

# Deer carcasses, scavengers, soil nutrients and invertebrates

Scott Newey

[\(scott.newey@hutton.ac.uk\)](mailto:scott.newey@hutton.ac.uk)

Justin Irvine, Debbie Fielding, and  
Rene van der Wal



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# Outline

- Introduction, background and why?
- Studies and approaches used
- (Preliminary) Results
  - Vertebrate Scavengers
  - Soil Nutrients
  - Invertebrates
- Summary



# Introduction: Red deer



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*“Iconic”* species



*“Pest”* species

- Culturally, economically and ecologically important
- National herd ~ 360,000 – 400,000



# Mortality, biodiversity, culls and venison

Sport shooting & culling mortality ~ 15%





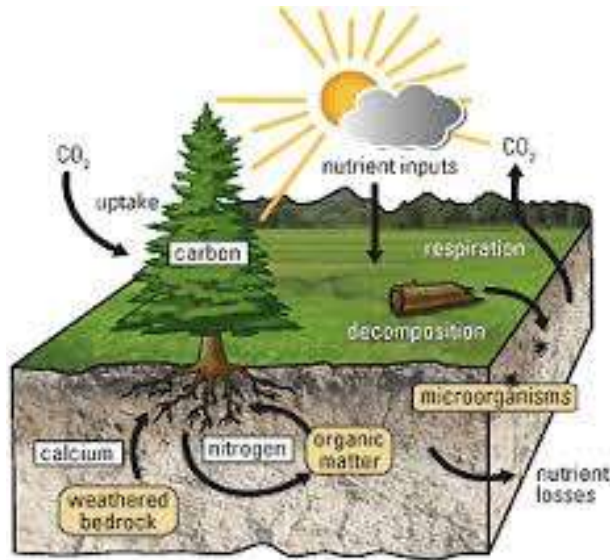
# Mortality, biodiversity, culls and venison

Natural mortality ~ 1%





# Carrion and carcass provisioning



- Reduced amount of carrion in the landscape  
loss of nutrients and energy  
break down in nutrient cycling  
loss of fertility  
decline in scavengers



- Carrion provisioning  
restore ecosystem processes  
as a conservation tool



# Carcass provisioning and controversies

38 DEGREES  
people. power. change.

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## STOP THE JOHN MUIR TRUST FROM MASSACRING OUR SCOTTISH RED DEER.

Campaign created by  
**Patricia Filmer-Sankey**

TO: PAUL MONAGHAN MP

Please stop the John Muir Trust from killing any more Red Deer in Assynt and Knoydart.

### Why is this important?

Red deer are native to our wild lands and one of the many reasons why tourists and cash rich stalkers come to visit these generally economically disadvantaged areas. The Red Deer are beautiful majestic animals and must be managed in a way as to assure there is a viable population for all. JMT preach "deer management" which to them means kill on sight to



NEWS

### Call to investigate Highland deer cull after dozens of carcasses are left to rot on hill

23 December 2016, by Colum Ross

92 comments



The JMT said thousands of deer die a painful death of starvation every year on hillsides because of overpopulation - and that the gamekeepers were trying to "deflect attention" from scrutiny as Scotland ponders greater land reform.

The Scottish Government has been urged to investigate claims a conservation charity left dozens of deer to rot on a Highland hillside.

NEWS

### Fresh clash in Highland deer cull row

14 January 2016, by Colum Ross

0 comments



The JMT said thousands of deer die a painful death of starvation every year on hillsides because of overpopulation - and that the gamekeepers were trying to "deflect attention" from scrutiny as Scotland ponders greater land reform.

### Gamekeepers angered by John Muir Trust deer cull



The SGA is calling on the Scottish Government to investigate claims that the John Muir Trust left

