Sheep GENETICS

THE BREEDER'S BULLETIN

2022 PLANNER: Check out all the analysis dates and coming events!

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MANAGERS REPORT - Gus Rose

Thank you for your support during 2021. This year Stephen Field and Fiona McLoughlin were awarded with 20 years' service to MLA highlighting the important contribution they are making for the industry. We are also back to a full team with Gabrielle Sherring and Chloe Bunter joining us this year with strong contributions early. Emma McCrabb got a worthy promotion to Senior Development Officer. Nicole Williams and Ermias Zerazion round out the team that have worked hard to continue providing our high quality service.

Our team has had a big year of communication, between Sheep Genetics direct events and other external events, we have reached over 600 people either online or face to face.

Thank you to the Animal Breeding and Genetics Unit (AGBU) for another solid year. You have maintained consistent quality service despite big increases in data and genomics services. AGBU have been working hard in the background to get ready for our big enhancements next year including:

- An updated evaluation using data from our new database pipeline

- Improved analysis that handles the increasing amount of Genotypes

- Updates to Merino and Terminal indexes

Additionally, thank you to the rest of the MLA Genetics team Hamish, Peta, Sarah and Keely for their support with Resource flock, Database Redevelopment and other projects.

In April 2022, we will have a big release of our new database system. This will mean changes to how you upload data and receive results. More information can be found later in this newsletter.

Our office is closed from the 24th December till the 4th January as our team have a well deserved break.

Our last Merino analysis is on the 7th December with the first analysis next year on the 7th January.

The last LAMBPLAN analysis is on the 15th December with the first analysis next year on the 14th January.

Enclosed with this newsletter is a year planner with analysis dates and events for the next year for your reference.

Have a Merry Christmas and a safe new year.

NEW MEMBER WORKSHOP

We will be holding a New Member Workshop via Zoom on the **17th March 2022 at 1pm**. The session will run for one hour and will cover the basics of what is involved in a Sheep Genetics membership, including:

- Getting ASBVs - what goes into your breeding values?

- Getting results - how do I access my breeding values?

- How does genotyping fit?

You can register on the following link:

www.sheepgenetics.org.au/resources/events/new-member-workshop/

Late last year we introduced these workshops to help new members get started, they have been well received. Over the past six months alone we have hosted 4 workshops and reached 50 new clients.

SAVE-THE-DATE!

Sheep Genetics is excited to get back on the road in 2022. There are a few key events that we are excited to provide 'Save-the-Dates' for.

The first big event of the year will be **MLA's Livestock Genetics Forum.** The forum is a two day event, which will be held on the **5th and 6th of April 2022**, at the Adelaide Convention Centre, SA. The event is only the second of its kind, following the inaugural Brisbane event in 2018 (and a postponed attempt in 2020). The program is targeted at sheep and beef producers, and is designed to encourage attendees to see genetics and the associated tools and technologies as a part of the solution to the challenges they face in their businesses.

This event will be run alongside the **SG Service Provider workshop**, which will also be held in Adelaide prior to the larger forum on the **4th and 5th of April 2022.** This workshop is targeted at those who advise and support Sheep Genetics breeders, through services such as data management or genetic advice.

This workshop provides valuable information and training in the tools required to support clients and deliver quality breeding program advice.

Regional Forums are also planned to be run face-to-face again next year, with the team hitting the road to provide breeders with the most up-to-date information about the genetic evaluation. Tentative dates and locations are:

- 11th May - Armidale NSW
- 19th May - QLD
- 24th May - Hamilton VIC
- 2nd June - Adelaide SA
- 9th June - Bendigo VIC
- 23rd June - Wagga Wagga NSW
- WA location is still to be confirmed

The team look forward to catching up with you all over the next 12 months!

NEW E-LEARNING MODULE 'INTRODUCTION TO SHEEP GENETICS'

We have developed an E-Learning module about the basics of a Sheep Genetics membership. The module provides an overview of:

- pedigree
- trait measurement
- management grouping
- linkage
- how genomics fits
- submitting data
- getting results.

If you are a new member or would like to brush up on the basics of ensuring you have good quality data, we encourage you to check it out.

