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BELFAST**

## **Evaluation of the veracity of muntjac records in Northern Ireland**

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# Evaluation of the veracity of muntjac records in Northern Ireland

*Quercus* Project QU10-06



Prepared for the

Northern Ireland Environment Agency

By

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*Quercus* hosts the Natural Heritage  
Research Partnership between the  
Northern Ireland Environment Agency  
and Queen's University Belfast

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## Executive Summary

1. One of the greatest problems facing conservation in Great Britain and Ireland is the spread and establishment of introduced species. Chinese or Reeves' muntjac deer (*Muntiacus reevesi*) is a highly invasive species which causes extensive ecological damage.
2. We collated 44 anecdotal reports of muntjac from throughout Ireland with notable clusters in Co. Wicklow, Co. Fermanagh and the Ards Peninsula, Co. Down.
3. Reports were evaluated critically and assigned a quality or veracity score on ordinal scale of 0-10 depending on reliability.
4. A total of 26 reports (59%) obtained a veracity score of between 5-7 indicating that the main body of anecdotal evidence consisted of putative sightings, the majority being single observations.
5. The first verified record of muntjac in Ireland was a free-living adult buck that was shot near Avoca, Co. Wicklow during 2007 and the first confirmed record in Northern Ireland occurred on the 3<sup>rd</sup> June 2009 as a result of a road traffic accident near Newtownards, County Down.
6. A total of four sites had reports assigned a veracity score  $\geq 7$  in Northern Ireland: Mount Stewart (Co. Down), Tullyratty (Co. Down), Lough Beg (Co. Londonderry) and Boa Island (Co. Fermanagh). Each was surveyed using five different techniques: interviews of local residents and landowners, camera trapping, daylight surveys for tracks and signs, crepuscular surveys using attractant 'buttollo' calls and nocturnal surveys using an infrared image intensifier and thermal imaging camera.
7. Interviewees reported either hearing or seeing muntjac at Mount Stewart only. No surveys confirmed the presence of muntjac, however, a small unidentified deer was observed fleeing a buttollo call survey near the Temple Woods area of Mount Stewart. Faint regular barking was heard lasting approximately 3 minutes.
8. A photograph taken near Mount Stewart appears genuine but is of insufficient resolution for positive identification. Another allegedly taken at Boa island, Co. Fermanagh has proved to be a hoax having been lifted directly from the internet.
9. No free living muntjac populations have been confirmed in Ireland but anecdotal reports from Mount Stewart, Co. Down are consistent with the possibility the muntjac may be in the area.

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## 1.0 Introduction

One of the greatest problems facing conservation in Britain and Ireland is the spread and establishment of introduced species (Harris & Yalden 2004; Stokes et al. 2006). Integrated and co-ordinated species surveillance and monitoring is imperative to document the arrival, establishment, spread and impact of alien species (DEFRA 2003; Harris & Yalden 2004).

Chinese or Reeves' muntjac deer (*Muntiacus reevesi*) are native to China and Taiwan. They are easily held in captivity with the first recorded release in Great Britain occurring at Woburn Park, Bedfordshire during 1901 (Chapman *et al.* 1994; Smith-Jones, 2004; Ward 2005). Their invasive distribution now covers most of the south and east of England and extends into Wales and Scotland. Muntjac cause severe ecological and economic damage in Great Britain, having major impacts on woodland herb layer composition and tree regeneration (Dolman & Wäber, 2008).

Anecdotal reports of muntjac in Ireland have increased recently raising suspicions that the species may have already established but gone largely unnoticed. Muntjac was listed as one of the 'most unwanted' non-native species by Invasive Species Ireland ([www.invasivespeciesireland.com](http://www.invasivespeciesireland.com)).

In Northern Ireland, an 'exclusion strategy and contingency plan' exists outlining the actions needed should the species establish in the wild. This project aimed to:

1. *Compile all available anecdotal muntjac records in Ireland*
2. *Assign each record a veracity score*
3. *Distribute leaflets to increase awareness and aid local identification in areas with records assigned high veracity scores*
4. *Interview local people*
5. *Conduct targeted crepuscular and nocturnal surveys*

## 2.0 Methods

### *Data collection*

Landowners, farmers and members of the public submit reports of animal sightings frequently to sightings databases, however, regardless of the sincerity of the observer it must be acknowledged that such sightings may be erroneous and must be evaluated critically before being accepted. Therefore, a sightings-based recording system requires a mechanism for discriminating between those reports that probably relate to that target species and those that may relate to other similar species.

