

Mapping the development of baby bats: making provision for learning opportunities for babies reared for release **Maggie Brown**

The point of mapping the development of babies is to identify ways we can provide opportunities to enable bats' instinctive development.

By mapping stages in the development it is possible to see how different skills are inter-related.

My work with baby bats began by trying to provide babies with the experiences they would have growing up in the wild, as much as was possible. Over the years I have seen that the *right experience at the right time* provides the opportunities for baby bats to practice the skills they are acquiring *practice is essential*. This talk is about how :- what we do can provide useful experiences towards developing the skills young bats need to survive after release.

Baby bats grow extremely quickly, so most behaviour needs to be instinctive - but young bats also learn by imitating other bats

In the wild young babies are equipped to hang on to mum or the roost – they are born with almost full grown thumbs and toes - an artificial roost with heat mat is appropriate at this stage.



From about three weeks old when wings are fully developed they will begin to fly – before they are weaned.



Therefore an increasingly large enclosure is required.

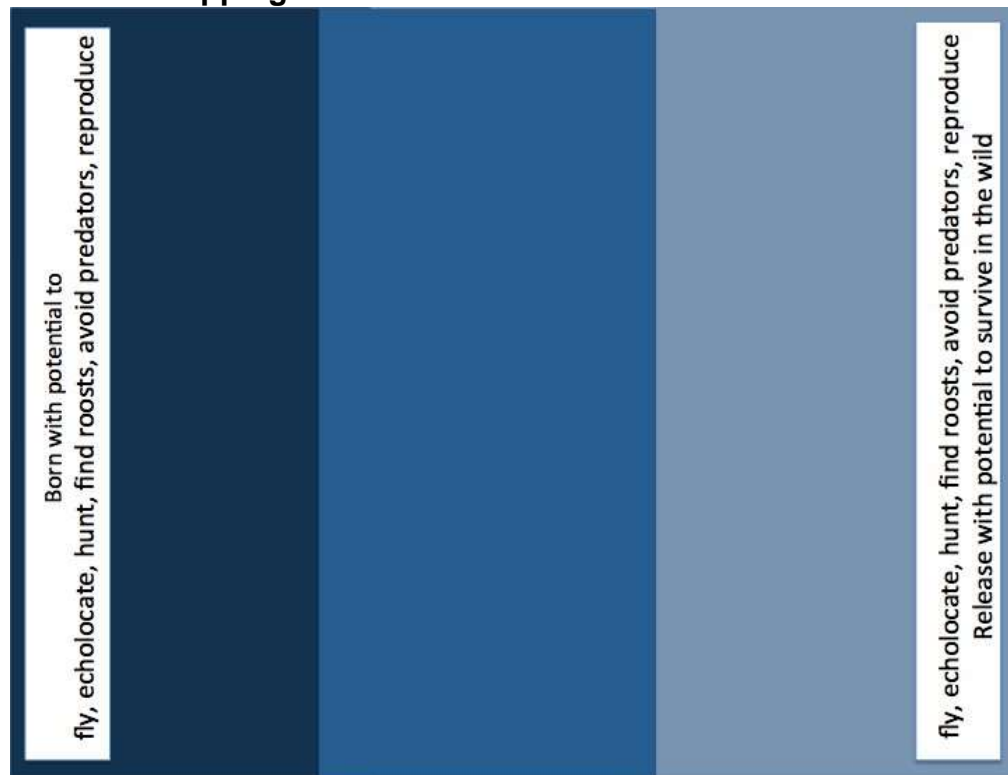


Baby bats grow at different rates, initially very quickly, but more slowly once they begin to fly. Therefore:

- facilities for baby bats must be available from the start.
- carers must be observant of each individual bats development.
- because of their individual growth rates there is no single blueprint for rearing them - but it is possible to create some general guidelines.