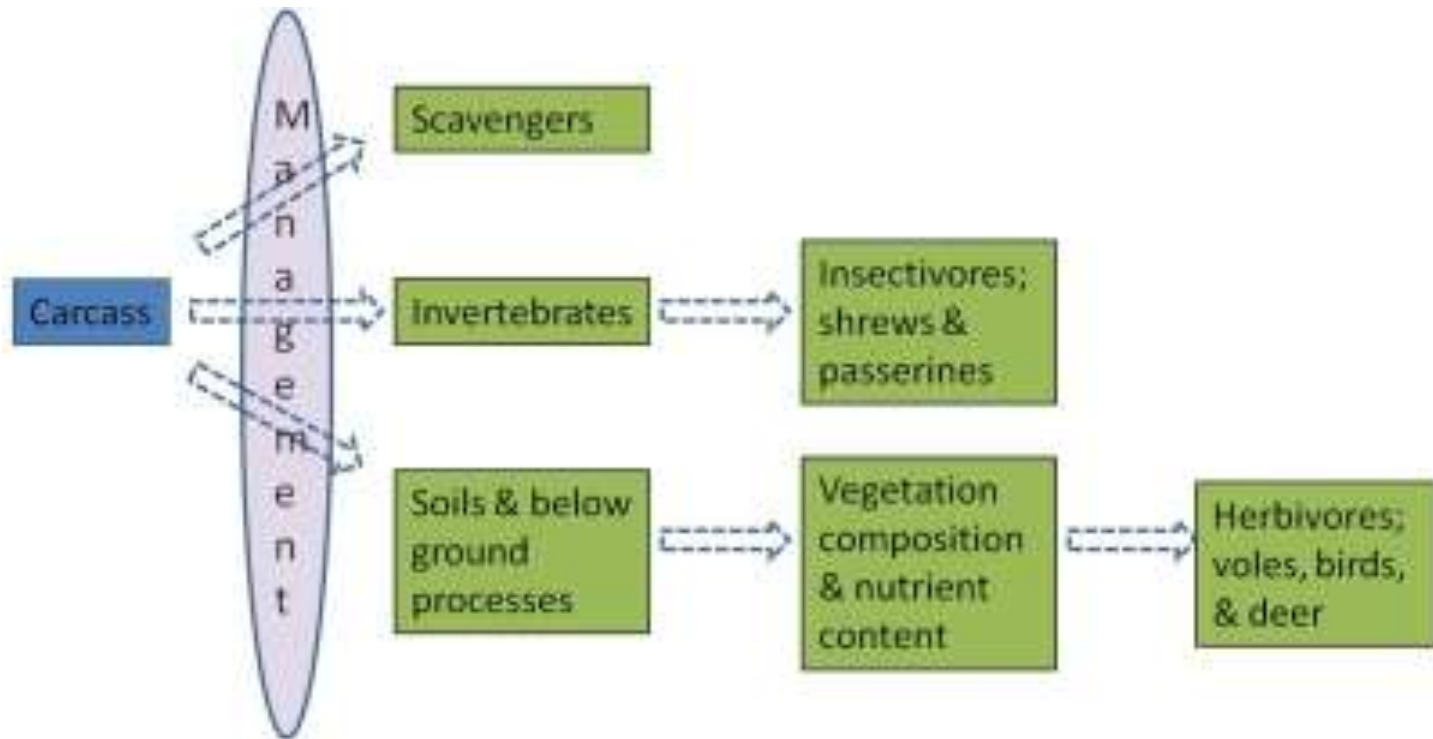




# Effects of deer carcasses on upland food webs

Three complimentary but independent questions:

1. Do, and if so what, scavengers use deer carcasses?
2. What are the spatial and temporal effects?
3. How does land management influence carcass decomposition?







# Approaches and studies



- Motivations for carcass provisioning
  - Fielding *et al.* (2014) *AMBIO* 43(6) 810-891
- Cross-sectional study
- Intensive carcass placement study
- **Extensive carcass placement study**
  - vertebrate scavengers
  - invertebrates
  - vegetation,
  - soil microbes
  - soil fungi (mycorrhizae)
  - soil nematodes
  - soil nutrients



# Extensive carcass placement study

- Six study sites; 2013-2015
- Different land management objectives



# Animal species using carcasses

Species/Management	Legal predator control	No predator control
Crow/Raven	+	+
Buzzard	-	+
Short-eared owl	+	+
Golden eagle	-	+
Fox	+	+
Pine marten	-	+
Stoat/weasel	-	+
Badger	-	+
Otter	-	+
Cat (unknown sp.)	-	+