To test the veracity of muntjac sightings in Ireland we designed a structured questionnaire with non-leading questions to allow each report to be objectively scored. Anecdotal evidence of muntjac presence was collated from eyewitnesses of putative sightings or local residents, landowners and farmers in areas purported to hold animals. Four factors were taken into account when determining the appropriate score to assign to each sighting: animal appearance, observer knowledge, environmental conditions at the time of the sightings and whether multiple reports were received from the same vicinity. Questions requested details of the animal's size, shape, colouration, behaviour and movement pattern. In the majority of cases interviewees were talked through the questionnaire to ensure consistency.

A quality or veracity score was assigned to each putative muntjac report on ordinal scale of 0-10 (Table 1). A score of 0 was assigned where insufficient information was available to reach a judgement about quality. Reports derived from observations or other evidence that could easily have been mistaken with other species were scored between 1-4 including generic reports of small deer, tracks and signs (which may have easily been mistaken with those of other ungulate species, for example, domestic lambs) or audible sounds (for example, barking which may have been confused with calling foxes). Reports derived from direct observation of animals were scored between 5-7 depending on whether there was a single observation, multiple observations or sightings made by experienced observers, for example, deer stalkers, professional biologists or countryside professionals. Hard evidence was taken as a score from 8-10 including photographs, DNA confirmation

from dung pellets or tissue or a confirmed carcass either shot or as a result of a deer-vehicle collision (verified by a Veterinary Surgeon).

**Table 1** Veracity scoring system for muntjac records based on Poulton et al (2006)

<b>Veracity score</b>	<b>Explanation</b>
0	Insufficient information to make any determination
1	Localised rumours of small deer
2	Putative tracks or signs
3	Anecdotal report of localised barking
4	Anecdotal report of 'small deer' sightings
5	Single anecdotal sightings of muntjac
6	Multiple anecdotal sightings of muntjac
7	Sighting(s) reported by experienced observer
8	Photographic evidence
9	DNA confirmed pellets or tissue
10	Confirmed carcass (shot or road traffic accident)

### *Processing*

All anecdotal reports of muntjac (regardless of veracity score) were mapped using ArcGIS 9.3 to examine their geographical distribution to identify clusters of sightings. All reports with a veracity score  $\geq 7$  in Northern Ireland were further investigated using field surveys in an attempt to verify muntjac presence. Interviews were conducted with as many residents as possible living within 2km of each sighting. Posters and leaflets appealing for information were distributed in the general area of such reports targeting those most likely to encounter and recognise muntjac, for example, local gun clubs, the Countryside Alliance and the British Association of Shooting and Conservation (BASC). Flyers were also handed out at two Game Fairs (Ballywalter and Moira on the 2<sup>nd</sup> and 31<sup>st</sup> May 2010 respectively). Information was also passed to the Ulster Wildlife Trust, RSPB and National Trust.



### *Field surveys*

Given the probably low density of any invasive species inoculum it was necessary to conduct thorough surveys in an attempt to ascertain species absence as fully as possible. Consequently, to increase the likelihood of muntjac detection we employed four different survey techniques at each site with a report with a veracity score  $\geq 7$ :

