



SPOTTA

Smart Pest Systems

Hylobius real-time monitoring 04/2022

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Context

- Spotta has worked in partnership with Scotland's top forestry experts to develop a breakthrough monitoring technology for *Hylobius abietis*.
- In the field, the system has demonstrated that:
 - It can save significant costs that far exceed the cost of the system.
 - It provides real-time data that inform operational decisions at the office.
 - After deployment, it requires minimal maintenance.
 - It is more effective than current monitoring methods.
- The system can be deployed at a scale of thousands of hectares in spring 2023.



Impact of remote monitoring for Forestry and Land Scotland

48%

Reduction in
insecticide use

3,400

Fewer site visits
per year

765,000

Fewer saplings lost
to Hylobius, per year

Average of estimates made by FLS's own forest managers if
deployed across 5,000 hectares



Financial impact

Cost/benefit

- For average to high activity site Spotta's system offers a significant cost saving on the establishment costs for a site
- For low-activity sites the system is cost neutral or offers a small cost saving

Planning

- Expensive processes, such as top up sprays can be avoided or at least predicted much earlier in the season
- Large reductions in tree mortality through earlier warning of weevil activity.
- Re-deploy forest managers to plant saplings on new sites.



Operational impact for FLS

Establishment efficiency

- Reduction in average fallow period from 3.4 to 3.0 years (FLS estimate)
- Reduction in average establishment time through reduced tree mortality (FLS estimate)

Forecasting benefit

- Know months or weeks in advance of needing to intervene, rather than days
- Send contractors exactly where they are most needed

Hard evidence to justify insecticide use

- The system provides hard evidence of weevil activity
- Strong proof for justifying use of insecticide, where this is necessary





<https://youtu.be/U1oMBUBvz3s>

The System

Pods and gateways
A fleet of smart monitors

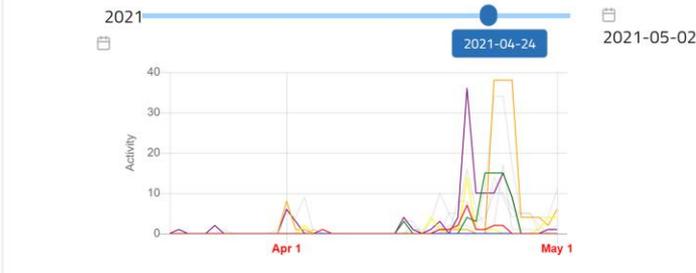
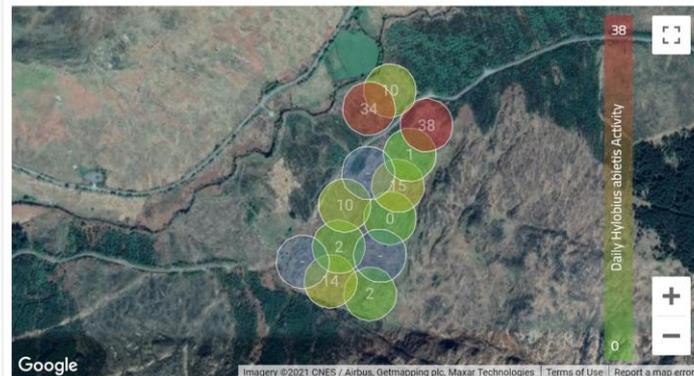


SPOTTA

Sign out

- Dashboard
- Alert History
- Sites
- Pods
- Spare Pods
- Gateways
- Uptime Monitor
- SETTINGS
- Your Account
- All Users

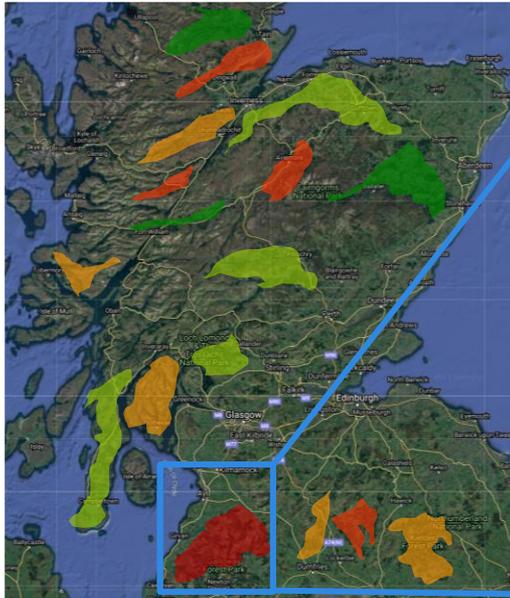
HYLOBIUS ABIETIS ACTIVITY IN 15070 QUEENSWAY



