Investigating a Secretive Reptile

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A legless lizard

The Slow worm(*Anguis fragilis*)is often mistaken for a snake

However, unlike snakes they have eyelids, visible ears, blunt notched tongues and smooth scales

Identification

The females have a spine stripe and dark sides (flanks). Copper, reddish-brown, brown in colouration.

The males sometimes have blue spots dorsally, and can be silver to grey, copper to brown.

Juveniles gold with dark brown dorsal area, sides and spine.

The slow worm demonstrates a pattern of coloured spots on their neck and throat from the age of 3

The Slow Worm Lifecycle

- Juveniles mature into adults at 3 years.
- Lifespan 30 years.
- They can reach a length of 50cm.
- Regularly shed their skins.
- Brumation October to March.
- Mating takes place April to May.
- 90- 100 days gestation.
- Between 6 to 12 young are born from August to mid September.
- Ovoviviparous - Encased in thin transparent membrane , that ruptures immediately.
- Precocial - Independent from birth.

Slow-worm giving birth (by Ron Allen)

Habitat

A broad range of habitats.

Dense vegetation-especially grass.

Sunny areas for thermoregulation.

Loose soil to burrow.

Damp humid environments.

Predators

Cats.

Hedgehogs.

Birds of prey.

Corvids.

Diet

Carnivorous.

Soft bodied invertebrates; Slugs and earthworms.

Juveniles enjoy ant larvae.

Behaviour

- Semi fossorial.
- Like to hide underneath objects.
- Ectotherm.
- Cryptic.
- Hunt during dusk and after rain.
- Do not move long distances.
- Same individuals are seen in same location.
- Some movement during annual hibernation.
- Aestivation during high temperatures.
- They can lose their tail (autotomy).

Slow worm status

- Protected

Schedule 5 of the Wildlife and Countryside Act (1981)

- Decline in population figures

Due to habitat loss(IUCN, 2019)

- Subjected to numerous translocations

Due to their habitat preference (Platenburg and Griffiths, 1999)

- The JNCC recommends

Priority habitat action

Species specific monitoring and surveying

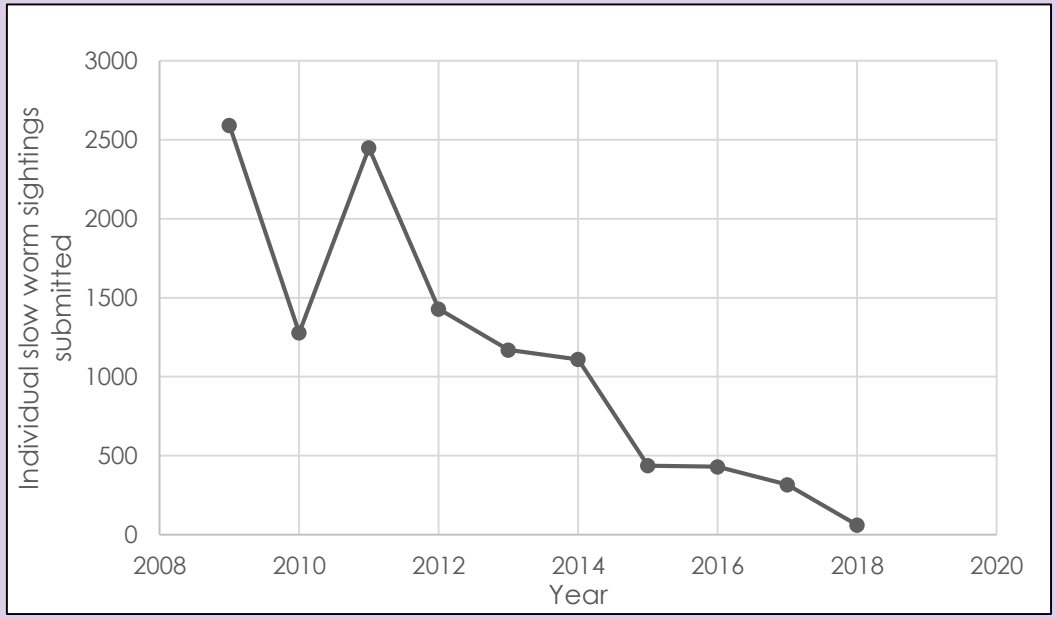


Figure 1. Individual slow worm recordings submitted to NBN atlas from 2008 to 2019, illustrating a decline of recordings from 2011 (NBN atlas 2019).