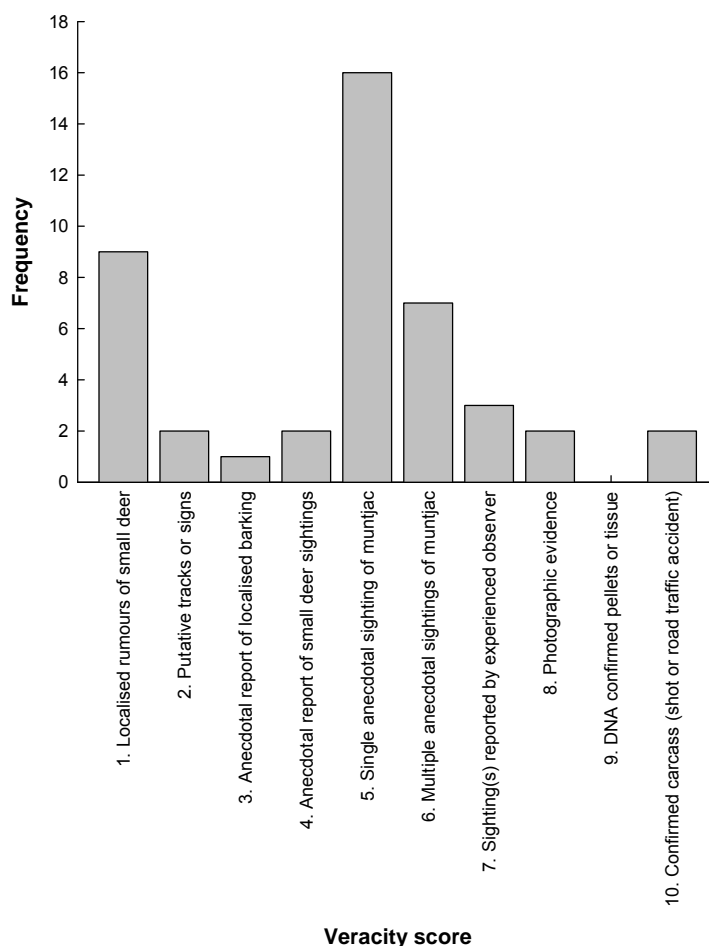
- i. *Camera trapping* - 3 Spypoint IR-A infrared triggered camera traps were set up and baited in areas of suitable habitat (i.e. scrub or thicket forest). Each camera was left in place for 7 days and checked at regular intervals for battery life and memory capacity.
- ii. *Daylight surveys* – At each site 4 x 1.2 x 30m belt transects were selected randomly in suitable habitat following the methods of Hemami *et al.* (2005). Each transect was searched for indirect evidence of muntjac presence, including tracks and signs (for example, dung pellets).
- iii. *Crepuscular surveys* – A total of 20 audio surveys were conducted at dawn and repeated at dusk in each site. Point locations were randomly selected in areas of suitable habitat and surveyed using a 'buttollo' call. The surveyors stood close to a large tree and produced buttollo calls in short bursts for a period of 10 minutes whilst constantly scanning 360°. After which the surveyor remained in place for 5 minutes whilst scanning further.
- iv. *Nocturnal surveys* - Night surveys were carried out using a Cobra fury Infrared Image intensifier and FLIR Flashsight Thermal imager camera to detect animal presence. Existing tracks within 2km of the sightings were followed with the surveyor walking into the wind and scanning every 5 minutes. This was repeated over 3 nights in each site.

### 3.0 Results

A total of 44 anecdotal reports of muntjac were collated throughout Ireland (Appendix I) with notable clusters in Co. Wicklow, Co. Fermanagh and the Ards Peninsula, Co. Down (Fig. 1). A total of 26 reports (59%) obtained a veracity score of between 5-7 indicating that the main body of anecdotal evidence consisted of putative sightings, the majority being single observations (Fig. 2).



**Fig. 1** Location of anecdotal muntjac evidence or sightings scaled by veracity score.



**Fig. 2** Frequency distribution of anecdotal muntjac reports assigned to each veracity score.

The first record of muntjac in Ireland was a free-living adult buck that was shot near Avoca, Co. Wicklow during 2007 (John Griffin and James Moore, 2007; pers. obs.) with a second animal sighted alive shortly thereafter near Trooperstown (Wesley Atkinson 2008; pers. obs.). The first verified record of muntjac in Northern Ireland was confirmed on the 3<sup>rd</sup> June 2009 as a result of a road traffic accident near Newtownards, County Down (J 554764). The carcass was examined initially by a local vet, Peter Rafter, who concluded the animal was road-kill, this was further verified by post-mortem conducted by the Agri-food and Biosciences Institute (Appendix II). The animal was a young buck judged to be between 1-2 years old due to juvenile pedicle and antler growth and short developing canine tusks. Identification was further verified by providing photographs to Trevor Banham (Forestry Commission, S.E. England) and Norma Chapman (deer expert and muntjac keeper in Suffolk, England). These were the only two records assigned a veracity score of 10 (Fig. 2).

