Use of GPS collars to assess the effect timing of post-partum upland grazing has on ewe home range area

EAAP Mountain Livestock and Grassland Conference

17/06/2026

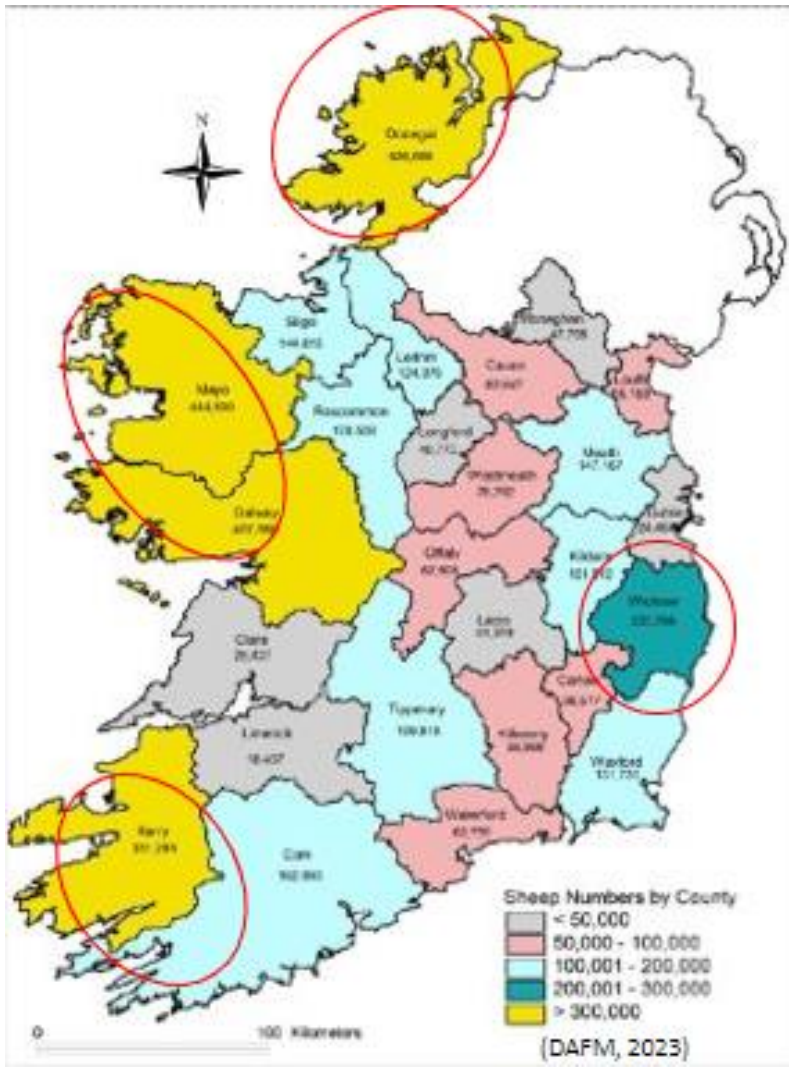
M.P. Dever[1,2], F.P. Campion[1], A. Mclaren[2], C. Morgan-Davies[2]

[1] Teagasc Animal and Grassland Research and Innovation Centre, Mellows Campus, Athenry, Co. Galway, Ireland

[2]Scotland's Rural College, Hill & Mountain Research Centre, Kirkton Farm, Crianlarich, FK20 8RU, United Kingdom

Sheep farming in Ireland

- 2.49m breeding ewes in 2025 (DAFM, 2025)
  - 2 main systems
    - Hill or Lowland



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Hill sheep farming

- Focus is on extensive grazing on the hill
- Lowland is prioritised for ewes
  - Lambing and mating
- Farms report a weaning rate of 0.9-1.1 lambs/ewe/yr*

*TEAGASC. 2025. *National Farm Survey Farm Enterprise Dashboards* [Online]. Teagasc Website: Teagasc. Available: https://teagasc.ie/rural-economy/rural-economy/national-farm-survey/enterprise-factsheets-and-dashboards/ [Accessed 2026].