More research is required –

How do environmental factors influence slow worm activity?

This knowledge would help optimise search efforts and enhance the habitat used for relocations (Platenburg and Griffiths 1999).

Few monitoring schemes evaluate success and failure of mitigation processes (Baker and Carey 2004).

Monitoring

Identifying an individual within a population

Providing data on a populations

- Structure
- Changing aspects
- Quantifying movement and activity

Techniques include:

- Hot and cold branding
- Internal and external tagging
- Scale and toe clipping
- Coloured marking

The slow worms anatomy does not lend itself to these traditional methods of capture, mark and recapture

However, their distinct neck and throat markings offer an alternative method

Capture - Photograph - Recapture

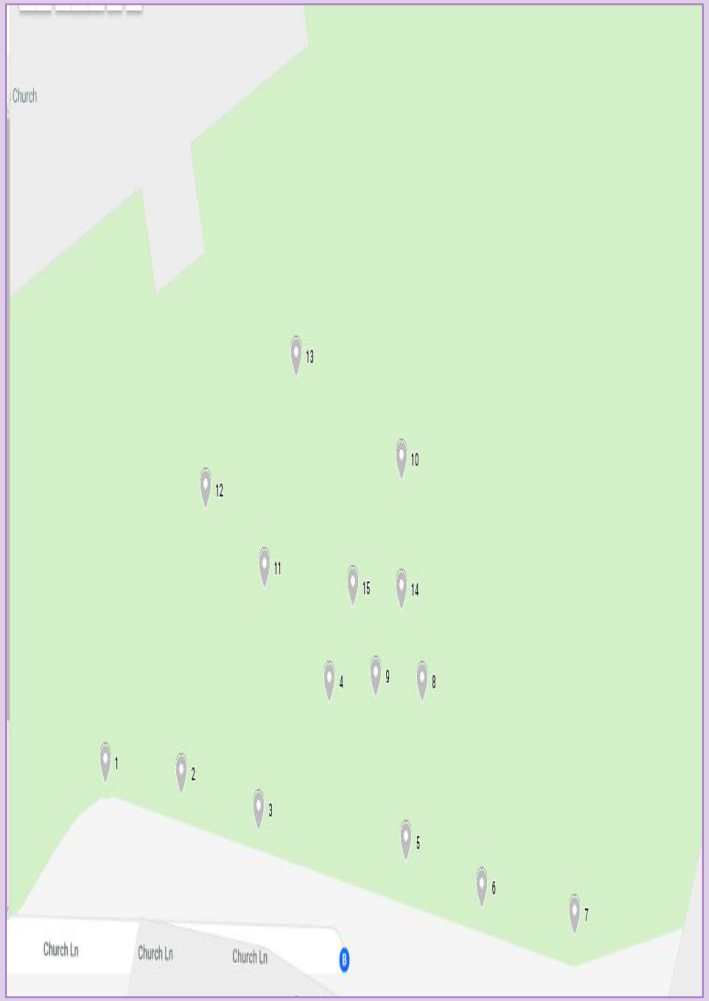
Using photo Identification of Individual Slow Worms (*Anguis fragilis*) to Investigate Refugia Fidelity

Aims

- To validate the use of photo identification of adult slow worms using their natural chin markings
- To test refugia fidelity within the population

Methods and Materials

May to September 2017/ 2018
Conservation site
15 ACO (Artificial covering objects) Area 0.122 hectares



Data Collected

•Date
•Time
•Weather
•Temperature

ACO data:
•Number
•Temperature
•Soft invertebrates
•Ant nests
•Toad/mouse presence

