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Seal/Salmon Predation Project Interim Report

December 2012

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Inland Fisheries Ireland

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Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

Beaufort
Ecosystems Approach to Fisheries Management

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Photo on front cover ©Michelle Cronin CMRC

Background

Seal interactions with fisheries include predation on salmon stocks entering rivers, interference and mortality of salmon in inshore commercial fisheries, and predation of outward migrating salmon smolts. Inland Fisheries Ireland (IFI) funded the Coastal and Marine Research Centre (CMRC) in University College Cork (UCC), in conjunction with partners at Biological Ecological and Environmental Science (BEES - UCC) and the Marine Institute (MI) to undertake a 2 year pilot study (2011-2013) to investigate seal predation on salmon stocks in selected Irish rivers and estuaries to address the issue. Two rivers in which seal predation of adult salmon stocks has been problematic were selected for the study namely the river Moy Co. Sligo and the river Slaney Co. Wexford. The study began in August 2011 and will continue to December 2013. This interim report details the progress to date and plans for the remainder of the study.

Moy River, Co. Sligo

Survey effort

Surveys of seals hauled-out in the Moy estuary were conducted monthly, from August 2011 to July 2012. Bi-monthly survey effort continued between July 2012-Dec 2012. Each survey consisted of two days of land-based counts and one day of scat (faecal) collection. Land-based counts were achieved from a vantage point (N 54˚19.29, W 9˚12.48) located on the Feeny Farm that overlooked the entire mouth of the estuary. Counts were conducted using an Opticron GS 655 GA fieldscope mounted on a Manfrotto tripod with a Wimberley Head (WH-200). Each count was carried out over the four hour tidal window i.e. 2 hours before low tide, 1 hour before low tide, at low tide, 1 hour after low tide, and 2 hours after low tide. Variables such as weather, wind direction, wind force, and disturbances were also noted. An overview of survey effort to date is presented in Table I.

Seal counts

During the months of June & July 2012, the highest numbers of harbour seals appeared to haul-out during the 2 hours after low tide (Figure 1). When looking at seal haul-out behaviour over the entire 17 month period, a similar picture emerges with the highest numbers of seals hauling-out after low tide (Figure 2). As the sandbars in the mouth of the Moy generally remain un-submerged for up to 3.5 hours after low tide, seals may remain hauled-out until these sandbars are completely submerged. The lowest numbers of seals are found 2 hours before low tide. When grey seals are present they tend to haul-out earlier than the harbour seals but will also leave the sandbars sooner.

Harbour seals are present year round in the Moy yet there does appear to be a seasonal affect (Figure 3), with numbers peaking in early Spring and declining towards the start of Winter. Grey seal presence in the estuary is sporadic (Figure 4). The highest number of grey seals counted was 11 during October 2011. The small group was made up of mainly juvenile males, 3-4 females and 2 large adult males (1 being blind in both eyes). The seals tend to haul-out on sandbars away from the harbour seals and will leave after low tide. For the majority of monthly surveys there was at least 1 juvenile grey seal present, however during the months of November & December 2011, and July, September, November & December 2012 no grey seals were observed to be hauled-out in the Moy.

Scat collection

Scat collection typically takes place between low-tide and +1 hour after low-tide. This allows for the seals to haul-out as long as possible before being disturbed. However, scat numbers are highly variable and retrieval requires that large numbers of seals haul-out in order to be successful. The haul-out sites are accessed either by IFI's boat (when the sandbar are cut off from the mainland) or by foot when the seals have hauled-out close to land.

Over the sampling period Aug 2011-Dec 2012, a total of 50 scat samples have been collected. An average of 4 scats were found each month with these samples likely coming from harbour seals. The highest number of samples collected (9 scats) was in September 2011, coinciding with the highest count of seals in the estuary (Figure 5). No scats were found during the months of November 2011, December 2011, and May 2012. Between the months of April – July 2012 very few scats were found on the sandbars although harbour seal presence was relatively high with an average count of 46 seals hauled-out per month.

As the numbers of scat samples from the Moy estuary were relatively low (compared to the Slaney) due to lower numbers of seals and intertidal sites (where scat is washed away), effort was continued until December 2012 at the Moy site. Seal haul-out sites adjacent to the Moy estuary were also examined for potential ancillary data.