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Hill sheep farming

- Lambs sold off farm to other farmers post weaning
- Approx. 300,000 store lambs produced from hill systems each year
- Farmers are becoming reluctant to put ewes to hill after lambing, fearing a perceived loss in lamb performance

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Home range

- Area of land sheep occupy for food, shelter and water
- Also known as a “heft”
- Learned behaviour exploited by hill farmers to keep sheep in a large unfenced area

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Hill abandonment

- Perceived loss in lamb performance drives a reluctance to stock the hills for financial and time reasons
- Leads to inadequate grazing of hill during peak summer grass growth
  - Increase in rank vegetation
  - Reduces biodiversity of the hill as habitats smothered
- Loss of “Heft” both in the sheep and farmers*
  - Ewes can’t pass on knowledge of the hill
  - Farmers themselves stop teaching the next generation
- Anecdotal evidence from the SUAS EIP reported that earlier grazing of the hill by ewes with lambs at foot resulted in improved grazing of hill vegetation without a reduction in lamb performance

*O’Rourke, E. (2019). "Drivers of Land Abandonment in the Irish Uplands: A Case Study." European Countryside **11**(2): 211-228.

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Hill abandonment

Main research questions

- How does pre-weaning hill grazing affect the ewe's grazing behaviour and hill ecology?
- Does earlier reintroduction of ewes to hill grazing post-lambing improve their utilisation of hill vegetation?

Objective:
To test the accuracy of GPS location data in tracking ewe grazing behaviour

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Tracking ewe grazing behaviour

- Ewes released to the hill in three treatment groups
  1. **T4**: four weeks post mean lambing date
  2. **T8**: eight weeks post mean lambing date
  3. **T10**: 10 weeks post mean lambing date

- **T4** released to hill grazing on the 12th of May
- **T8** released to hill grazing on the 10th of June
- **T10** released to hill grazing on the 26th of June

- Data collection ended on the *11th of August* when all ewes gathered in to wean the lambs.

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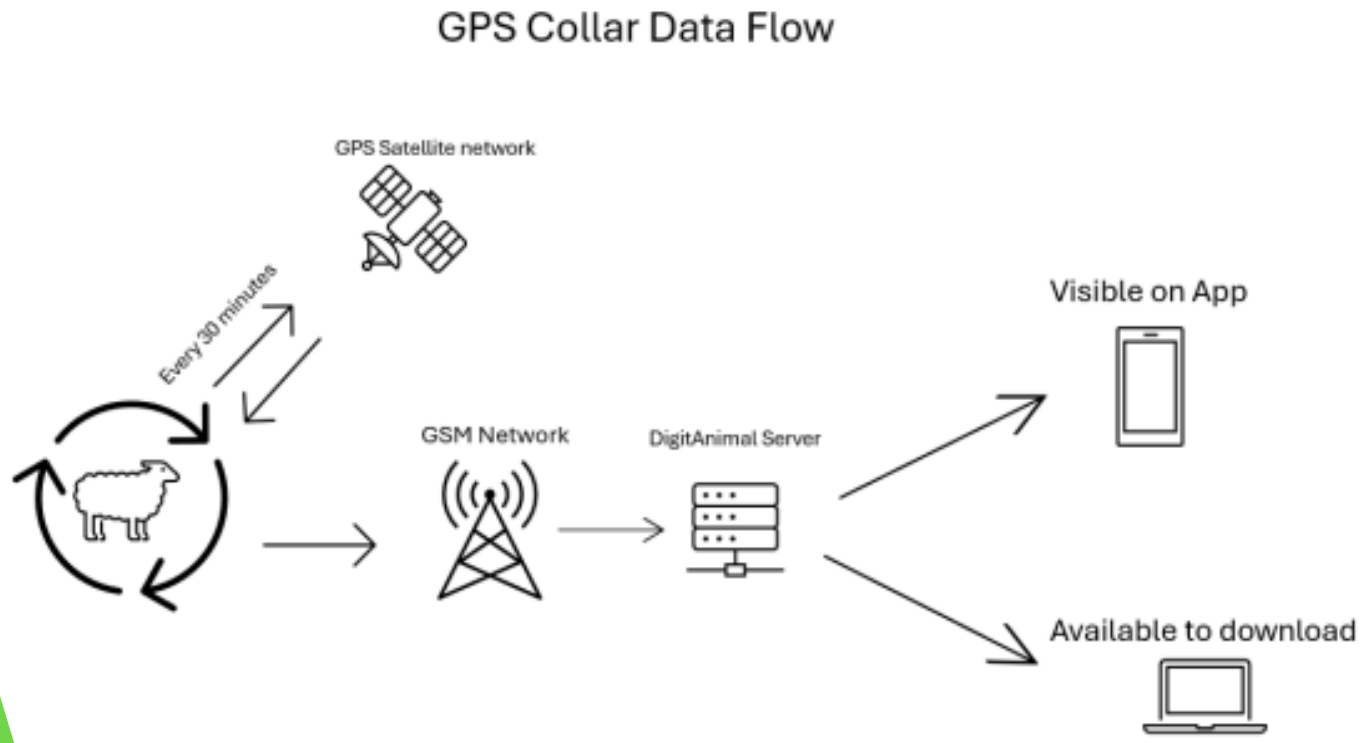
Tracking ewe grazing behaviour