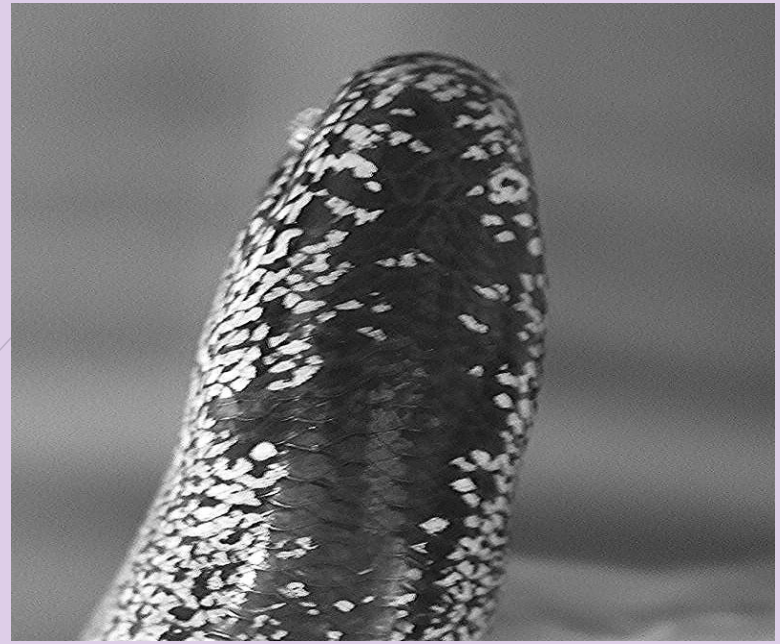
Slow worm data:
- Life stage
- Sex
- Length measured

