVITY RATE OF ♀:YL  SET CULL BASED ON PRODUCTIVITY |  |
| **POPULATION CONTROL** | SEPT. 2018 | FEB. 2019 | 6 months | **NPWS** (Subject to staff availability) | Maintenance cull of **40** deer to be completed by February 2019  12♂, 22♀, 6 juveniles  All relevant records to be kept (see appendix data) | To do |
| **ANNUAL PLAN REVIEW** | FEB 2019 | FEB 2019 | 1-2 days | CONTRACTOR / CLIENT | FULL PLAN REVIEW AT YEAR END – AMEND AS NECESSARY | To do |
| **COLLABORATION** | 2018 ? |  |  | COLLECTIVE**\*** | INITIATE COLLABORATION WITH NEIGHBOURING LANDOWNERS SHARING THE DEER RESOURCE IF AND WHERE NECESSARY |  |

**YEAR 2**

TASKS and RESPONSIBILITIES: YEAR 2 (2019 – 2020)**\***

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| **TASKS** | **START**  **Date** | **FINISH**  **Date** | **DURATION** | **RESPONSIBILITY** | **DESCRIPTION OF WORK** | **COMPLETED Y/N** |
| **ENCLOSURE MAINTENANCE** | MONTHLY |  | 1 week | **NPWS** | CHECK & MAINTAIN ENCLOSURE FENCES  ENSURE DEER DO NOT GAIN ACCESS |  |
| **NON-FENCED WOODLAND** | BI-ANNUAL |  | 2-3 days | **NPWS** (Subject to staff availability) | MONITOR CONDITION OF NON-FENCED WOODLAND |  |
| **UPLAND HABITATS** | BI-ANNUAL |  | 10 days | **NPWS** (Subject to staff availability) | MONITOR GENERAL CONDITION OF UPLAND HABITATS |  |
| **PERIMITER FENCE** | ANNUAL |  |  | **NPWS** (Subject to staff availability) | MONITOR CONDITION OF PERIMITER FENCE AS NECESSARY |  |
| **DEER DENSITY ASSESSMENT** | SPRING 2020 | SPRING 2020 | 2-3 weeks | **\*** | 1. FSCST census completed 2017  2. Requires follow up census in 2020 | 1. YES |
| **RECORD NET PRODUCTIVITY** | SPRING 2020 | SPRING 2020 | 1 week | **\*** | 1. Productivity assessed in 2017  2. Requires confirmation in Spring 2020 | 1. YES |
| **POPULATION CONTROL** | SEPT. 2019 | FEB. 2020 | 6 months | **NPWS** (Subject to staff availability) | Maintenance cull – dependent on population estimates / model | To Do |
| **ANNUAL REVIEW** | FEB 2020 | FEB 2020 | 1-2 days | CLIENT/CONTRACTOR | Review work done and projected targets are on track  Amend plan as necessary | To do |

YEAR 3

TASKS and RESPONSIBILITIES: YEAR 3 (2020 – 2021)**\***

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| --- | --- | --- | --- | --- | --- | --- |
| **TASKS** | **START**  **Date** | **FINISH**  **Date** | **DURATION** | **RESPONSIBILITY** | **DESCRIPTION OF WORK** | **COMPLETED Y/N** |
| **ENCLOSURE SURVEY** | AUTUMN 2021 |  | 1 week | **?** | RE-SURVEY WOODLAND ENCLOSURES + REPORT ON PROGRESS |  |
| **ENCLOSURE MAINTENANCE** | MONTHLY |  | 1 week | **NPWS** (Subject to staff availability) | CHECK & MAINTAIN ENCLOSURE FENCES  ENSURE DEER DO NOT GAIN ACCESS |  |
| **NON-FENCED WOODLAND** | BI-ANNUAL |  | 2-3 days | **NPWS** (Subject to staff availability) | MONITOR CONDITION OF NON-FENCED WOODLAND |  |
| **UPLAND HABITATS** | BI-ANNUAL |  | 10 days | **NPWS** (Subject to staff availability) | MONITOR GENERAL CONDITION OF UPLAND HABITATS |  |
| **PERIMITER FENCE** | ANNUAL |  |  | **NPWS** (Subject to staff availability) | MONITOR CONDITION OF PERIMITER FENCE AS NECESSARY |  |
| **DEER DENSITY ASSESSMENT** | SPRING 2021 | SPRING 2021 | 2-3 weeks | **\*** | 1. FSCST census completed 2017  2. Requires follow up census in Spring 2021 | 1. YES |
| **RECORD NET PRODUCTIVITY** | AUTUMN 2021 | AUTUMN 2021 | 1 week | **\*** | 1. Productivity assessed in 2017 -  2. Requires confirmation in Spring 2021 | 1. YES |
| **POPULATION CONTROL 2017/18** | SEPT. 2020 | FEB. 2021 | 6 months | **NPWS** (Subject to staff availability) | Maintenance cull – dependent on population estimates / model | To Do |
| **ANNUAL REVIEW** | FEB 2021 | FEB 2021 | 1-2 days | CLIENT/CONTRACTOR | Review work done and projected targets are on track  Amend plan as necessary | To do |