Photo identification

Grey seals have been observed swimming up-river near Ballina town (just below the first bridge) during January & February 2012. Head shots were taken using a digital SLR camera (Canon EOS-ISD) with a 600mm telephoto autofocus image stabilising lens (Canon 600mm f/4L EF IS USM lens), however photo-id from these pictures is not possible. The seal was observed in this area approximately 3 hours after low tide and remained up-river for 2 hours. On one occasion (February 2012) the same male which had been observed the previous day caught & ate a large salmon before swimming back down-river. A smaller female was also observed further down river from the male, however she did not remain in the area for long and did not swim up as far as the town.

No grey seals have been observed up-river during other survey months. However, anglers and IFI staff have reported seeing grey seals up-river sporadically during Summer months, swimming around near the first bridge in Ballina town. Unfortunately we have been unable to capture any images of grey seals up-river that could be used for photo-identification purposes. Furthermore, no grey seals were observed up-river during the months of June & July 2012.

Slaney River, Co. Wexford

Survey effort

Surveys of seals hauled-out in the mouth of the River Slaney have been conducted bi-monthly, from September 2011 to December 2012. Each survey (until September 2012) consisted of two days of boat-based counts and one day of scat collection; between Sept and Dec 2012 boat based surveys have continued on a monthly basis. Aerial surveys of the Slaney have been carried out on two occasions. Similar to the Moy, each count was conducted over the four hour tidal window. An overview of effort to date is presented in Table I.

Seal counts

The highest count of grey seals in the Slaney occurred during March 2012 with 470 seals hauled-out. The lowest number of grey seals (150) was observed during December 2012. Grey seal abundance in this area appears to be relatively high throughout all months (Figure 6). However, lower counts were noted in Jan, May and Oct 2012.

Harbour seal presence in this region appears minimal (Figure 7). The highest abundance recorded was in January 2012 when 5 seals were present. Harbour seals have only been present in 3 out of 10 survey trips to the Slaney.

Aerial surveys were conducted on Jan 23rd and Sept 19th 2012. A total of 230 and 217 grey seals were observed from aerial images captured on those dates respectively. A total of 157 grey seals were observed during a boat based count on Sept 19th 2012. The counts taken from the boat are under-estimated due to disturbance caused by the aerial survey.

Scat collection

Over a 10 month period, a total of 187 scat samples have been collected. The haul-out sites are accessed by boat when weather permits. The highest number of samples collected was 40 scats in November 2012, while the lowest number collected was 5 scats in January 2012 & December 2012 (Figure 8). An average of 19 scats were found each month with these samples likely coming from grey seals.

Photo identification

Images were taken of seals in the water near the haul-out site following disturbance during scat collection. For these images to be used in mark recapture models to asses population parameters high sampling effort would be necessary and as outlined in the proposal, is outside of the scope of the present study. No individual seals were observed predating on salmon in the river so effort related to this aspect of the study is focused on the Moy site.

Genetic analyses of scat samples

Samples of scat for testing for presence of salmonid DNA have been sent to a laboratory in Aberdeen, Scotland for processing. The results will be interpreted in the coming months and comparisons made with the outputs from the conventional diet analyses (scat).

Problems/Issues and solutions

- Seal tagging was not undertaken as planned in Spring 2012 due to budget constraints, however the planned work will take place in Spring 2013 and not compromise the projects objectives.
- The tagging efforts will focus on the Slaney site as the seal population is significantly higher at this site than the Moy and the river is currently below conservation limits.
- Only one aerial survey was conducted during the Winter months due to adverse weather. Another aerial survey will be conducted during Spring 2013.
- Images of individual seals actively predating on salmon at the Moy site proved difficult to obtain. The purpose of this is to assess how many seals are directly involved in fishery interactions in the Moy, as outlined in the proposal. It was anticipated that this site would be more suitable for photo id data collection than the Slaney. To date a very small number of images have been acquired, none suitable for photo identification.
- The study end date was planned for Aug 2013; as seal tagging plans changed due to budget constraints in 2012, the tagging will take place in March-Sept 2013; to allow for analyses of telemetry data the final report will be delivered in Dec 2013.