The E-Learning module 'Introduction to Sheep Genetics' can be accessed at:

www.sheepgenetics.org.au/getting-started/key-steps/

SHEEP GENETICS DATABASE REDEVELOPMENT—WHAT IT MEANS FOR YOU

We are excited for you to begin interacting with the new database system when it is released in April 2022 as part of our annual analysis enhancements. There are a number of key benefits of the database upgrade project that Sheep Genetics has undertaken. These include:

- More timely feedback on data submission

- Better user experience when viewing results – this includes flexibility of traits, layout and data display

- Future proofing our Sheep Genetics system which includes making your data more secure

- Using the data you collect better and integrating it with other industry data

Preparing for Launch of the new Sheep Genetics database

To get ready for the launch please read the article on the back page "Get the most out of the search site".

As the Sheep Genetics search site will be the main way that you interact with the database it is important that you have your account set up.

Sheep Genetics are working closely with all software providers. Ahead of the launch of the new database system please make sure that you update your software when their updates are released.

A snapshot of the new import process

You will have more control and feedback on the data that you submit to Sheep Genetics. Breeders and service providers will be able to directly upload files through a new portal on the

website. This portal will provide you with feedback on the data in your file so that you can submit data with confidence knowing what measurements have been included in the database. It will also compare your data submission with previous submissions so that you can see what new data is being added. *See images below.*

Accessing results from Sheep Genetics

What happens now

Currently when you submit data to Sheep Genetics once the analysis has been run you will receive results via PDF reports attached to an email. You only receive these reports if you have submitted data for a run or if you have specifically suggested these be created.

The new results system

When the new database is launched you will be able to access updated result reports every run regardless

Image 1 & 2 - Screenshots of the Importing process

of if you have submitted data or not. When a run that you have submitted a file in is finished and results are available you will receive an email notifying you that you can view results online via the search site. This page is accessible on both desktop and mobile devices. You will be able to view of snapshot of all your reports then deep dive into each of the reports. When accessing results you will be able to:

- Customise your results including genetic trend graphs

- Build your own customisable percentile band table

- View reproduction recording, genomic reports, exclusions, traits recorded report and linkage reports

- Download results for your software

More search site features

Along with the upgrades to the database Sheep Genetics have been working on further upgrades to the search site. These upgrades will mean that you can:

- Access the Ramping Up Genetic Gain Report and Data Quality Score

- View up to 20 traits on a single page

- Print pen cards faster and with better quality

- Update your details including email address, website and phone number

Find out more

Sheep Genetics will be developing a range of material as well as running a series of webinars prior to the release of the new database in April. Please keep an eye on Sheep Genetics communications to register for these events and find out more.
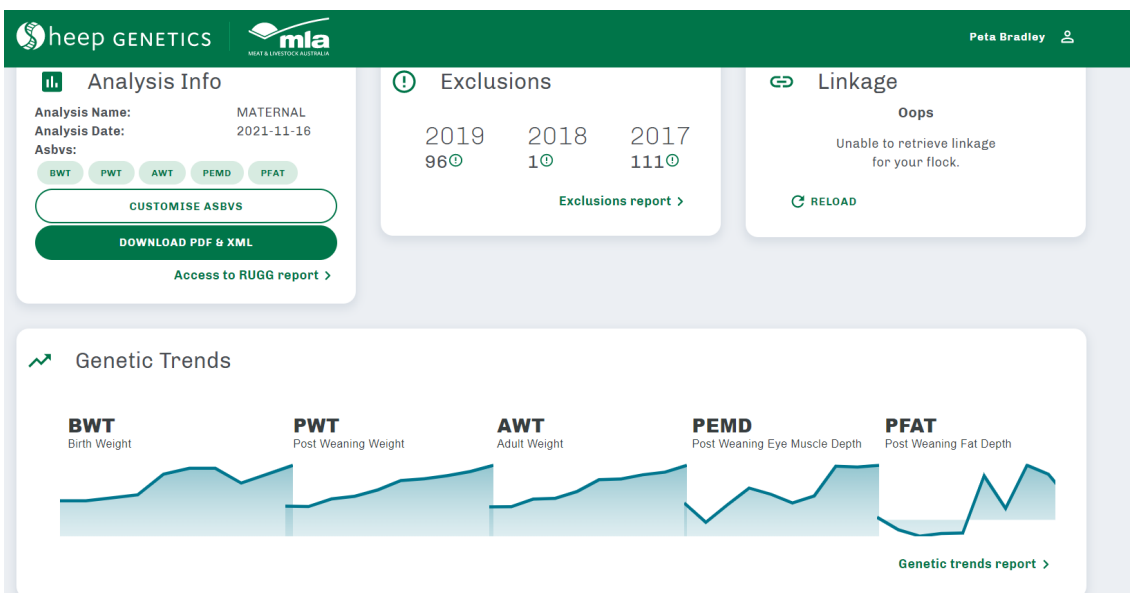