A total of two photographs were reported (4.5% of records). The first (Fig 3a) was allegedly taken using a camera phone near Rossgole point, Boa Island, Co Fermanagh (H 108,642), however, has subsequently proved to be a fake lifted from the internet (<http://www.uksafari.com/muntjac2.htm>). The second (Fig 3b) was taken in a garden on Spring Lane, near Mount Stewart, Co Down (J 568,696) on the 25<sup>th</sup> May 2009. The latter image is poor quality but the animal silhouette is consistent with that of a muntjac.



**Fig. 3 (a)** Photograph of a muntjac allegedly taken at Boa Island, Co. Fermanagh (Andy Callander, pers. obs.) which subsequently proved to be a fake taken from the internet and **(b)** a photograph taken at Spring Lane, near Mount Stewart (Mrs Maine, pers. obs.)

A total of four sites had reports assigned a veracity score  $\geq 7$  in Northern Ireland: Mount Stewart (Co. Down), Tullyratty (Co. Down), Lough Beg (Co. Londonderry) and Boa Island (Co. Fermanagh).

Mount Stewart is situated on the East shore of Strangford Lough and is a National Trust site with 40ha of woodlands, gardens and agricultural land. A total of 12 reports were received from the immediate area representing the highest density anywhere in Ireland (Fig. 1). Moreover, the site is only a few kilometres from the location of a confirmed road kill during 2009. A total of 17 individuals were interviewed (Appendix III) in the area with 6 (35%) reporting that they had seen muntjac and 3 (18%) reported hearing unusual barking in the area in the past few years. Surveys were conducted on 14<sup>th</sup> April, 8<sup>th</sup>, 10<sup>th</sup> and 25<sup>th</sup> May 2010. No surveys confirmed muntjac presence, however, a small unidentified deer was observed fleeing a buttollo call survey on 8<sup>th</sup> May 2010 near the Temple Woods area. Faint regular barking was heard lasting approximately 3 minutes.

Tullyratty is situated west of Strangford town and is predominately species rich grassland surrounded by scrub. A total of 16 individuals were interviewed (Appendix II) in the area and no one had heard of muntjac in the local area. Surveys were conducted on 21<sup>st</sup>, and 28<sup>th</sup> April and also on 24<sup>th</sup> and 28<sup>th</sup> June 2010. Surveys found no evidence of muntjac presence.

Lough Beg straddles the border of County Londonderry and Antrim and is a wet grassland site with significant areas of scrub managed by the RSPB. A total of 7 individuals were interviewed in the area (Appendix II), excluding the original report, no one had heard of muntjac in the local area. Surveys were conducted on 19<sup>th</sup> April, 18<sup>th</sup> May and 24<sup>th</sup> May 2010. No evidence of muntjac presence was found.

Boa Island is located on the north shore of Lower Lough Erne and consists of wet scrubland belonging to multiple private owners. A total of 8 individuals were interviewed (Appendix II) in the surrounding area and although no one had seen or heard muntjac, one individual had heard rumours of muntjac in a nearby forest. Crepuscular and daylight surveys were carried out on the 12<sup>th</sup> April 2010. No evidence of muntjac presence was found.

## **4.0 Discussion**

All too often it is the case that by the time an invasive species is discovered in a new area a population may well have established making it virtually impossible to effect a full eradication. This is particularly the case with secretive and elusive species such as muntjac deer. Whilst there are many anecdotal reports of muntjac in Ireland with two verified carcasses, one in the Republic of Ireland and one in Northern Ireland, we found no evidence of wild living populations at this time.

Mount Stewart, Co. Down represents the highest density of anecdotal reports and is close to the location of the only verified carcass found in Northern Ireland. Moreover, a photograph taken nearby and the observation of a small barking deer is consistent with muntjac being present in the area. If reports continue to occur in the Mount Stewart area it may warrant further deployment of passive camera trap survey techniques. Camera trapping allows survey standardisation and is cost effective. Camera trapping with infrared illumination causes less disturbance compared with other survey techniques.