Future plans:

- Scat collection in the Slaney will continue in 2013.
- An aerial survey of seals in the Slaney will take place in Spring 2013, weather permitting.
- Genetic analysis of scat samples will take place in February/March 2013
- An MSc student is currently undertaking the scat analyses and will complete the study by July 2013. Funding was secured from the Beaufort project.
- Processing of photo id images of individual seals will be undertaken in 2013.
- Tagging of grey seals will take place in at the Slaney March 2013.
- Habitat use of tagged seals will be assessed Sept 2013
- Modeling of prey consumption in study areas will be undertaken Oct 2013
- Questionnaire will be provided to fishermen in June 2012
- Assessment of changes in depredation levels following driftnet fishery Aug-Sept 2012
- Literature review of seal predation and management/mitigation options will be undertaken Apr-June 2013
- Final report/manuscript drafts Dec 2013

The work undertaken to date and planned research effort in the next 11 months will meet the projects objectives outlined in the proposal which include:

1. Determine the seasonal abundance of local seal species in the river mouth and estuaries of the

river Moy and river Slaney.
2. Explore seasonal (and where possible inter-annual) levels of predation, diet and impact of seals on fish stocks, particularly Atlantic salmon, in the two study rivers.
3. Explore models to determine population-level rates of predation on salmon and other fish species using seal abundance estimates and seal energetic requirements and consumption rates of fish; explore the use of photographic identification to determine the number of individual seals involved in fish interactions; assess changes in seal predation on salmon following the closure of the off-shore drift net fishery.
4. Undertake a literature review on seal predation and management options in river/estuary situations.

Table 1: Summary of effort to date

	Moy	**Slaney**
Start date/End date	August 2011/December 2012	September 2011/ December 2012
No. days effort	27	14
No. months effort	15	10
No. range of grey seals	0 – 11	150 - 470
No. range of harbour seals	7 – 104	0 - 5
Monthly effects	Highest in September'11. Lowest in December'11	Highest in March'12. Lowest in December'12
Total no. scats	50	187
Avg no. scats per month	4	19
Photo I.D.	No usable images	No images required as grey seals not swimming up-river

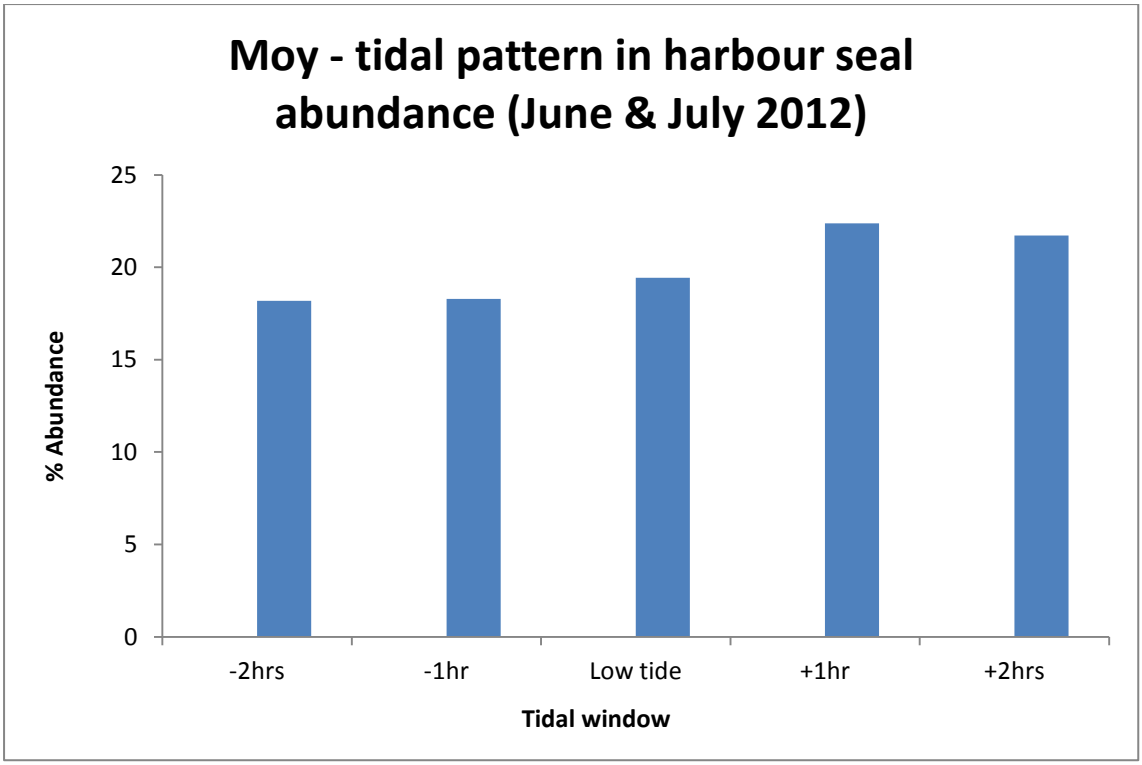

Fig 1. Percentage of harbour seal abundance during the tidal windows in the River Moy, between the months of June & July 2012.