**Deer Control programme 2018-2019 GNP – All DMUs**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TASK** | **DMU** | **Area km2** | **Current km2** | **Approx. numbers** | **Target km2** | **Km2 Reduction** | **Est. Cull** | **Completed Y/N** | **Date Completed** |
| POPULATION CONTROL 2018/19 | MN | 5.52 | 2.55 | 14 | 2.55 | 0.0 | 0.0 | NA |  |
| POPULATION CONTROL 2018/19 | KV | 9.16 | 5.07 | 46 | 5.07 | 0.0 | 0.0 | NA |  |
| POPULATION CONTROL 2018/19 | LM | 13.05 | 3.13 | 41 | 3.13 | 0.0 | 0.0 | NA |  |
| POPULATION CONTROL 2018/19 | SC | 7.7 | 8.99 | 70 | 6.00 | -2.99 | 25 |  |  |
| POPULATION CONTROL 2018/19 | SH | 4.6 | 8.8 | 41 | 6.00 | -2.8 | 15 |  |  |
| POPULATION CONTROL 2018/19 | WL | 13.65 | 6.02 | 82 | 6.02 | 0.0 | 0.0 | NA |  |
| POPULATION CONTROL 2018/19 | KC | 5.78 | 6.18 | 36 | 6.18 | 0.0 | 0.0 | NA |  |
| POPULATION CONTROL 2018/19 | DL | 5.01 | 5.75 | 29 | 5.75 | 0.0 | 0.0 | NA |  |
| **TOTALS** | **8** | **6,547** | **5.67±1.15** | **359** | **4.87** | **0.61** | **40** |  |  |

### PART 4 -MONITORING

The purpose of monitoring is to assess progress towards achieving the objectives outlined in the Plan. It is the process of assembling, analysing and measuring data gathered for the purpose of informing and enhancing the decision making process.

* Deer Density Estimates – Census work is an annual task. It is required for the following reasons: (i)To estimate a baseline deer density throughout the National Park (ii) To measure the effectiveness or otherwise of control activity (iii) To measure productivity to aid in cull setting (iv) To quantify deer density in vulnerable habitats (v) To allow for proactive decision making.
* Density estimates related to projections – Compare density estimates (deer km-2) with the projected density. Record density estimates in each DMU annually.
* Recruitment Rate (RCR)\* - Calculate recruitment rates by the assessing the yearling: hind ratio during the spring census and comparing the results with data on reproductive rates from the previous years’ cull.
* Cull Results and future projections – Compare results of actual culls against projected culls. Document detailed cull data and monitor trends (for a meaningful analysis a minimum of 6 years of data will be required).
* Reproductive Rate (RR)\*\* - Collect data on reproductive performance from culled females.
* Biometric data – From each animal culled the following data should be collected: (a) Body weight (b) age – calf / yearling / adult (c) sex (d) Reproductive status (presence or absence of *Corpora lutea* in the ovaries) (e) any other relevant information. Carcass information should be summarised at the end of each season and compared with previous years.
* Habitat Condition – Monitor through habitat surveys (every 3 years)
* Biodiversity – Focus on the Qualifying Interests, threatened or priority species. Use surveys, counts or assessments and indicator species as a guide to ecosystem health and function.
* Impacts – Impacts should be classified into positive, negative or neutral. Not all impacts are negative. Methods of monitoring impacts will depend on what habitats or species are being assessed and what are the requirements outlined in the overall objectives (subject also to requirements under EU Directives). Impacts should be described under 3 headings – Environmental, Social, and Economic.
* Deer Welfare – Monitor through information obtained from census, cull data (e.g. carcass weights and reproductive rates) and mortality searches. District Veterinary Officer (DVO) should be informed in relation to specific health and disease issues.
* Modelling population changes – Data collected on deer density, recruitment and mortality can be used to model predicted changes in the population. Models have been constructed for a range of populations from which reliable data are available.
* Analysis – ensure that data are analysed at the Review stage to monitor trends in population performance, density, animal health and welfare, habitat condition and biodiversity indicators.