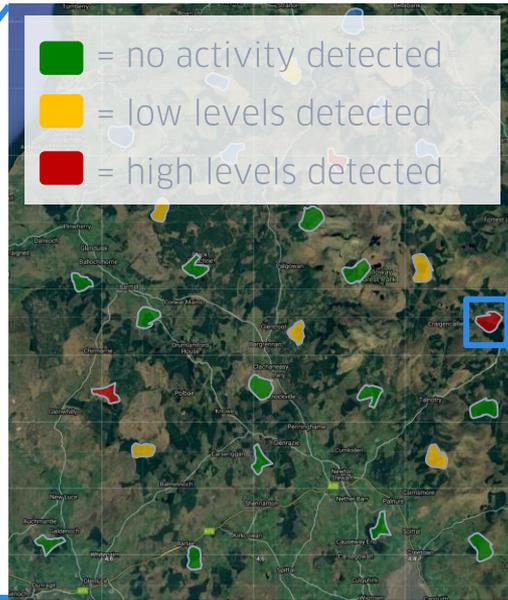
Online console
Data analysed and presented online



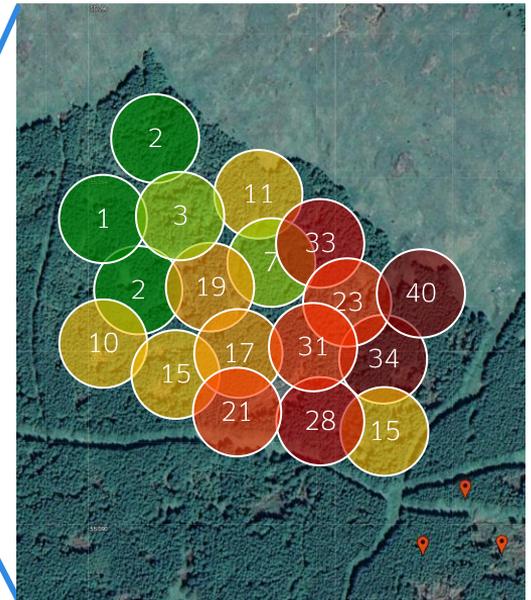
Planning operations across sites in real time



The system can be deployed at sites spanning a very wide area



Your team assesses weevil activity across sites and plans where / when to deploy operatives and equipment.



Within a site, a forest manager can target actions to specific areas.



If you could see exactly where and when weevils are active on all your sites in real time, how would this change or improve management practices nationally?