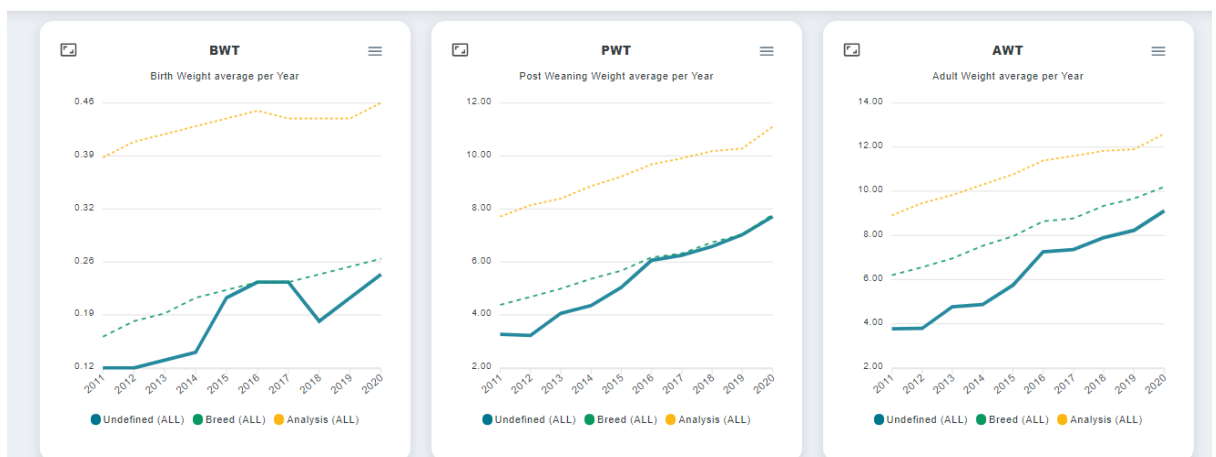**Image 3 - Screenshots of the results overview page**

Image 4 - example of the genetic trend report

DOES SELECTING EWES OR RAMS FROM TWIN LITTERS INCREASE LITTER SIZE?

By Kim Bunter, Principal Scientist at the Animal Genetics and Breeding Unit

The genetics of twinning. We know that litter size is a lowly heritable trait. This means that the environment has a stronger influence on litter size than genes do generally. In fact, you may have seen larger litter sizes with a good season before joining, or after specific nutritional or pharmaceutical interventions. These are examples of non-genetic effects.

The changing influence of the environment each year also means is that a ewe's litter size can change from one year to the next, even though her genes remain the same (perhaps regulated differently). In the Sheep Genetics database, with over 900,000 maternal breed ewes with accurate litter size records, the percentages of ewes having only singles, only twins, or only triplets or higher across four parities were only 3.50%, 11.8% and 0.32%. The remaining 84.4% of ewes with four lambings recorded had many different combinations of litter sizes. So, a genetically prolific ewe can have a lower litter size from time to time, and similarly a genetically average ewe can have more lambs than expected. Litter size observed each year is a combination of both genetic and non-genetic effects. Selecting last year's rams from dams with twin litters may not be reproducible in the following year for the same dams.

Despite low heritability, there are quite a few major genes which can have an impact on litter size. The most well-known one in Australia is the Booroola gene, which increases ovulation rate. Rams with the Booroola gene have very prolific daughters. However, specific major genes for litter size are not present in every breed. Further, progeny surviving from very prolific litters may be limited without special care (eg hand rearing). This is one of the reasons why high prolificacy genes typically do not increase in incidence within extensive production systems.

Selecting for higher litter size. Ram breeders attempt to increase litter size by selecting replacement rams from twin litters. But since we know that the environment has a greater influence on litter size than genes do, choosing a ram based on whether he came from a twin litter is also a bit hit and miss. If a ram's dam repeatedly has more lambs than her contemporaries from year to year, then perhaps the breeder is on the money. But we can see above, this is not very common.