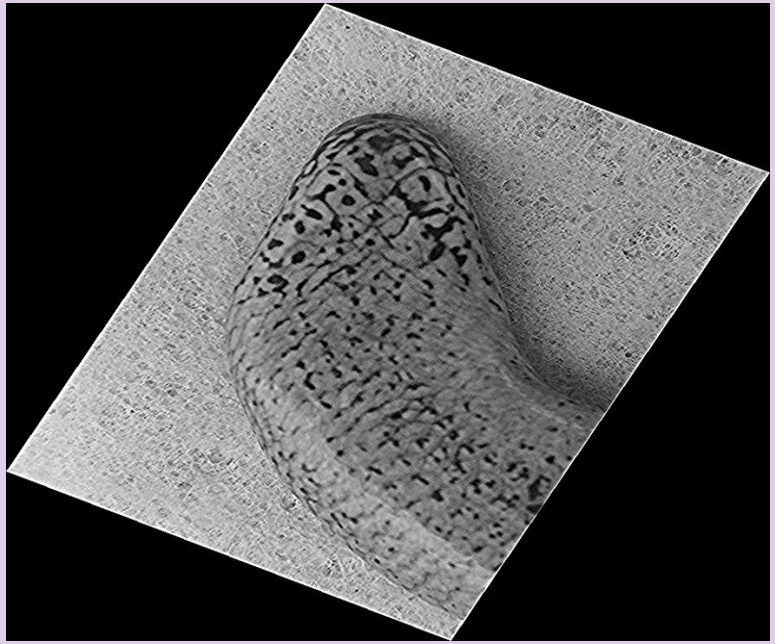
Snout to vent and
snout to tail end

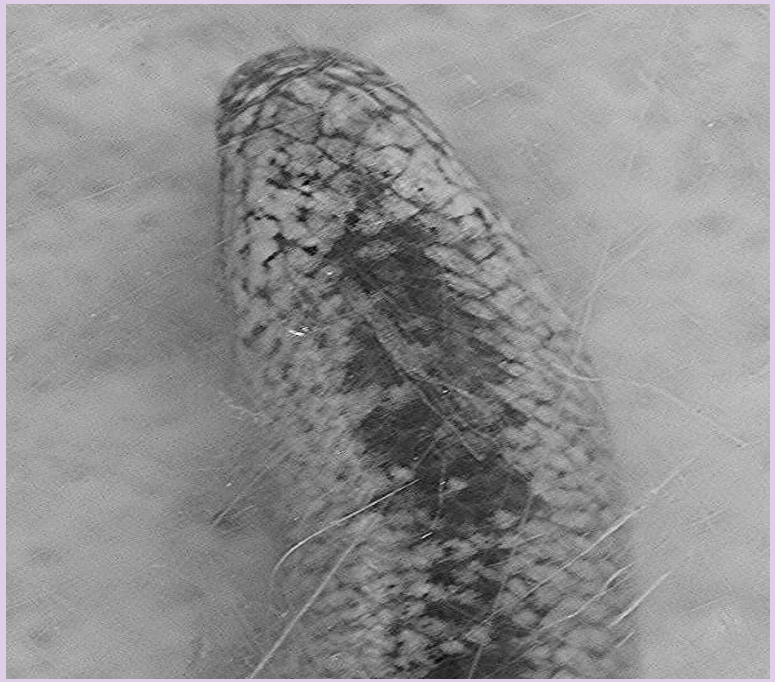
- Weighed
- Marked
- Photographed

Methods and Materials

- Adult slow worms > 10cm in length photographed
- Images graded on quality 1 to 4
- Excellent and good quality images (1 and 2) used for observation test







Results

- Observation test 92% correctness
- No deviation in measurements for the matched individuals
- Suggesting individual slow worms (seen on different dates) can be recognised by their markings
- 25 individual slow worms on site
- 6 individuals seen multiple times over survey duration
- This has facilitated the recording of movement across site