Key information for the sites in the following charts

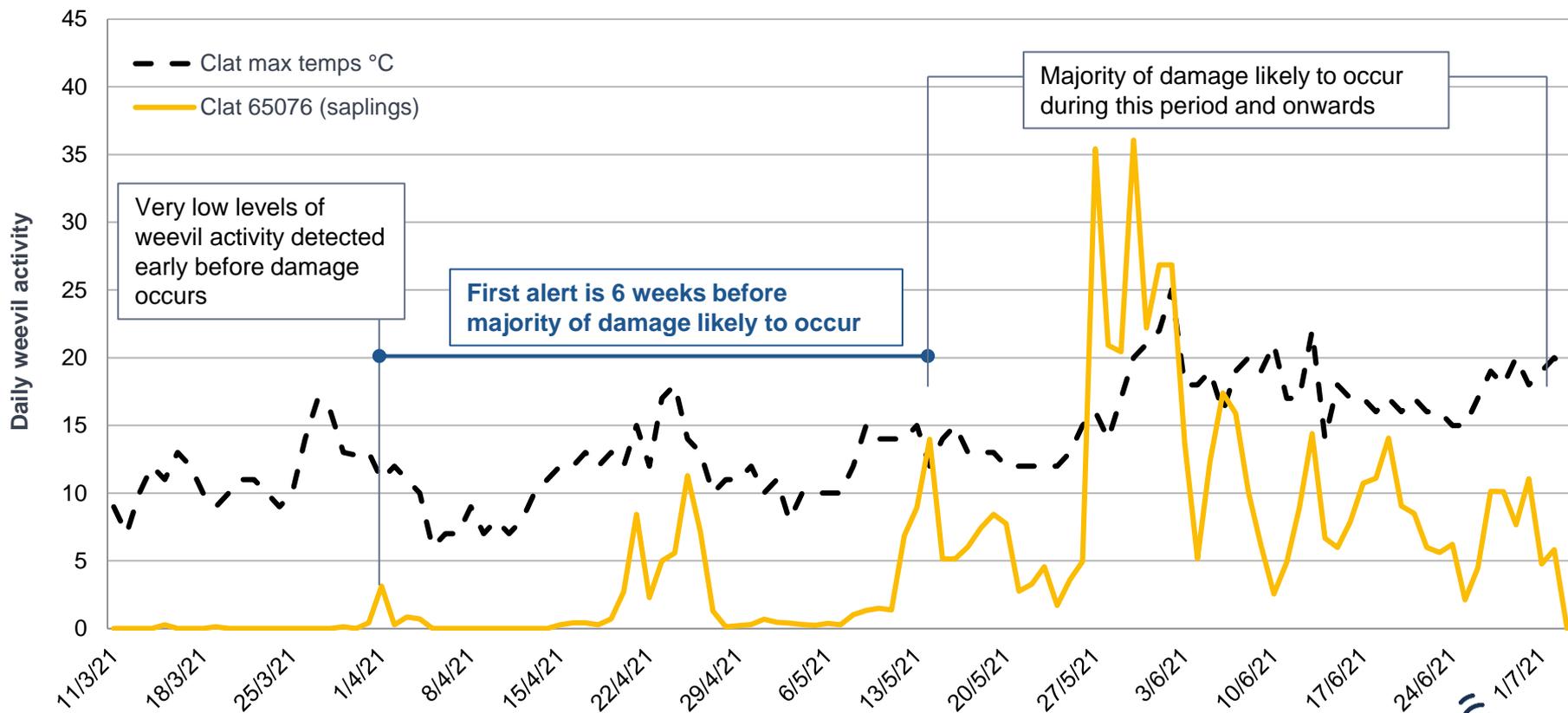
Coupe	Block	Grid reference	Fell date	Felled area (ha)	Restocking information
65076	Clatteringshaws (Clat)	NX 5265 7436	Nov 17 to Jan 18	18.1	Restocked with sitka spruce in October 2020
15070	Queensway	NX 5044 7180	Oct 17 to Jan 18	13.8	Restocked with scots pine and mixed broadleaves in December 2020
65035	Clatteringshaws (Clat)	NX 5232 7964	Oct 19 to Jan 20	13.6	Planned 2023
89001	Eriff	NX 4924 9971	Sep 18 to Mar 19	27.9	Planned 2022
26029	Girvan	NX 3254 7785	Oct 18 to Jan 19	10.6	Planned 2022

Charts on the following pages
use this colour code:

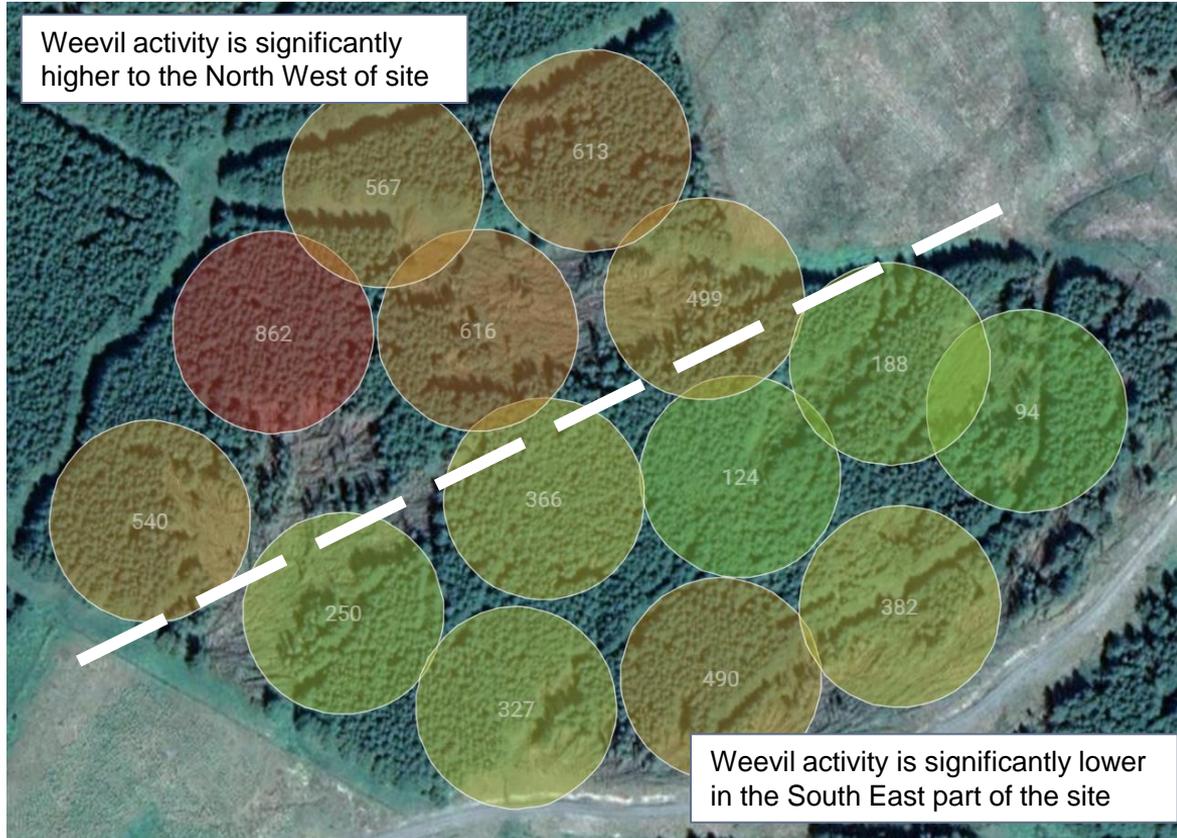
-  Clat 65076 (saplings)
-  Queensway 15070 (saplings)
-  Clat 65035 (fallow)
-  Girvan 26029 (fallow)
-  Eriff 89001 (fallow)