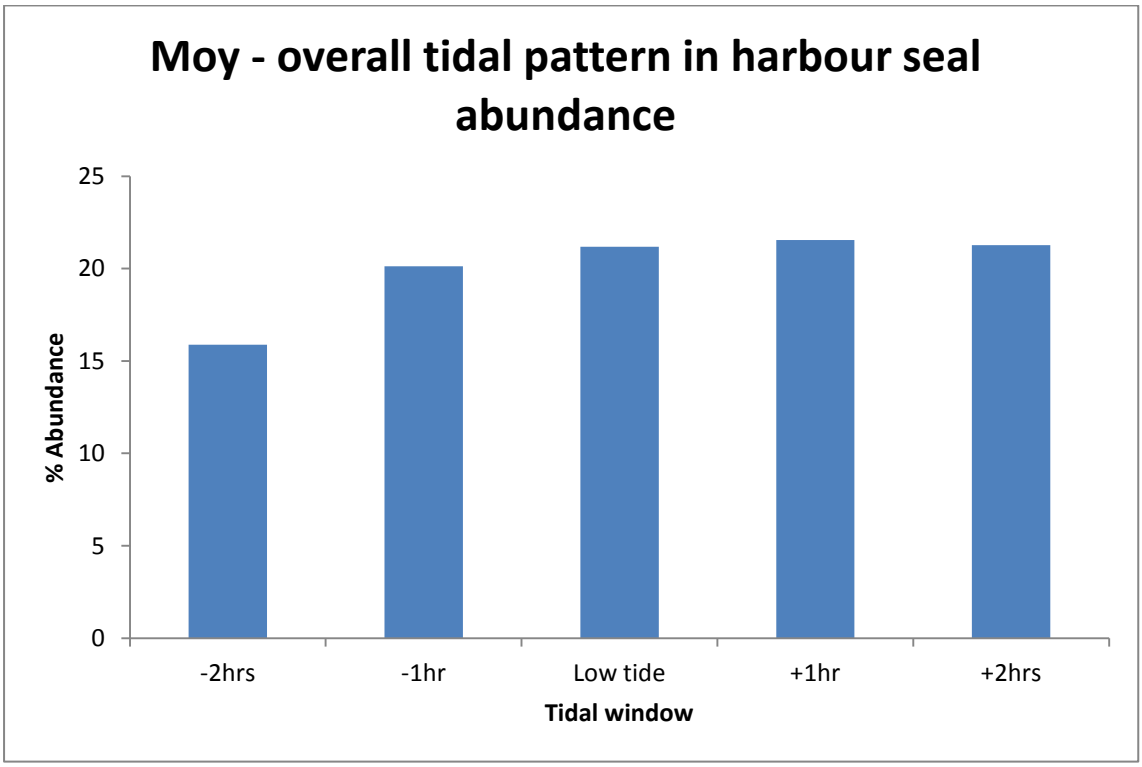

Fig 2. Overall percentage of harbour seal abundance during the tidal windows in the River Moy