- All ewes equipped with DigitAnimal GPS collars
  - Collect location fixes every **30 minutes**
    - Can be changed to suit system
  - Transmit data using GSM



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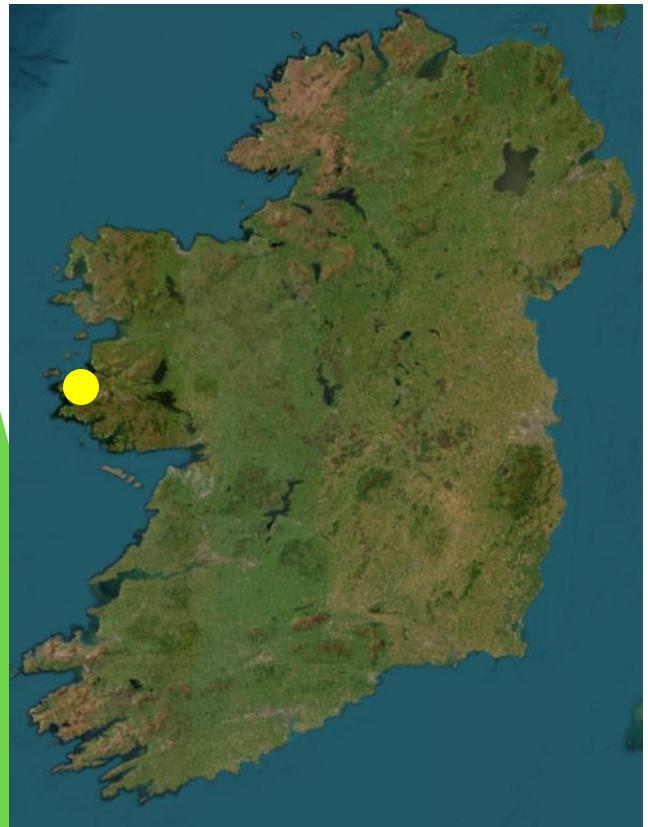
Location of hill farm used in study

- Located in the west of Ireland
- Commercial hill farm participating in the Teagasc BETTER Farm programme
- **47ha** fenced hill bordered by the sea on the northern boundary



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Initial cleaning of location fix data

- 93000 location fixes collected from May to August
- 64060 (69%) available after initial cleaning pass
- 95% Kernel Density Home range generated on ArcGIS

Period: 14th July to 11th August

Treatment Group	Raw Points	Available Points	Home Range (ha)
T4 (n=12)	12997	9550 (73%)	20.60
T8 (n=13)	14457	10909 (75%)	16.61
T10 (n=12)	13938	11459 (70%)	16.96