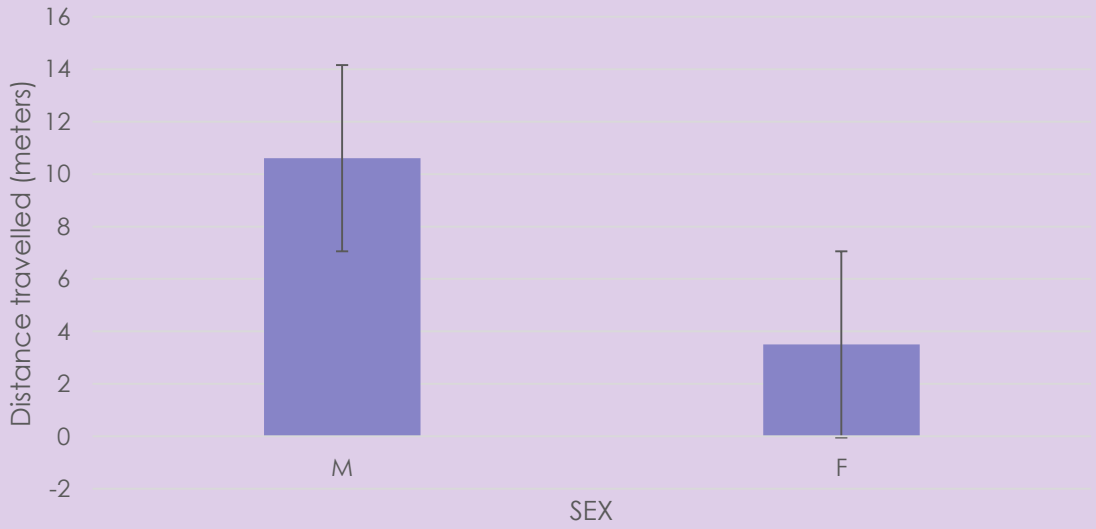
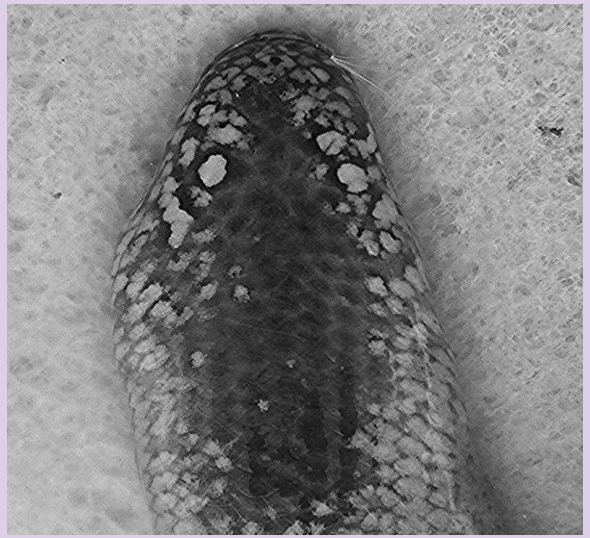
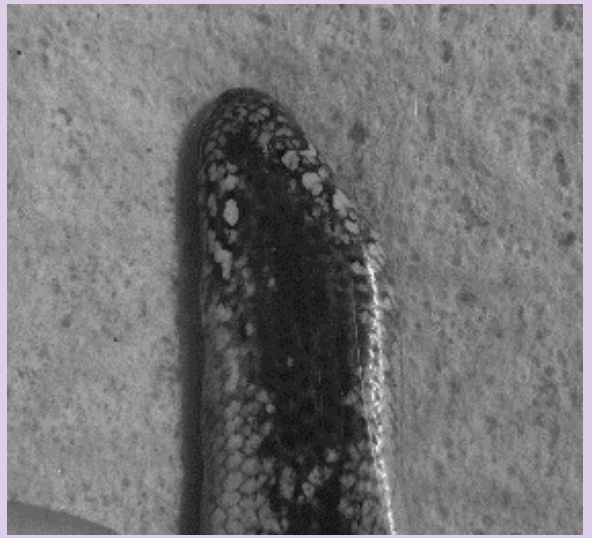
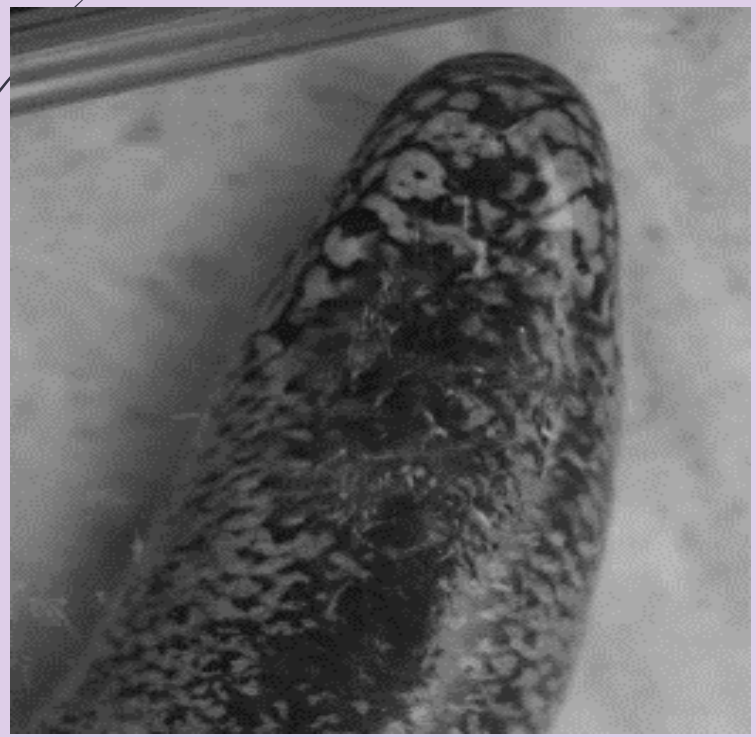


Figure 2. Comparison of mean distance recorded between identifiable males and females (females 3.5 males 10.6 metres)

Encountered on 2 different dates
24/07 and 31/07
Under different ACO (6) and (12)
Both male
Same measurements
Observed to share the same pattern
25 metres of movement recorded in 8 days







- Female encountered on 5 different visits
- 17/06 to 24/07
- Encountered under the same ACO (2)
- No deviation in measurements
- Observed as having the same patterns
- Recorded movement 0 metres in 38 days

Adult females and juveniles
- Shorter distance covered
- Preferred certain ACO (2)(8)(4)
- Preferred ACO temperature 22-24°c
- Not seen above 34°c

Prey
- More prey recorded ACO (2)(8)(4)
- More prey recorded at ACO temperature 22-24°c
- Prey presence decreased above 24°c

Adult males
- Travelled a further distance
- No preference for ACO
- No preference for ACO temperature
- Not seen over ACO temperature 28°c