# Effects of land management

3-4 months after placement

No predator  
control



Predator  
control



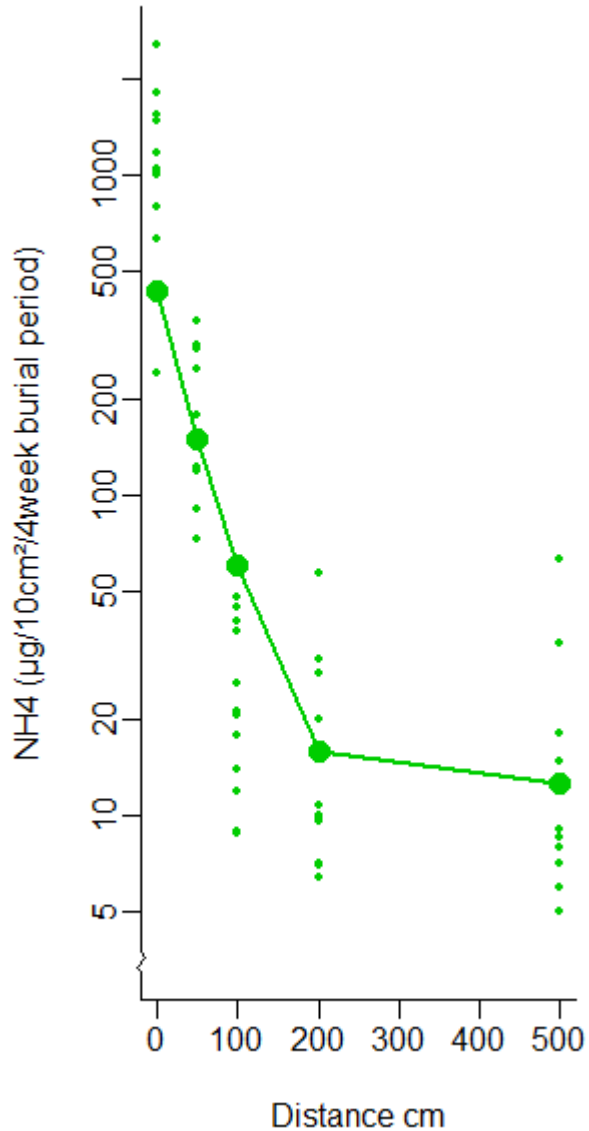


# Soil nutrients

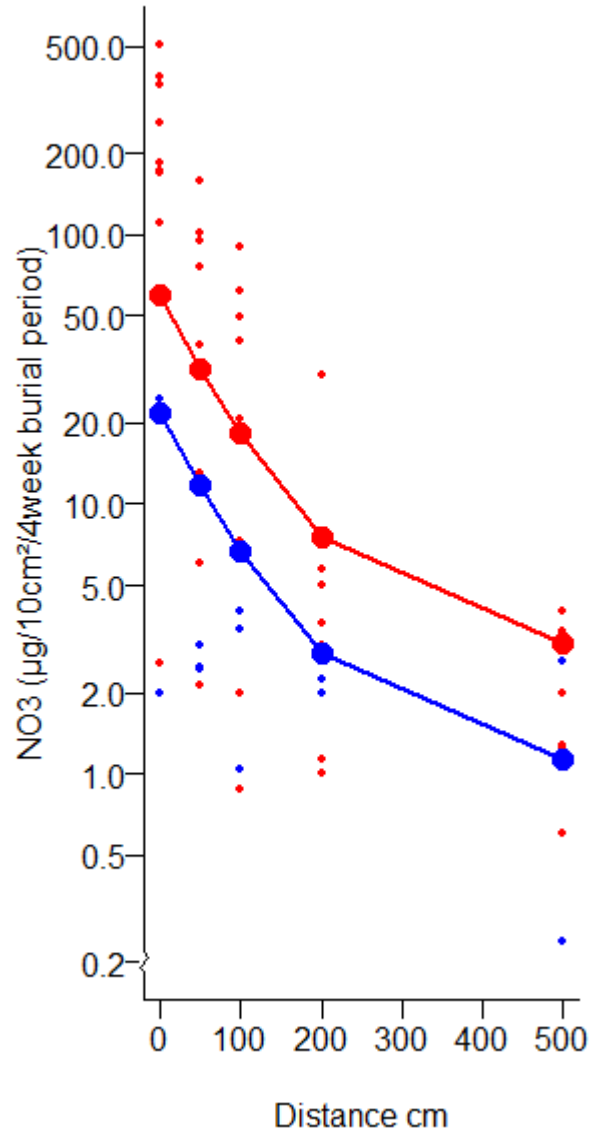


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### Ammonium - First Spring



### Nitrate - Second Spring

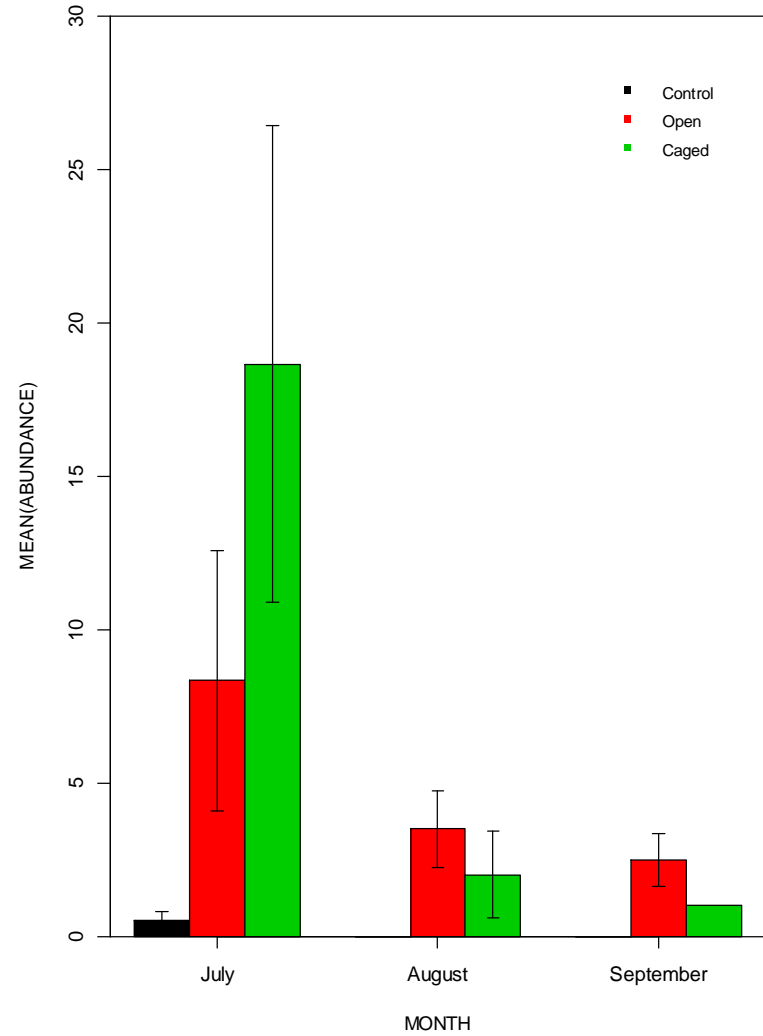
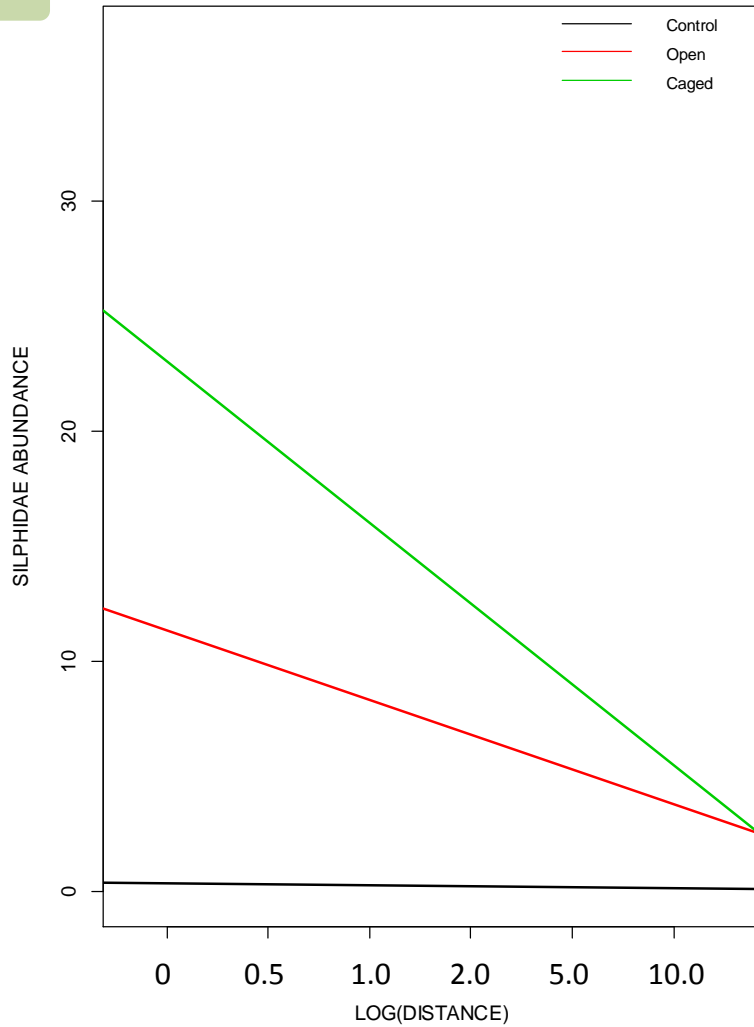




# Invertebrates: Silphidia



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# Summary and conclusions

- There is national and international interest in carcass provisioning as a rewilding and conservation tool.
- Controversial and benefits and disbenefits have not been quantified.
- A range of vertebrate scavenger species visited carcasses, though population level effects remain unknown.
- Land management effected the species detected and the decomposition of carcasses.
- Carcasses appear to have a large and spatially limited effect on soil nutrients, and invertebrate communities and abundance.



Thank s to all those who have helped during the project, and to all the estates that provided access and assisted with this study.

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The Scottish  
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# Thank you !

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