Mapping skills development shows us that **flight, echolocation, roost finding, echolocation, hunting, roost finding** and normal **social behaviour** are all happening at the same time

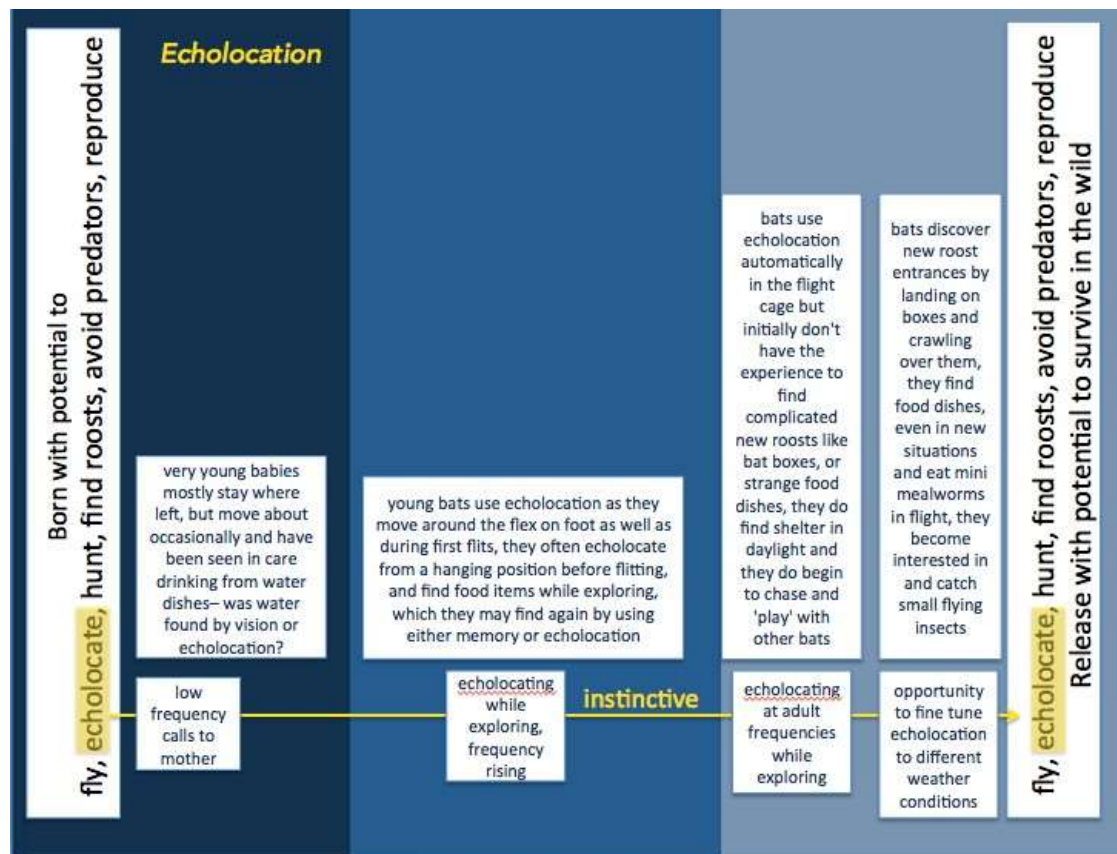
So to the mapping...





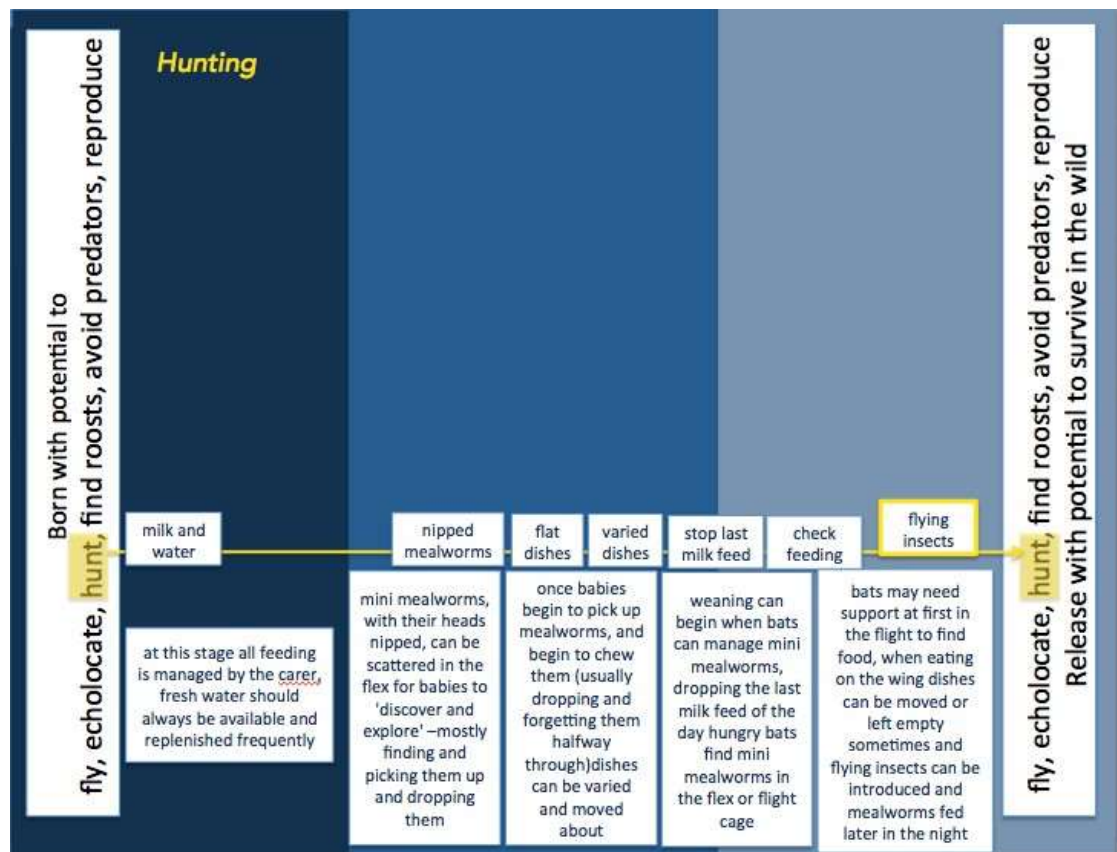
To sum up Flight:

- flight opportunities are not necessary until wings begin to mature • a flexarium gives space for push ups*, which leads to flits, and climbing which helps to build flight muscles.
- grouping young bats in a flexarium also leads to encounters between bats. • a flex provides room for more roost places, some people add bat boxes, cardboard tubes etc.
- a flex provides opportunities to use and explore echolocation.
- nipped** mealworms in the flex give chance to discover and explore food • a twenty four hour, outdoor flight cage gives time and space for practice, building up stamina and experience of the real world.



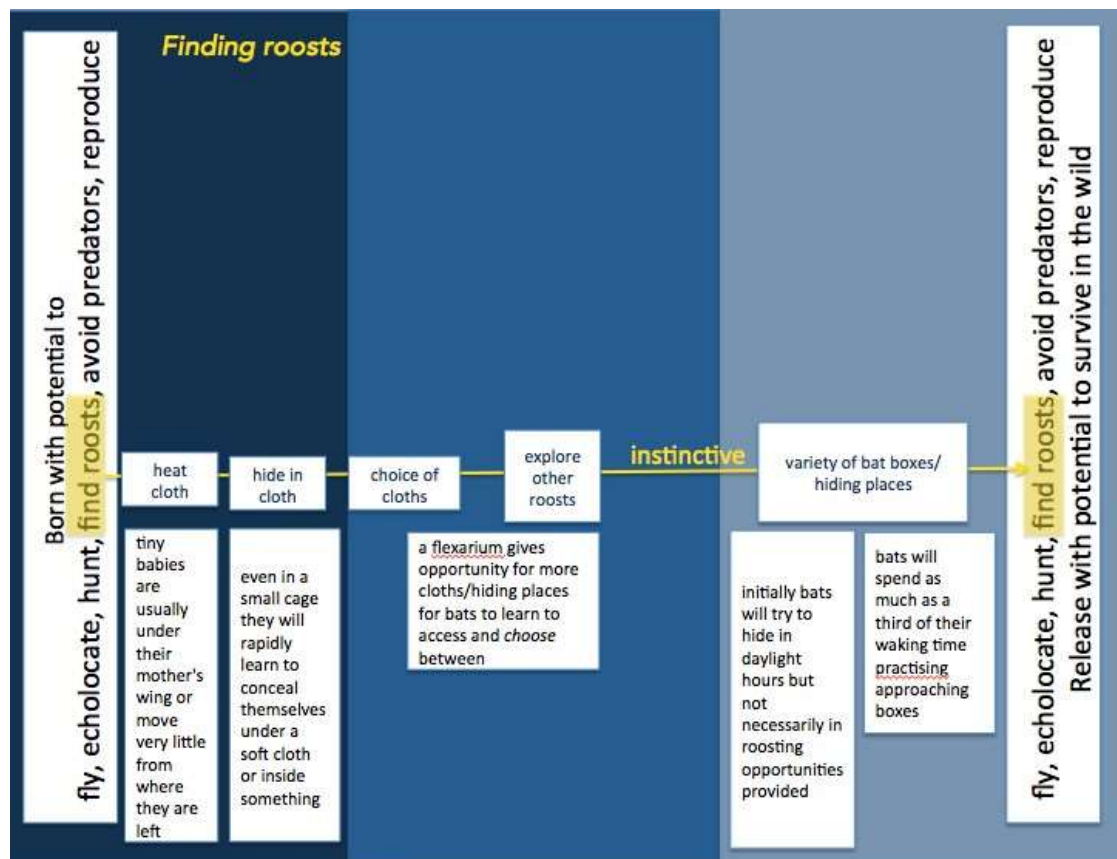