To demonstrate the association between an animals own litter size at birth and its future reproductive potential due to genetics, we looked at the performance of over 900,000 ewes from the maternal analysis, which have accurate records for their own birth type and also litter size records. Ram lambs and their half and full-sib sister ewes share many genes. However, rams present in the data are already selected (often from twin litters), and must be represented by many daughters to demonstrate whether they carry better genes for litter size or not. A more robust strategy is to compare the output of many contemporary ewes born into different litter sizes, performing within a common site.

Figure 1 shows that ewes born as a single produced an average litter size of 1.67. Contemporary ewes born in a twin litter had a very small difference in productivity, with an average litter size of 1.71.

We start to see some more notable differences in litter sizes for ewes born into a litter of triplets or quads. More extreme litter sizes (triplets/quads) are more indicative of true genetic differences for litter size relative to the difference between single vs twin birth litters. However, since litters of triplets and quads are uncommon, the survival of lambs in these litters is typically reduced relative to smaller litters. Further, the phenotypes of rams is frequently compromised by their multiple birth status, so there is limited choice in the rams available for selection from litters of this size.

Sheep Genetics has a new litter size Australian Sheep Breeding Value (ASBVs). The litter size ASBVs are calculated using all available family information on litter size from multiple parities, along with a range of other traits contributing to successful joining and litter size. ASBVs eliminate the non-genetic contributions from performance, and are therefore more accurate than selecting replacements from twin litters. High accuracy breeding values result in very predictable changes for phenotypes. Rams differing by 1 lamb in ASBVs will have daughters who differ, on average, by 0.5 lambs. Ewes that differ by 1 lamb in ASBVs will differ, on average, by 1 lamb in their own performance, for very accurate breeding values.
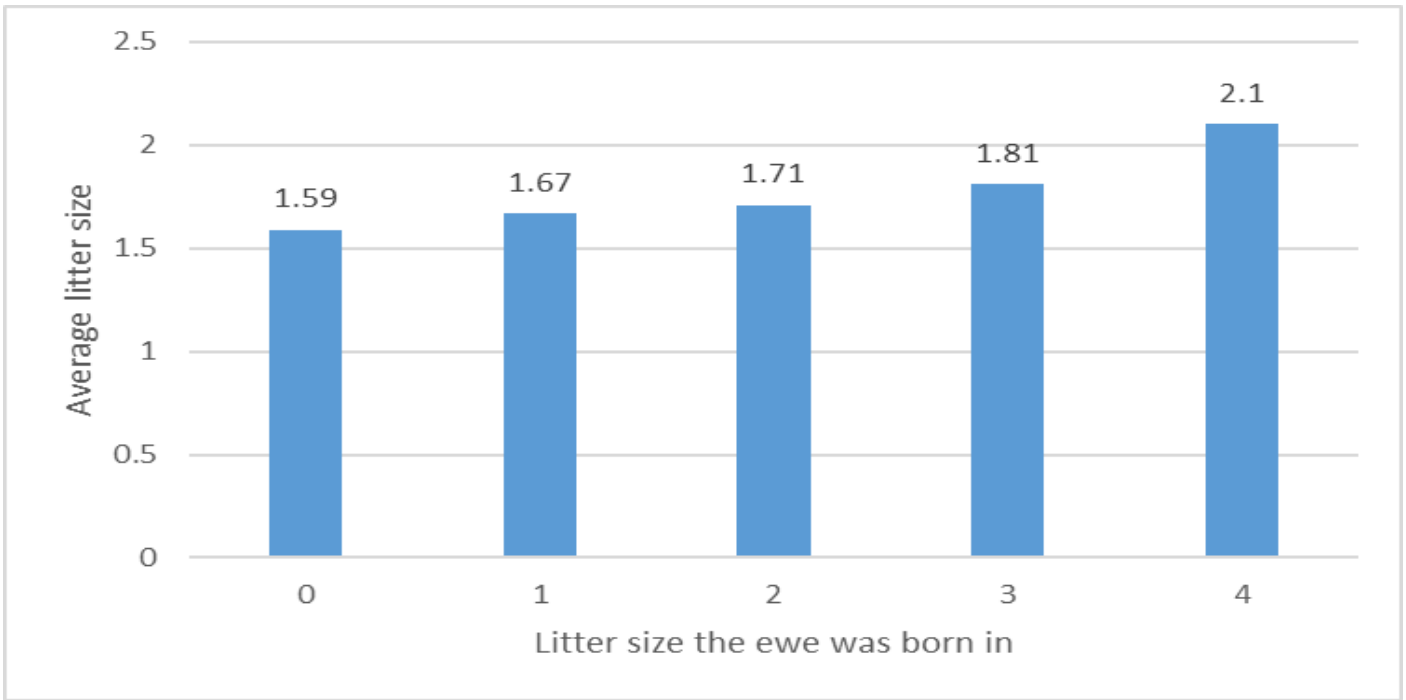
Figure 1: the average litter size produced by ewes born as a single, twin, triplet or quad (n > **900,000 ewes). Litter size of zero represents ewe litter size at birth is unknown.**