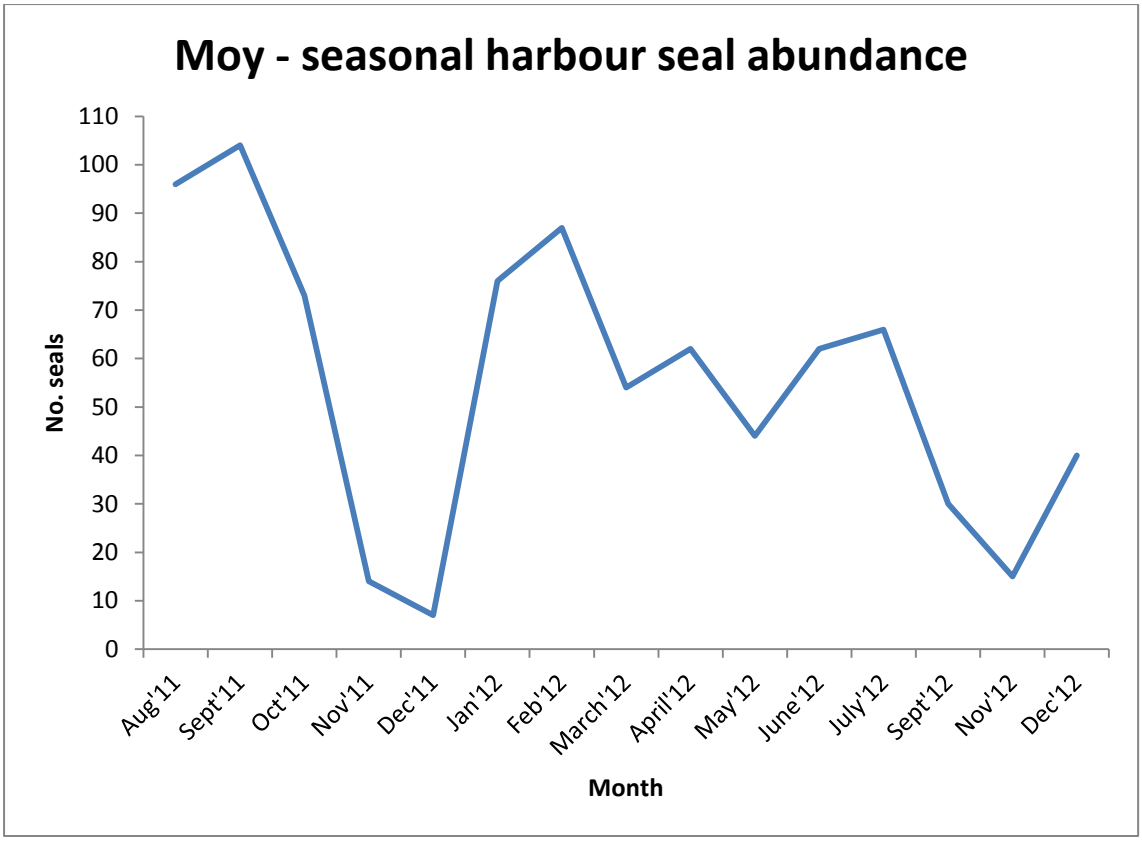

Fig 3. Seasonal pattern of harbour seal abundance in the Moy estuary.

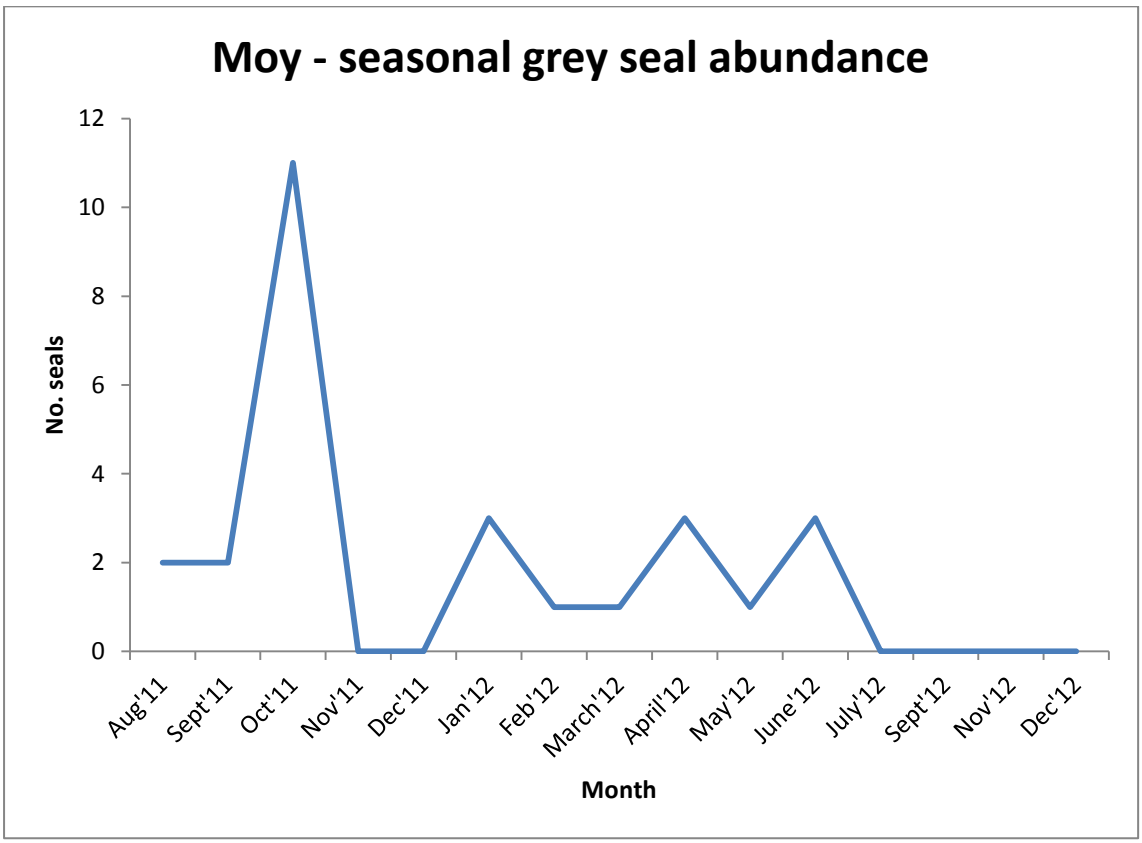

Fig 4. Seasonal pattern of grey seal abundance in the Moy estuary.