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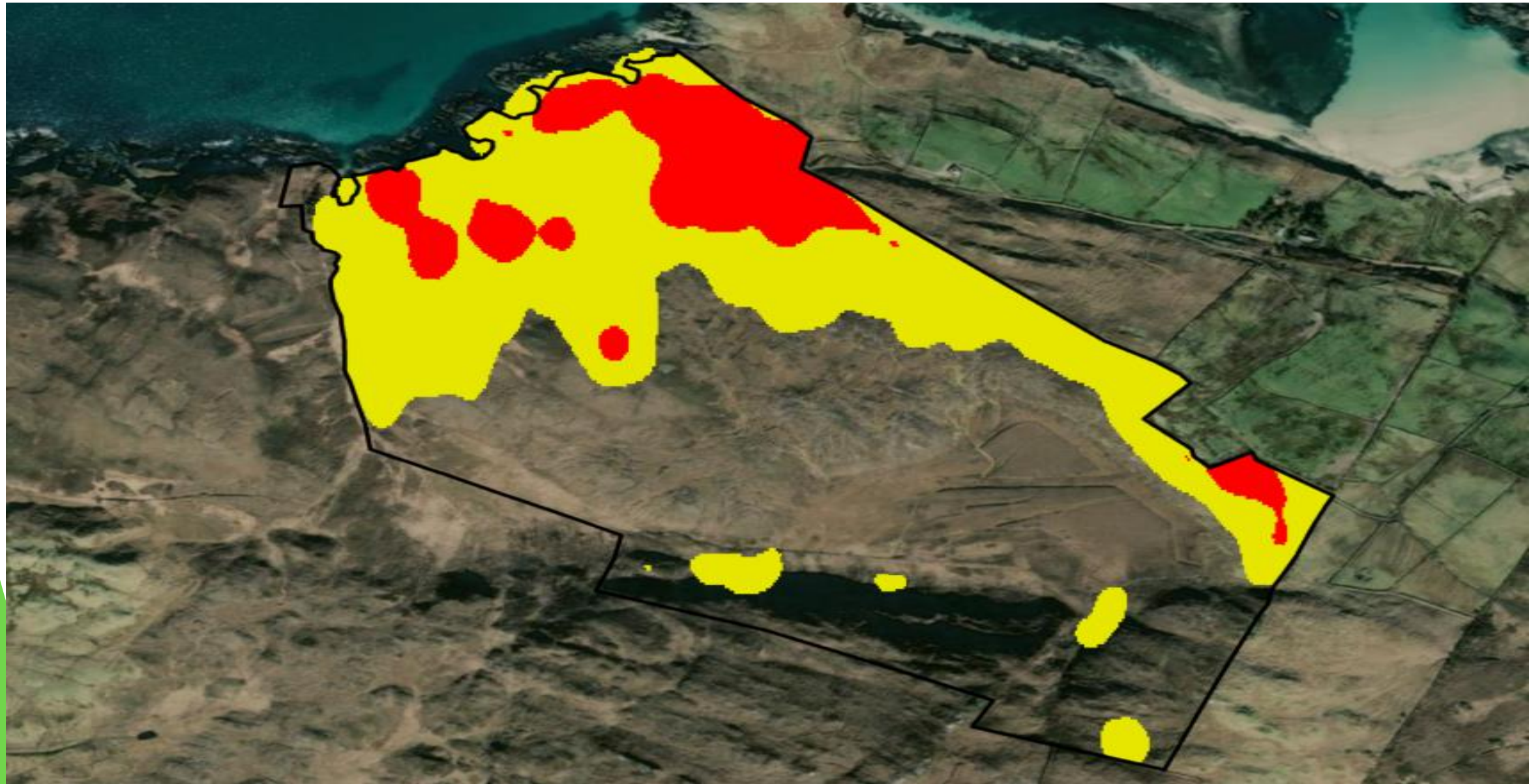
Initial cleaning of location fix data

T4: 95% Kernel Density Map
July 14th to August 11th



Assessment of collar location fix accuracy

- Collars placed at 5m fixed point intervals 70cm from ground level
- All collars tested for 48 hours
- Mean geodesic distance from fixed point measured on ArcGIS using *"generate near table"* tool

2025 Treatment Group Collars	Mean Distance (m)	SEM
T4 (n=12)	17.6	1.21
T8 (n=13)	18.5	1.03
T10 (n=12)	18.9	1.10

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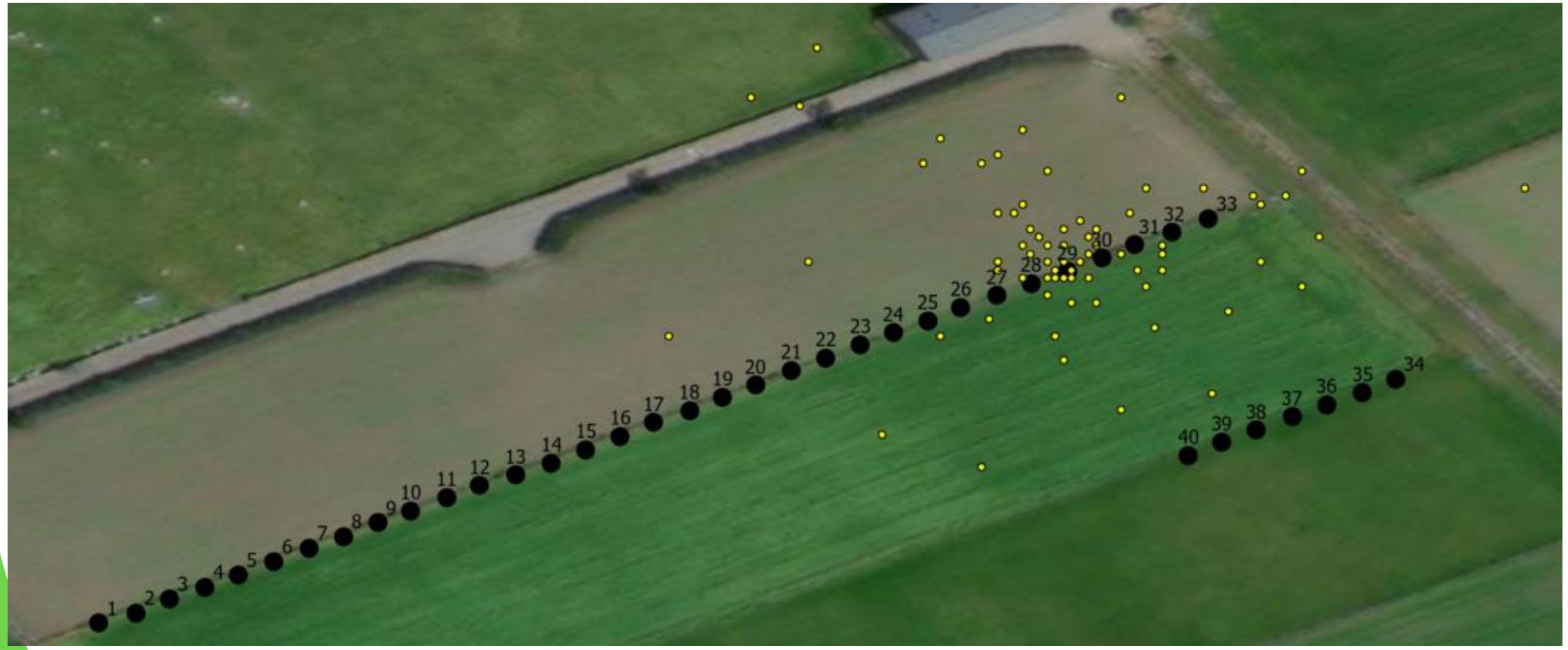
Assessment of collar location fix accuracy