Notes

\*Recruitment Rate (RCR) – Is a critical measure of population performance and should not be confused with Reproductive Rate. It is the number of juveniles (those aged >10 months) that have survived neo-natal, post-natal and over-winter mortality to be recruited (or added) into the adult population. It is therefore the most effective measure of population growth and is always measured in the spring.

\*\*Reproductive Rate (RR) (performance) – is the percentage of females (adult and juvenile) that show the presence of *Corpora lutea,* (not embryos) in the ovaries during the winter and early spring.

PART 5 -REVIEW

**FINAL PLAN:**

*Review –*

1. Agree procedures for reviewing and modifying the Plan (where necessary).

2. The overall plan should run for a maximum of 3 years, beginning in March 2018 and ending in February 2021.

3. It should be reviewed at the end of each 12 month period.

3. Record a commitment that the progress of the plan will be reviewed annually (to be signed off by DM, RM and DCO)

**NOTEWORTHY ISSUES REQUIRING CONSIDERATION**

1. Removal of unwanted and unnecessary fencing that poses a potential hazard to deer and other wildlife.
2. Consider the use of other grazers (cattle and sheep) as management tools to enhance biodiversity.
3. Consider the introduction of grazing agreements on upland areas to enhance habitat quality and to militate against future potential fire events.
4. Evaluate the costs and benefits associated with deer and their management.
5. Consider the use of fire (Muirburn) as a management tool in upland areas.
6. Consider all of the issues (not just grazing) that relate to natural regeneration and future management of native woodlands
7. Consider venison as a renewable resource that has a positive economic value.
8. Consider uncontrolled influences such as local climate and weather patterns that may affect deer ecology. At a Global level, the effects of Global climate change and changes in the North Atlantic Oscillation (NAO) should also be considered in the longer term.

**PART 6 - APPENDIX**

APPROXIMATE CURRENT POPULATION STRUCTURE and SIZE (AS OF AUTUMN 2017) based on sex ratios (Autumn 2017)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **DATE** |  | **MALES** | **FEMALES** | **JUVENILES** | **CALVES** | **TOTAL** |
| **2018** | **MAX** | 62 | 222 | 46 | 99 | **429** |
| **2018** | **MIN** | 42 | 148 | 32 | 67 | **289** |
| **2018** | **Mean** | 52 | 185 | 39 | 83 | **359** |

**Population Reduction Targets\* Sex: M/F Age: Adult – A (**2 years +**) Juvenile – J** (1 year +**)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEASON** | **MALES** | | **FEMALES** | | **JUVENILES** | | **TOTAL** | |
|  | **Target** | **Actual** | **Target** | **Actual** | **Target** | **Actual** | **Target** | **Actual** |
| **2018/19** | 12 |  | 22 |  | 6 |  | **40** |  |
| **2019/20** |  |  |  |  |  |  |  |  |
| **2020/21** |  |  |  |  |  |  |  |  |
| **Trends**  **→↓↑** |  |  |  |  |  |  |  |  |
| **Impact** |  |  |  |  |  |  |  |
| **Other** |  |  |  |  |  |  |  |

DEER OBSERVATION (RECRUITMENT / PRODUCTIVITY) **A = ADULT (**2 years +**) J = JUVENILE** (1-2 YR**.) C = CALF** (< 1 YEAR.) 2018/9 *(Sample only)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **OBS.** | **DATE** | **DMU** | **SEX** | | **♂ AGE CLASS** | | | **♀ AGE CLASS** | | | **TOTAL ♂** | | | **TOTAL ♀** | | | **COMMENTS** |
|  |  |  | ♂ | ♀ | A | J | C | A | J | C | A | J | C | A | J | C |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**DEER CULL DATA SHEET A = ADULT J = JUVENILE** (>1 YR**.) C = CALF** (< 1 YEAR.) 2017/8 *(Sample only)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NUMBER | DATE | DMU | SEX | WEIGHT (kg) | AGE CLASS | | | PREGNANCY | | LACTATION | | COMMENTS |
|  |  |  |  |  | A | J | C | P | NP | YES | NO |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

Reference to relevant reports, scientific publications and other pertinent documentation.