## **6.0 Acknowledgements**

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**APPENDIX I** – List of anecdotal muntjac sightings or evidence of muntjac throughout Ireland

Date	Grid Reference	Recorder	Location	Veracity Score
~1999/2000	H935625	Anon	West side river near Coney Island	1
~2000	J548701	David Cully	Near Mount Stewart	5
~2005	H158342	Anon	Florence Court	6
~2005	J468737	Bap Kelly	Scrabo Hill	5
~2005	J475723	Golf club green	Scrabo Golf Club	4
~2006	J053616	Alan Kilpatrick	Coney Island, Lurgan	6
~2006/07	T016229	Ruth Carden	River slaney	1
~2007	H125567	Anon	Tullywood, Lower Lough Erne	4
~2008	O190026	Liam Nolan	Roundwood	1
~2008	T246920	Liam Nolan	Glenealy	1
~2008/09	C149175	Anon	Letterkenny- Kilmacrennen	1
~2009	J555734	Anon	Killaughey road area	5
~2009	G949601	Adam- Lusty Beg	Belleek Forest	1
~2009	R8678	Colin Magill	Tipperary	1
1990-2000	J558491 and J563485	Collum McDaid	Tullyratty	7
15/09/2005	H179431	Andy Callander	Coolyermer Lough	5
01/05/2008	T177958	Wesley Aitkinson	Trooperstown, Laragh	5
14/05/2008	H108642	Andy Callander	Boa Island, Lough Erne (Hoax)	0
01/06/2008	T202801	John Griffin	Avoca/ Aughrim	10
14/07/2008	R564645	Pat Madden	Ballycar South, Meelick	5
01/04/2009	H976586	Anon	Foymore Bog	6
04/05/2009	J584728	Anon	Carrowdore Primary School	6
25/05/2009	J568696	Mrs Maine	Springlane	8
01/06/2009	J460738	Policeman	Dual Carrigeway (A20)	5
02/06/2009	J588764	Anon	Woburn Road	5
03/06/2009	J555734	Jaimie Dick	Killaughey Road	10
01/07/2009	J1673	Mark Mahan	Glenavy area	1
01/07/2009	J565701	Kudgi	Mount Stewart	5
01/07/2009	J618713	Robin Thomson	Greystone Road	3
18/09/2009	J555702	Dolly McRoberts	Mount Stewart	5
03/10/2009	S7896	George Hendy	A mile from Ballytore, Athy	5
25/11/2009	J588764	Drew Hesslop	Woburn Road	5
11/12/2009	H985928	Collum McDaid	South Lough Beg	5
11/12/2009	J448928	Collum McDaid	Ballycarry	5
01/01/2010	J606714	Robin Thomson	New Road, Carrowdore	5
10/02/2010	M034270	Michael Ellard	Ballydrehid, Cahir	5
18/02/2010	J551707	Eileen Pritchard	Mount Stewart	5
25/02/2010	J553703 and J549706	Drew Hesslop	Mount Stewart	4
28/02/2010	X190093	Anon	Knockaun, Tallon	5
08/05/2010	J558693	Marianne Freeman	Temple Woods, Mount Stewart	4
11/05/2010	J554702	Anon	White stag area, Mount Stewart	2
15/05/2010	J564689	Anon	Temple Woods, Mount Stewart	5
20/05/2010	J555705	Donald Whiteside	Mount Stewart	2



**APPENDIX II** – Post mortem report from carcase found on the Ards Peninsula, Co. Down on the 3<sup>rd</sup> July 2009.

**Agri-Food And Biosciences Institute**

Veterinary Sciences Division, Stormont, Belfast, BT4 3SD

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=====

Emma Meredith	Reference No: 2009-009766
Wildlife Liaison Officer, PSNI Headqua	
Brooklyn, 65 Knock Road	
Belfast	Date received: 11/06/2009
BT5 6LE	

=====

**LABORATORY REPORT**

Owner: Emma Meredith  
 Address: PSNI  
 Species: Muntjac deer  
 Submission: 1 Muntjac deer

Animal	Description	Sex	Age
A	Muntjac deer	M	2 years

**Results of Post Mortem examination**

**Carcase:**

Carcase received frozen. Examined by Tony Patterson on 12/06/09.  
 Right metacarpus with open fracture. Abrasions on anterior head and right horn. Right hind leg with fracture at hock. Abrasions over lateral aspect of metatarsus and lateral digit horn hanging off.  
 Left hind leg with abrasions over medial aspect of hock, medial and lateral aspects of metatarsus and lateral digit horn hanging off.  
 Ruptured diaphragm, ruptured lungs and heart with associated haemorrhage. Ruptured liver and rumen.  
 No significant abnormality detected in all other organs and systems.  
 Skin taken and frozen.  
 Carcase retained for QUB.