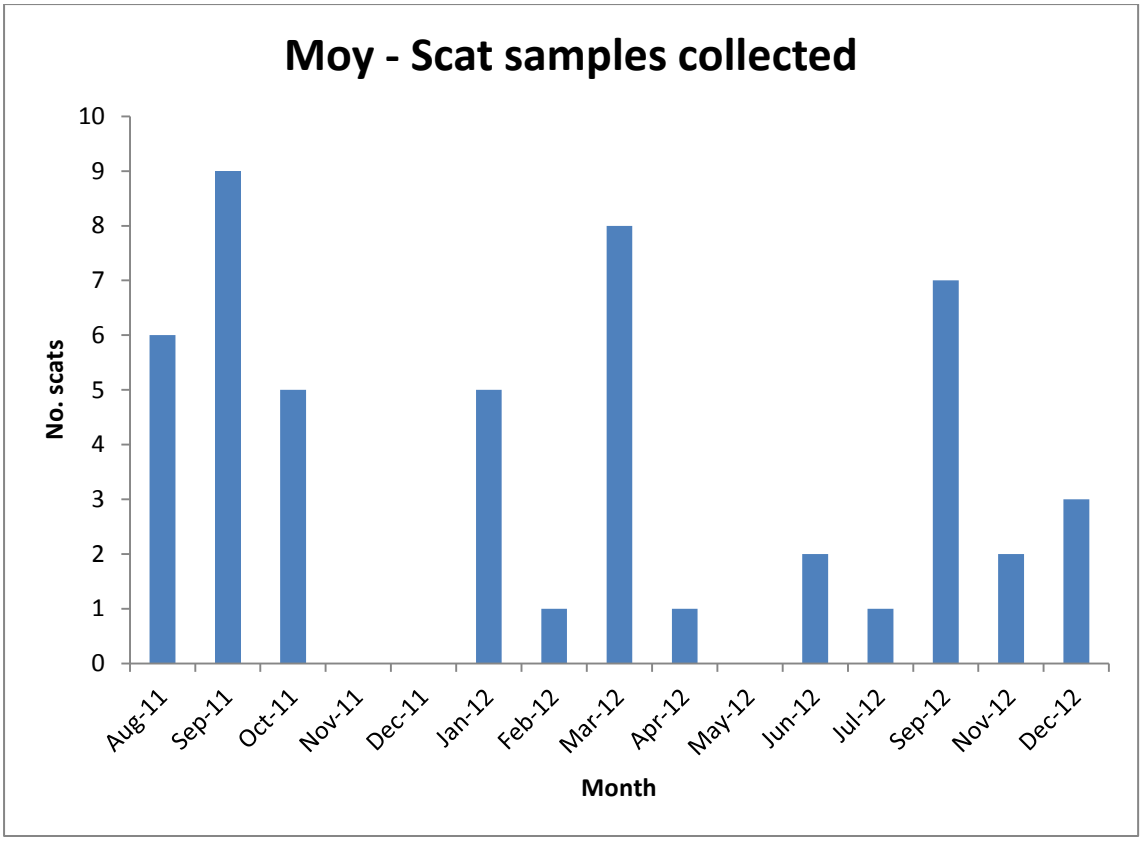

Fig 5. Total number of scat samples collected over a 15 month period from the River Moy (n=50).