Detecting emergence: Average daily weevil activity at an FLS site in Scotland



Finding problematic areas: Spatial variation of activity to 8th July at one site



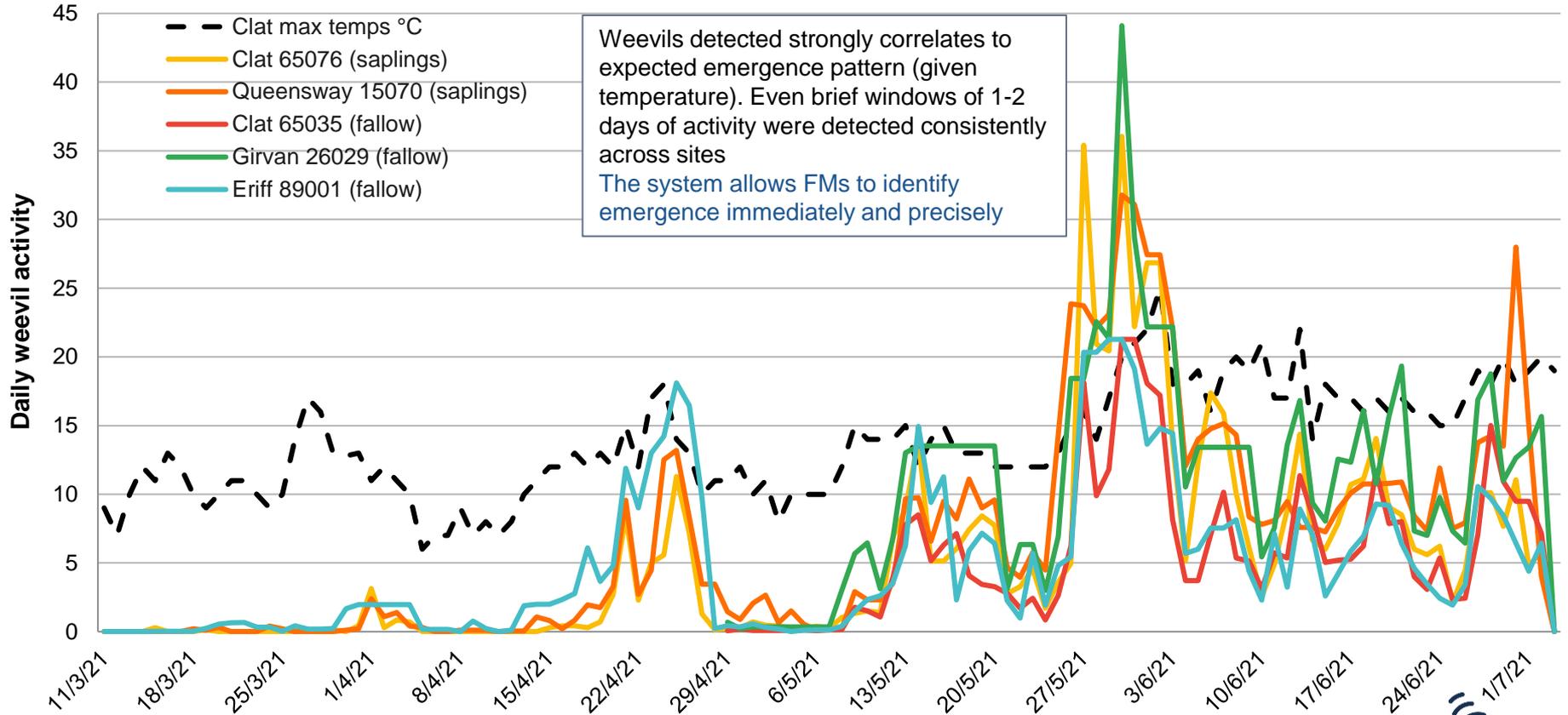
Circles represent approximately one hectare. Numbers represent cumulative weevil activity detected.