=====

**Pathologist's Overview and Comments**

There were multiple traumatic injuries consistent with a road traffic accident.

T Patterson BVM&S, CertSHP, MRCVS  
 Signature



Date: 18/06/2009

=====01

Cc: Victor Fryer.  
 Newtownards PSNI.  
 Declan Looney, Klondyke Building, Cromac Avenue, Gasworks, Business Park, Belfast BT7 2JA.

**APPENDIX III** – Interview results from the four sample sites (Mount Stewart, Tullyratty, South Lough Beg and Boa Island respectively).

Name	Address	Sighting	Indirect Signs	Rumours
Evelyn Scott	46 Spring Lane	Yes	No	No
Mrs Maine	22 Spring Lane	Yes	No	Yes
Sharon Martin	25 Spring Lane	No	No	No
Jillian Martin	19 Spring Lane	No	Yes	Yes
Simon Steele	9 Spring Lane	No	Yes	Yes
Margaret Courtney	1 Spring Lane	No	No	No
Stephen Gordan	70 Mountstewart Road	No	No	No
Mr Davidson	60 Mountstewart Road	No	No	No
Alan Foster	58 Mountstewart Road	No	No	No
H Robinson	48 Mountstewart Road	No	No	No
Ron Deering	20 Mountstewart Road	No	No	No
Liz Jones	2 Mountstewart Road	No	No	No
Phil Rolinson	Head Gardener Mountstewart	No	No	Yes
Drew Hesslop	Game Keeper Mountstewart	Yes	Yes	Yes
Brendan Culden	Fox Hunter Mountstewart	Yes	No	Yes
Eliene Pritchard	Mountstewart	Yes	No	No
Dolly McRoberts	Mountstewart	Yes	No	No

Name	Address	Sighting	Indirect Signs	Rumours
Ann-Marie Dunlop	45 Castleward Road	No	No	No
Greer Lowe	51 Castleward Road	No	No	No
Anon	66 Castleward Road	No	No	No
Rosie Quaile	61 Castleward Road	No	No	No
Anthony Clark	63 Castleward Road	No	No	No
Charlie Johnstone	65 Castleward Road	No	No	No
Andy O'Neil	74 Castleward Road	No	No	No
Eddie Crangle	84 Castleward Road	No	No	No
Anon	12 Audleystown Road	No	No	No
Gerry O'Conner	14 Audleystown Road	No	No	No
Hilary Mayne	Bannaghan Road	No	No	No
Mrs Crea	Bannaghan Road	No	No	No
Richard Sharvin	Bannaghan Road	No	No	No
Craig McCoy	Area Warden National Trust	No	No	No
Mark Mahan	Strangford Ferry	No	No	Yes (elsewhere)
Anon	Churchtown Organic Farm	No	No	No

Name	Address	Sighting	Indirect Signs	Rumours
Daimien Walls	3 Old Bann Road	No	No	No
Michael Keenan	Keenan Farm	No	No	No
Charlie Morrow	Lough Beg Gun Club	No	No	No
Colum McDaid	South Derry Gun Club	Yes	No	No
Seamus Burns	RSPB restoration officer	No	No	No
Gregory Woulahan	RSPB reserves manager	No	No	No

Name	Address	Sighting	Indirect Signs	Rumours
A Neill	Portinode Cottage, Boa Island Road	No	No	No
Mrs Swan	Boa Island Road	No	No	No
Mr Alan Reid	541 Boa Island Road	No	No	No
Mr Johnstone	609 Boa Island Road	No	No	No
Mr Roy Kinnaird	Lusty Beg Island	No	No	No
Adam (Ferryman)	Lusty Beg Island	No	No	Yes
Mr Carlton	Belleek	No	No	No
Mr Charlie Parke	Blaney	No	No	No