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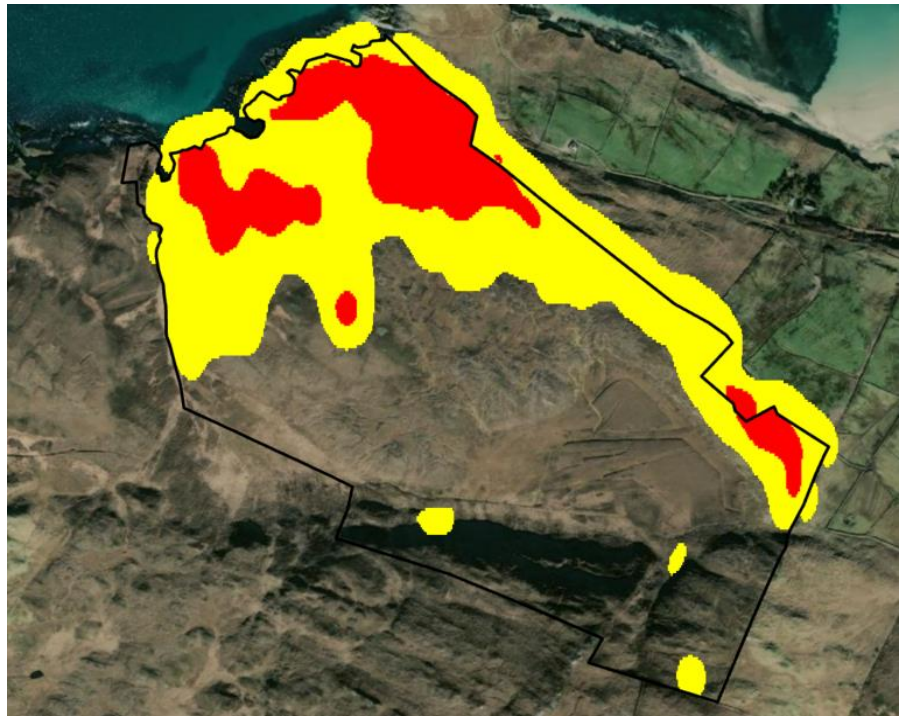
Results post assessment of collar location fix accuracy

- Treatment group mean used to add a buffer zone to hill boundary to refine cleaning protocol
- Same method used to generate Home Range

Period: 14th July to 11th August

Treatment Group	Raw points	Initial clean	Post calibration	Initial area (ha)	Post calibration area (ha)
T4	12997	9550 (73%)	11203 (86%)	20.60	23.96
T8	14457	10909 (75%)	12476 (86%)	16.61	19.32
T10	13938	9704 (70%)	11459 (82%)	16.96	19.76

T4 95% Kernel Density Map
July 14th to August 11th



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Conclusions

By conducting an assessment of collar location fix accuracy, the amount of points available for analysis increased, increasing the accuracy of the location data used to track ewe's grazing behaviour while hill grazing.

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Thank You

michael.dever@teagasc.ie