\*NOTE – Commissioned Report “A Scientific assessment of the population density (km2), distribution and population structure of the red deer (*Cervus elaphus* L*.*) herd in Glenveagh National Park” to be added to DMP file

Any additional relevant information**\***

WOODLAND DEER DENSITY INDICATORS

|  |  |  |  |
| --- | --- | --- | --- |
| **EVIDENCE** | **0-5 km2**  **LOW DENSITY** | **6–12 km2**  **MODERATE DENSITY** | **12 km2 +**  **HIGH DENSITY** |
| TRACKS | Slot marks evident but concentrated on defined paths | Clearly defined paths - slot marks clearly evident | Many well defined paths – often black with consistent use |
| DUNG | Odd isolated groups widely scattered | FPGs relatively easy to find particularly on woodland edge and good feeding areas | FPGs easy to find. Highly concentrated on favoured feeding areas and on tracks / paths |
| BROWSING | Natural re--generation taking place with little or no damage to current years incremental growth | Broad-leaved saplings present but showing signs of significant damage | No seedlings growing above dominant vegetation height. Well defined browse line on established plants. |

MANAGEMENT PLAN SUMMARY

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **WOODLAND MANAGEMENT** | | | | |
| ITEM | OUTLINE DESCRIPTION | ASSESSMENT CRITERIA | TARGET DATE | RESPONSIBILITY |
| Woodland management / enclosures | Regeneration zones  Potential new sites for woodland establishment  Existing enclosures | Base line survey  Fence security  Re-survey in 3-5 years | Autumn 2018  Autumn 2021 | **?** |
| **UPLAND MANAGEMENT** | | | | |
| ITEM | OUT LINE DESCRIPTION | ASSESSMENT CRITERIA | TARGET DATE | RESPONSIBILITY |
| Upland Management | Upland habitat stability | Deer densities / Habitat condition | Annually | **NPWS** (Subject to staff availability) |
| **DEER MANAGEMENT** | | | | |
| ITEM | OUT LINE DESCRIPTION | ASSESSMENT CRITERIA | TARGET DATE | RESPONSIBILITY |
| Deer fencing | Internal (Perimeter?) | Fence security (internal) | monthly | **NPWS** (Subject to staff availability) |
| Control | Annual deer control within statutory Open season | Habitat condition  Deer density assessments | Annual | **NPWS** (Subject to staff availability) |
| **Habitats and habitat Codes** | **Present Y/N** | **Status**  **E=Excellent**  **G=Good**  **M=Moderate**  **P=Poor** | **Extent (ha.)** | **Map** |
| Amenity Grassland GA2 | **Y** | G |  |  |
| Dry Meadows GS2 | **Y** | G |  |  |
| Dry Grasslands GS3 | **Y** | G |  |  |
| Dry Heath/ HH1 | **Y** | M |  |  |
| Wet Heath HH3 | **Y** | G |  |  |
| Heath/Montane Heath HH4 | **Y** | G |  |  |
| Raised Bog PB1 | **Y** | M |  |  |
| Upland Blanket Bog PB2 | **Y** | G |  |  |
| Lowland Blanket bog PB3 | **Y** | G |  |  |
| Fens and Flushes PF1/2 | **Y** | G |  |  |
| Semi-natural Mixed Broadleaf Woodland WD1 | **Y** | M |  |  |
| Oak-Birch-Holly Woodland WN1 | **Y** | M |  |  |
| Mixed Broadleaved/Conifer Woodland WD2 | **Y** | M |  |  |
| Wet Woodlands WN6 | **Y** | M |  |  |
| Riparian Woodland WN5 | **Y** | M |  |  |
| Bog Woodland/Transitional bog Woodland WN7 | **Y** | M |  |  |