Without this information, a damage survey may have been done at the South East part of the site, which is easiest to access.

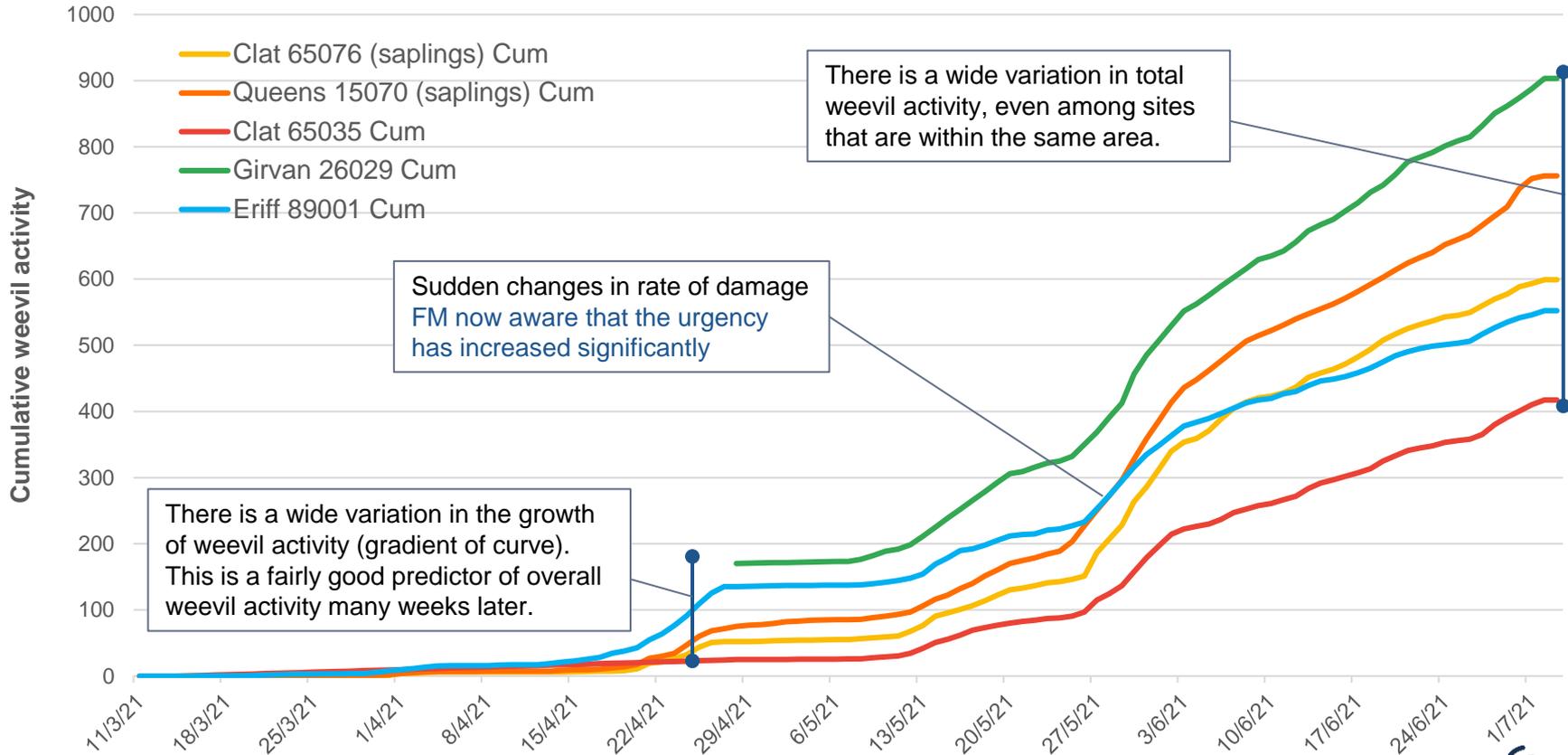
However, with this information foresters would know the activity levels from the office and could choose to focus control measures to the North West part of the site.