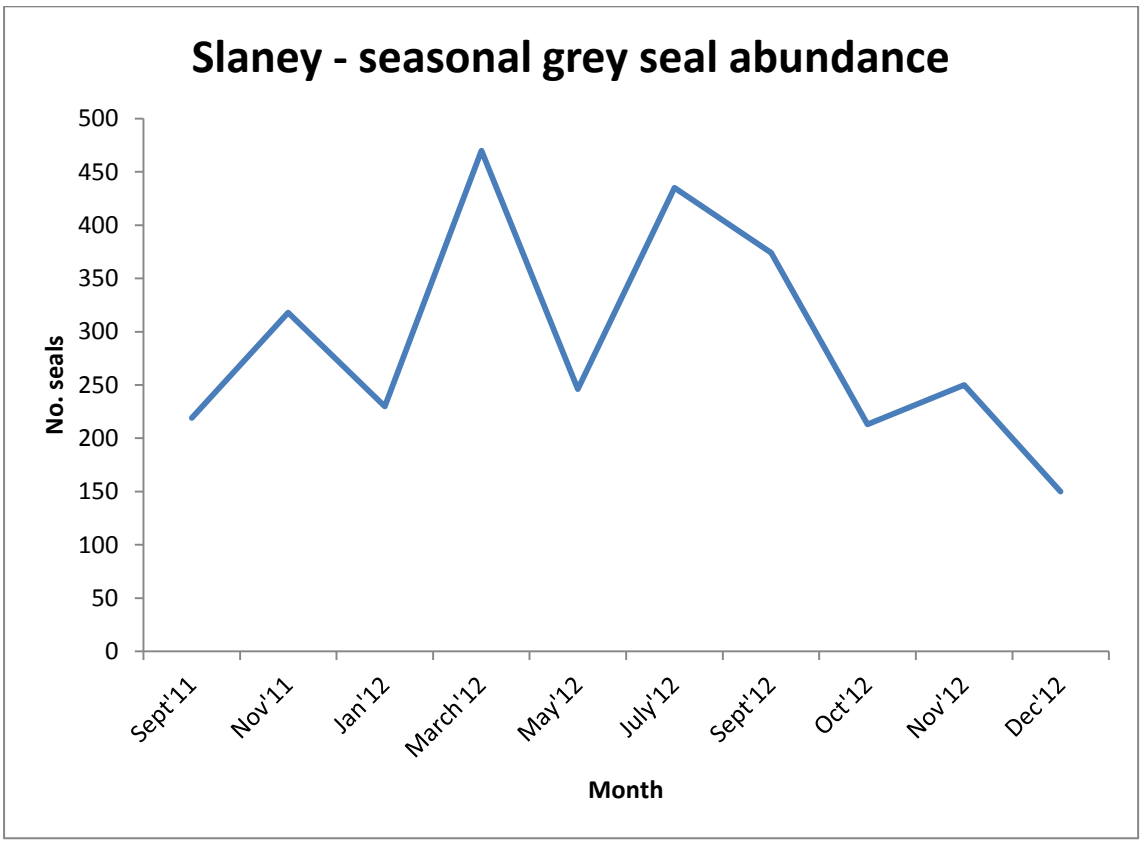

Fig 6. Seasonal pattern of grey seal abundance in the River Slaney.