Take home message. Selecting rams (or ewes) from twin litters doesn't guarantee a predictable increase in litter size. A more accurate way to select for increased litter size is to use the new litter size breeding value and an index that considers other traits at the same time.
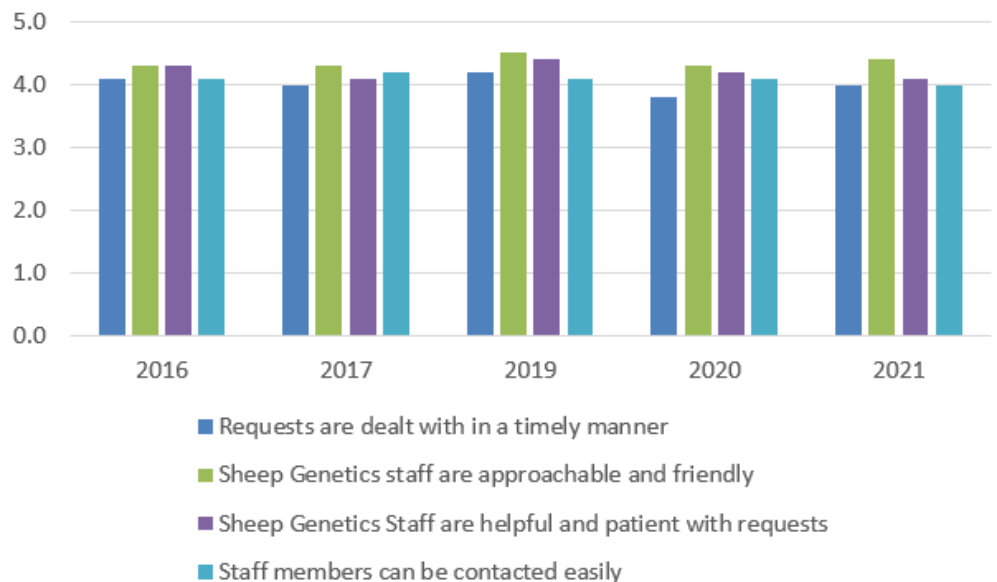
ANNUAL SURVEY OVERVIEW

Thankyou to everyone who completed the recent annual survey. We have roughly 10 percent of flocks respond and provide some excellent feedback that can help guide how Sheep Genetics operates.

One of the key areas that we focus on is the Customer Service, from the graph below you can see that there is some movement between years. Some of the changes over the past two surveys can directly relate to Covid and the change in how we deliver services, as well as staff changes.

2020 and 2021 has shown us that we need to be able to adapt how we can reach clients, and saw a rise in online workshops which we would have previously delivered face to face. This has been great in many ways, ensuring that people that may

not have been able to travel have accessed the information. However, there is great benefit to face to face interactions. 2022 will see us with a full complement of staff, and we are looking forward to once again traveling and meeting people.

Requests are dealt with in a timely manner
Sheep Genetics staff are approachable and friendly
Sheep Genetics Staff are helpful and patient with requests
Staff members can be contacted easily

GET THE MOST OUT OF THE SEARCH SITE

Creating an account and linking your flocks.