**1. RECORDS OF INTRODUCTIONS TO GLENVEAGH 1891 – 1949**.

**1891** – 2 stags + 4 hinds – Glenartney Deer Forest, Perthshire

1 stag + 9 hinds – Langwell Deer Forest, Caithness

**1894** – 5 stags – Warnham Park, West Sussex

**1909** – 8 stags – Grimsthorpe Park, Lincolnshire

**1910** – 7 stags – Colebrooke Park, Fermannagh

**1922** – 5 stags + 8 hinds – Warnham Park, West Sussex

**1930** – 4 stags + 4 hinds – Warnham Park, West Sussex

**1939** – 8 stags – Warnham Park, West Sussex

**1947** – 6 hinds – Slane Castle, Co. Meath

**1948** – 2 stags + 6 hinds – Slane Castle, Co. Meath

**1949** – 4 stags – Slane Castle , Co. Meath.

**2. Deer Counts - Glenveagh 1959 – 2017**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| YEAR | STAGS | HINDS | CALVES | **TOTAL** |  | YEAR | STAGS | HINDS | CALVES | **TOTAL** |
| **1959** | 179 | 417 | 104 | **700** |  | **1990** | 154 | 390 | 148 | **692** |
| **1960** | 184 | 435 | 106 | **725** |  | **1991** | 161 | 352 | 160 | **673** |
| **1961** | 191 | 456 | 103 | **750** |  | **1992** | 192 | 316 | 161 | **669** |
| **1962** | 177 | 423 | 112 | **712** |  | **1993** | 179 | 308 | 136 | **623** |
| **1963** | 144 | 326 | 129 | **599** |  | **1994** | 179 | 222 | 94 | **495** |
| **1964** | 155 | 320 | 125 | **600** |  | **1995** | 129 | 245 | 90 | **464** |
| **1965** | 213 | 441 | 126 | **780** |  | **1996** | 115 | 163 | 63 | **341** |
| **1966** | 173 | 401 | 131 | **705** |  | **1997** |  |  |  | **420** |
| **1967** | 161 | 323 | 110 | **594** |  | **1998** |  |  |  |  |
| **1968** | 188 | 414 | 108 | **710** |  | **1999** | 171 | 239 | 101 | **511** |
| **1969** | 174 | 260 | 97 | **531** |  | **2000** |  |  |  | **460** |
| **1970** | 259 | 501 | 160 | **920** |  | **2001** | 108 | 242 | 70 | **420** |
| **1971** | 169 | 328 | 129 | **626** |  | **2002** | 103 | 201 | 60 | **364** |
| **1972** | 185 | 242 | 98 | **525** |  | **2003** | 80 | 121 | 62 | **263** |
| **1973** | 152 | 314 | 119 | **585** |  | **2004** | 69 | 136 | 51 | **256** |
| **1974** | 172 | 339 | 119 | **630** |  | **2005** | 101 | 121 | 48 | **270** |
| **1975** | 179 | 423 | 98 | **700** |  | **2006** | 102 | 144 | 38 | **284** |
| **1976** | 164 | 249 | 98 | **511** |  | **2007** | 80 | 121 | 53 | **254** |
| **1977** | 188 | 330 | 132 | **650** |  | **2008** | 67 | 146 | 67 | **280** |
| **1978** | 190 | 256 | 104 | **550** |  | **2009** | 69 | 61 | 67 | **247** |
| **1979** | 101 | 239 | 70 | **410** |  | **2010** | 39 | 143 | 47 | **229** |
| **1980** | 132 | 295 | 134 | **561** |  | **2011** |  |  |  |  |
| **1981** | 167 | 334 | 124 | **625** |  | **2012** |  |  |  |  |
| **1981** | 117 | 303 | 93 | **513** |  | **2013** |  |  |  |  |
| **1982** | 219 | 412 | 100 | **731** |  | **2014** | 66 | 250 | 77 | **393** |
| **1982** | 155 | 319 | 135 | **608** |  | **2015** |  |  |  |  |
| **1983** | 198 | 383 | 87 | **660** |  | **2016** |  |  |  |  |
| **1984** | 236 | 333 | 92 | **661** |  | **2017** | 52 | 224 | 83 | **359** |
| **1985** | 191 | 410 | 124 | **725** |  | **2018** |  |  |  |  |
| **1986** | 292 | 519 | 162 | **973** |  |  |  |  |  |  |
| **1987** | 223 | 499 | 132 | **854** |  |  |  |  |  |  |
| **1988** | 179 | 368 | 121 | **668** |  |  |  |  |  |  |
| **1989** | 183 | 359 | 130 | **689** |  |  |  |  |  |  |