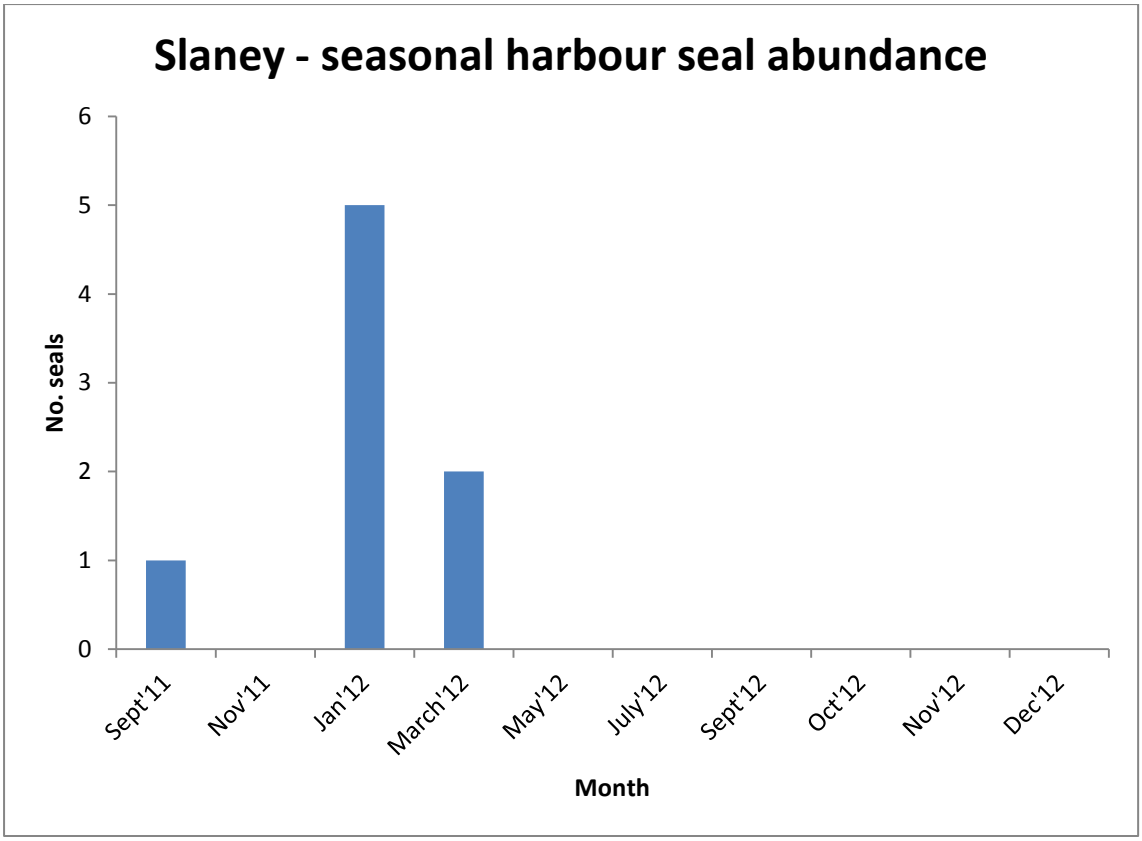

Fig 7. Seasonal pattern of harbour seal abundance in the River Slaney.

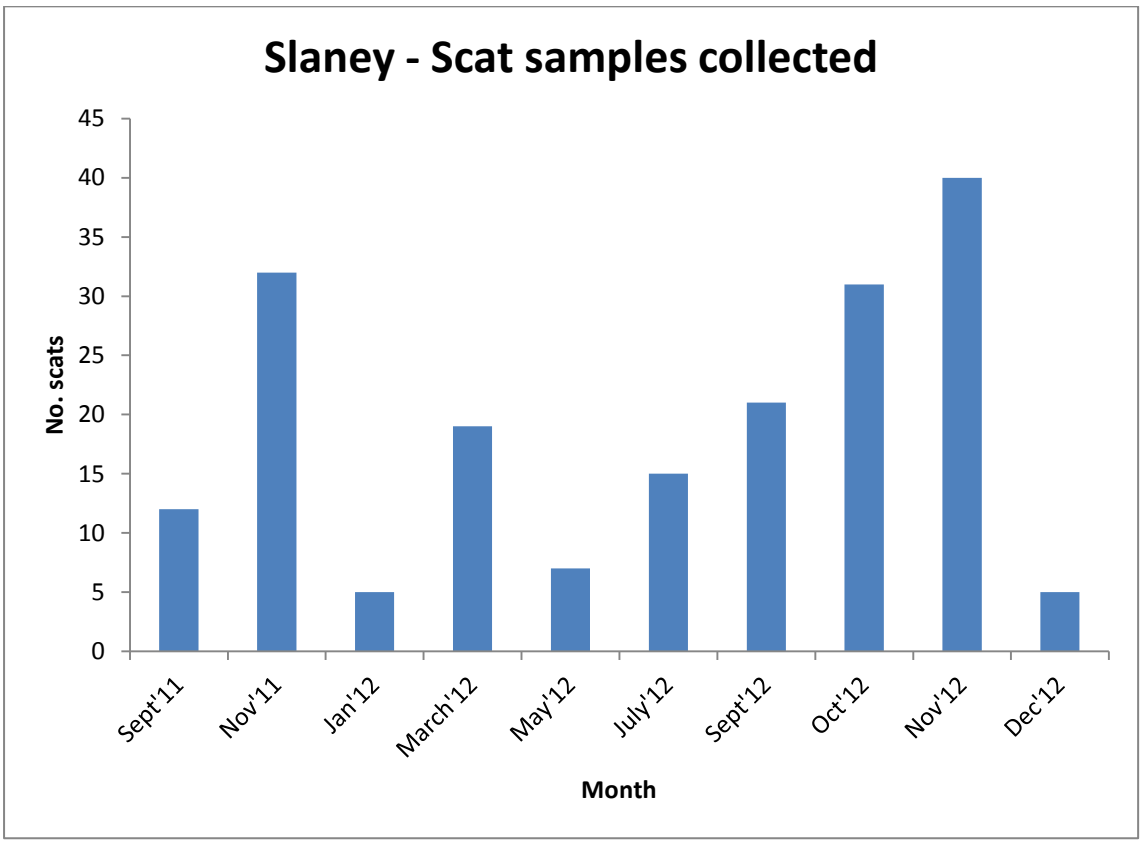

Fig 8. Total number of scat samples collected over a 10 month period from the River Slaney (n=187).