You can register and create an account for the Sheep Genetics site that will provide you will access to different resources and tools. For breeders, linking your flocks to this account will allow you to access additional services.
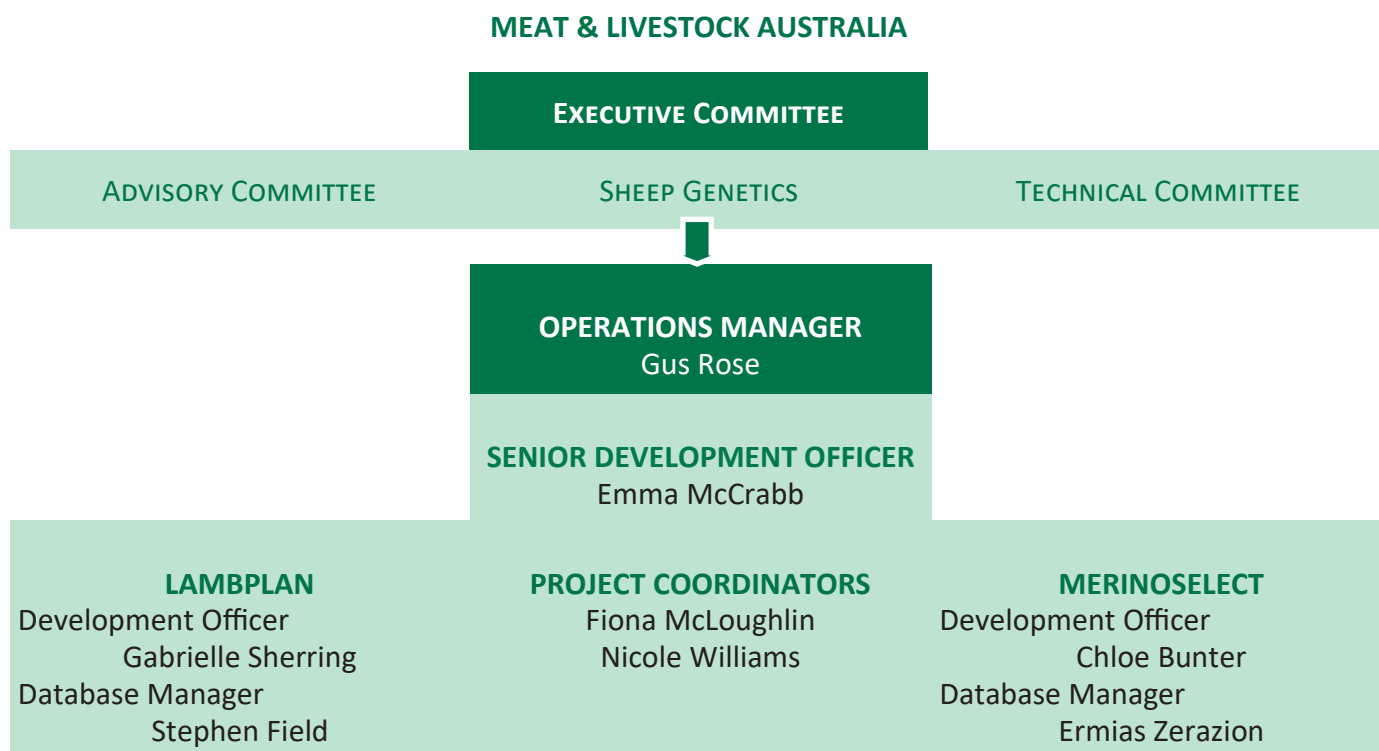
To create your account, click on the "Register" link on the Sheep Genetics search site, fill in the form and an email will be sent for you to confirm and verify.

To link your flock codes to this account simply include your email address, the relevant flock codes and the email address of your service provider (if applicable) on an email to the Sheep Genetics team at info@sheepgenetics.org.au.

It will be essential to have your account linked to the flocks as the search site will soon be a portal to uploads and submit data to Sheep Genetics. Additionally linking your email and flocks in the account allows you to create sale catalogues, semen catalogues and pen cards. A guide on how to create an account and further information can be found on the Sheep Genetics website.

SHEEP GENETICS STRUCTURE

MEAT & LIVESTOCK AUSTRALIA

EXECUTIVE COMMITTEE

| ADVISORY COMMITTEE | SHEEP GENETICS | TECHNICAL COMMITTEE |

OPERATIONS MANAGER
Gus Rose

SENIOR DEVELOPMENT OFFICER
Emma McCrabb

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