**3. Deer Culls Glenveagh – 1959 – 2010**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| YEAR | STAGS | HINDS | CALVES | **TOTAL** |  | YEAR | STAGS | HINDS | CALVES | **TOTAL** |
| **1959** | 41 | 29 |  | **70** |  | **1990** | 66 | 50 |  | **116** |
| **1960** | 35 | 15 |  | **50** |  | **1991** | 56 | 83 |  | **139** |
| **1961** | 37 | 21 |  | **58** |  | **1992** | 62 | 93 |  | **155** |
| **1962** | 38 | 26 |  | **64** |  | **1993** | 39 | 94 |  | **133** |
| **1963** | 25 | 15 |  | **40** |  | **1994** | 41 | 48 |  | **89** |
| **1964** | 30 | 12 |  | **42** |  | **1995** | 28 | 45 |  | **73** |
| **1965** | 33 | 14 |  | **47** |  | **1996** | 19 | 21 |  | **40** |
| **1966** | 27 | 18 |  | **45** |  | **1997** | 30 | 58 |  | **88** |
| **1967** | 29 | 10 |  | **39** |  | **1998** |  |  |  |  |
| **1968** | 50 | 95 |  | **145** |  | **1999** | 50 | 52 |  | **102** |
| **1969** | 44 | 96 |  | **140** |  | **2000** | 75 | 127 |  | **202** |
| **1970** | 24 | 16 |  | **40** |  | **2001** | 55 | 46 |  | **101** |
| **1971** | 24 | 11 |  | **35** |  | **2002** | 28 | 29 |  | **57** |
| **1972** | 32 | 27 |  | **59** |  | **2003** | 28 | 9 |  | **37** |
| **1973** | 26 | 19 |  | **45** |  | **2004** | 28 | 17 |  | **45** |
| **1974** | 34 | 0 |  | **34** |  | **2005** | 34 | 39 |  | **73** |
| **1975** | 19 | 0 |  | **19** |  | **2006** | 18 | 39 |  | **57** |
| **1976** | 32 | 28 |  | **60** |  | **2007** | 36 | 24 |  | **60** |
| **1977** | 25 | 0 |  | **25** |  | **2008** | 38 | 47 |  | **85** |
| **1978** | 12 | 0 |  | **12** |  | **2009** | 52 | 32 |  | **84** |
| **1979** | 11 | 0 |  | **11** |  | **2010** | 5 | 6 |  | **11** |
| **1980** | 24 | 29 |  | **53** |  | **2011** | 0 | 0 |  | 0 |
| **1981** |  |  |  |  |  | **2012** | 0 | 0 |  | 0 |
| **1981** |  |  |  |  |  | **2013** | 0 | 0 |  | 0 |
| **1982** |  |  |  |  |  | **2014** | 0 | 0 |  | 0 |
| **1982** | 33 | 3 |  | **36** |  | **2015** | 0 | 0 |  | 0 |
| **1983** | 33 | 28 |  | **61** |  | **2016** | 0 | 0 |  | 0 |
| **1984** | 37 | 26 |  | **63** |  | **2017** |  |  |  |  |
| **1985** | 59 | 23 |  | **82** |  | **2018** |  |  |  |  |
| **1986** | 37 | 40 |  | **85** |  | **2019** |  |  |  |  |
| **1987** | 102 | 92 |  | **194** |  | **2020** |  |  |  |  |
| **1988** | 59 | 38 |  | **97** |  | **2021** |  |  |  |  |
| **1989** | 64 | 49 |  | **113** |  |  |  |  |  |  |

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4. **Deer Culls Glenveagh 1959 – 2010** – Archive (J.F.H Burkitt, Estate Manager 1954-1985) and current material NPWS

5. **Burkitt, T.D. (2017)** - A Scientific assessment of the population density (km2), distribution and population structure of the red deer (*Cervus elaphus* L.) herd in Glenveagh National Park, Co. Donegal, Autumn / Winter 2017. Commissioned Report for the National Parks & Wildlife Service, Dept. Culture, Heritage and the Gaeltacht.