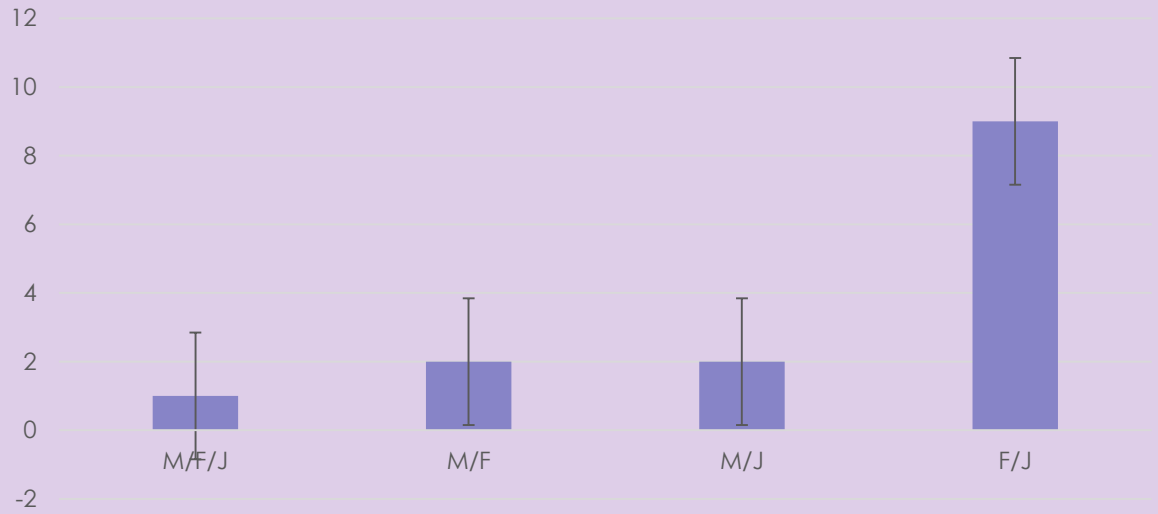
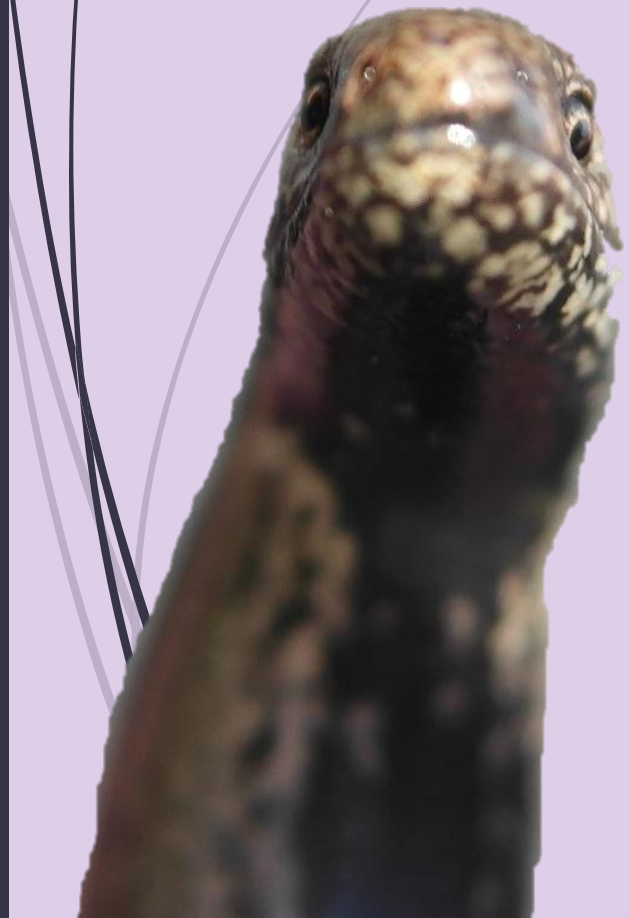
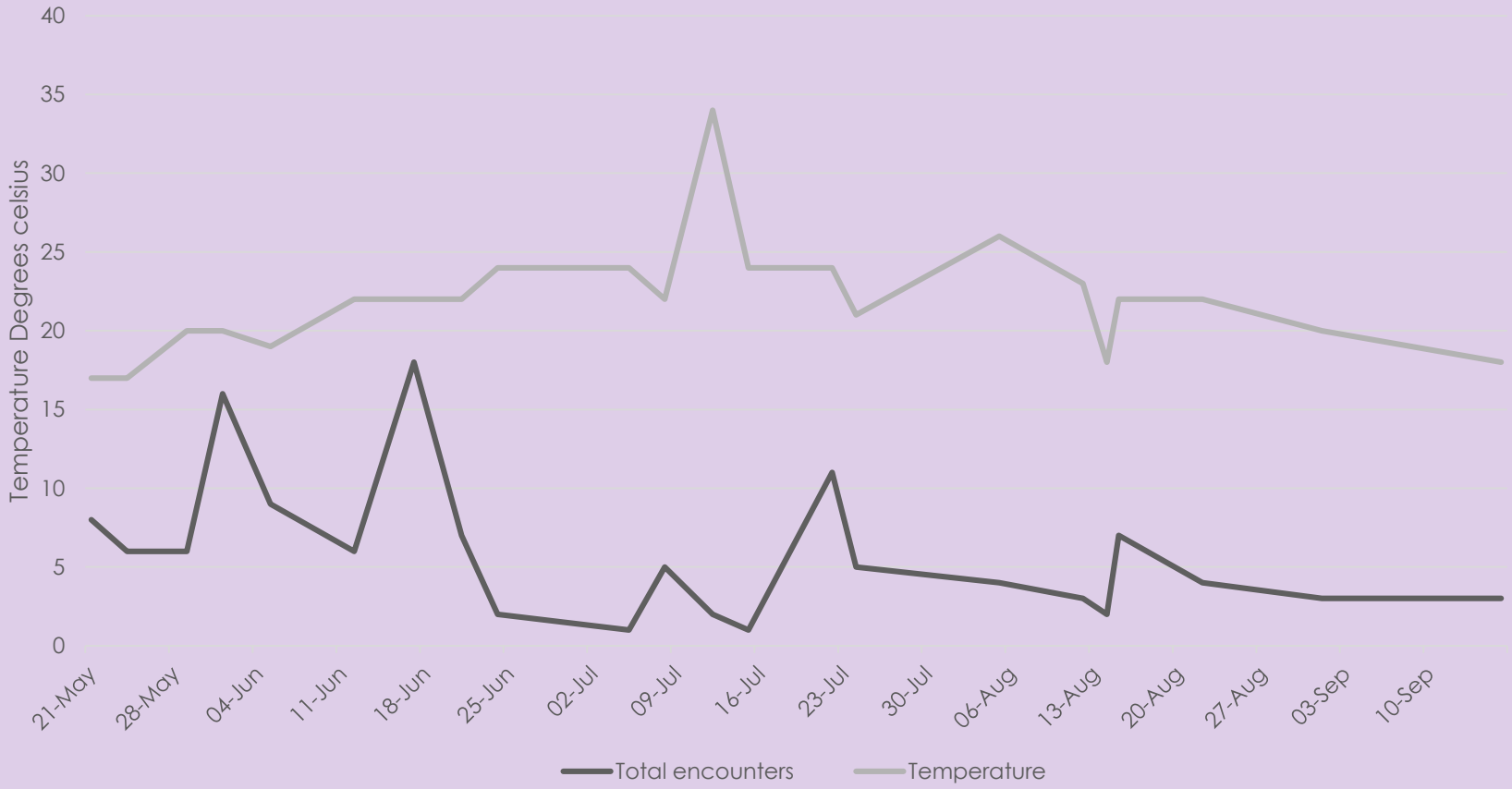


Figure 3. Different life stage interactions.

Key: M- male, F- female, J- Juvenile

A difference was recorded in slow worm encounters between July and August 2017 and 2018
Temperatures rose significantly between the two years
A moderate negative correlation whereby slow worm encounters decrease as temperature rose (2018)





Implementation

- Accurate population count
- Movement across site
- It can assist in mitigation applications
- Allows a continuation in monitoring the species after mitigation processes

Thank you

Thank you
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