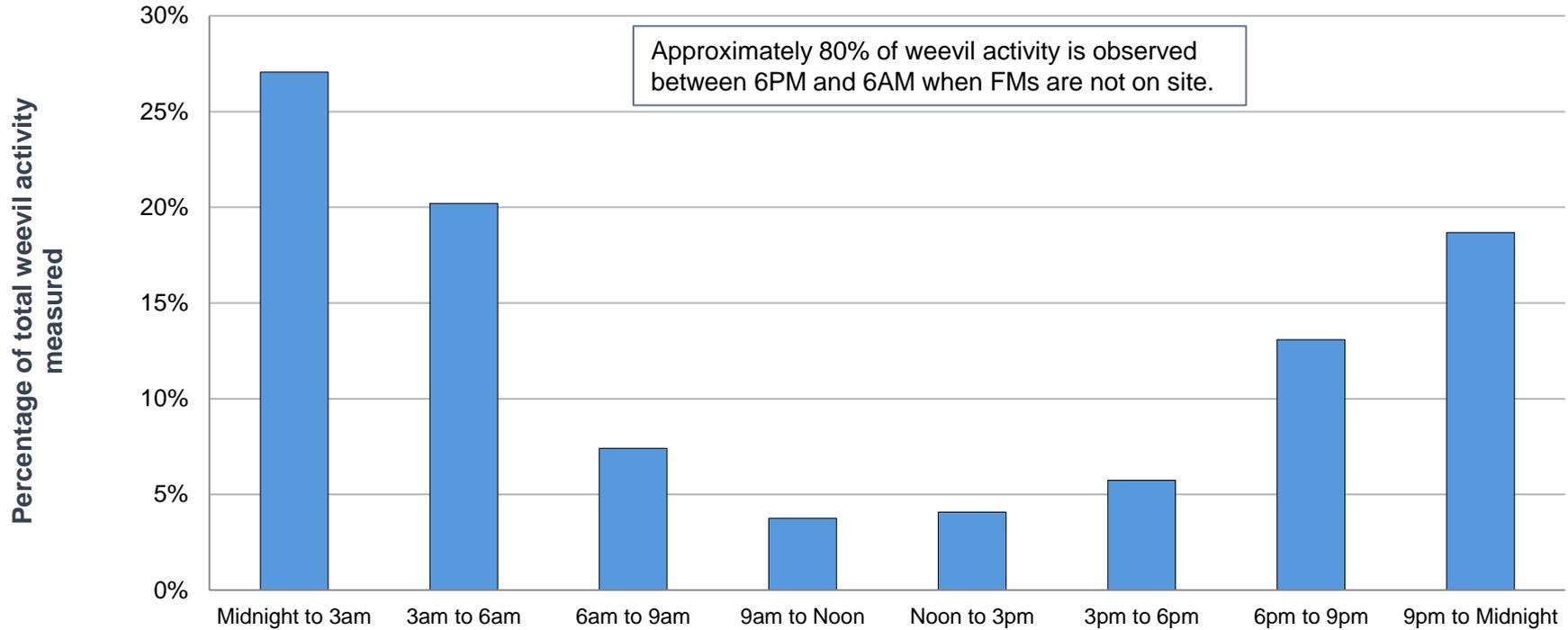
Average daily weevil activity across five sites in Scotland



Comparing cumulative weevil activity across five sites in Scotland



Activity overnight: Activity across all sites from 16th March to 10th May



How does the system help?

At the site level it tells you:

- When do weevils start to become active on each site?
- Where are weevils active on each site?

At the regional or national level it tells you:

- Which sites see weevil activity soonest, next, latest?
- Which sites have the highest levels and fastest rising levels of weevil activity?

At a **national** level, government agencies can decide:

- What actions to take against *Hylobius*.
- Where the actions are needed most urgently.
- When the actions should take place, so that they are optimized.





Conclusion

Cost savings / cost neutral depending on operational model

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Huge insecticide reduction

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Significant saving of FM and contractor time

- time freed up to establish new sites

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Predict and plan operational requirements much earlier