Echolocation

- babies use echolocation from a very early age starting at lower frequencies, often audible and sounding like very faint rain.
- a flex gives opportunities to explore and use echolocation.
- a flex gives opportunities to encounter other young bats and hear their echolocation.
- a flex gives opportunities to find other hiding places and locate obstacles including food items by echolocation.
- echolocation pitch matures naturally in keeping with flight development and the flight cage gives opportunities to refine skills in a more real setting.



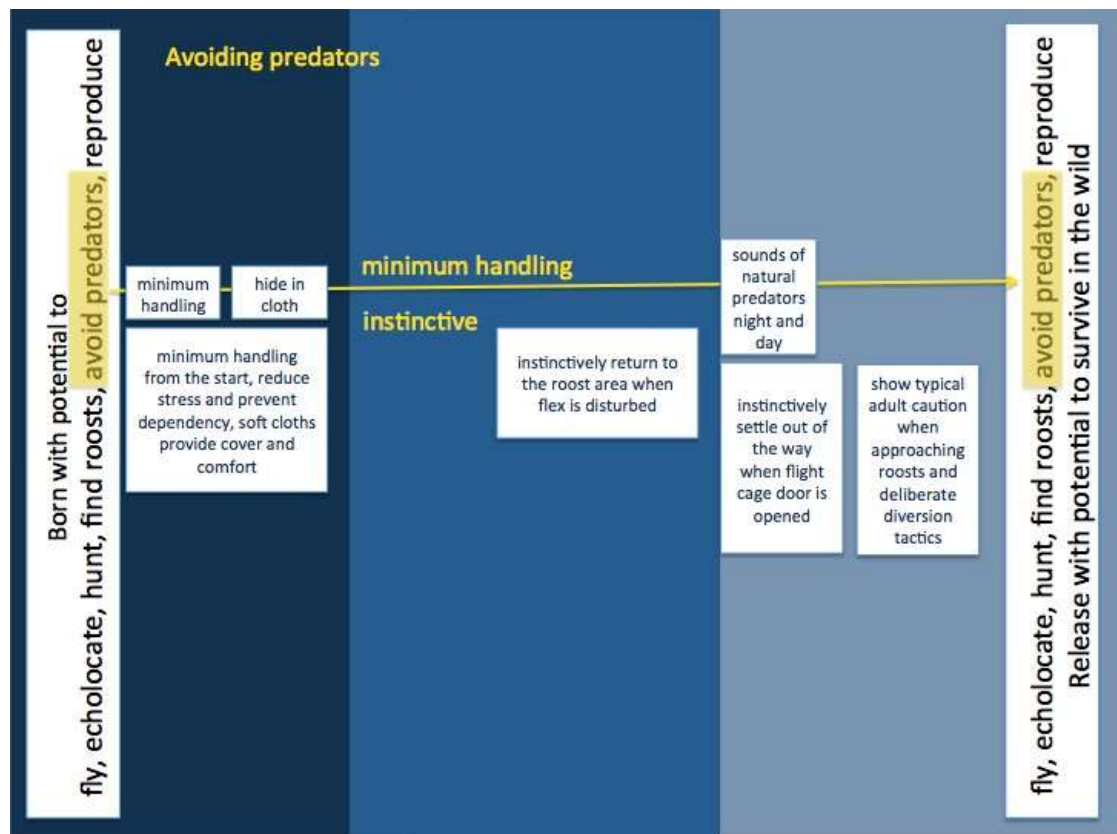
Hunting successfully to feed itself is the last stage of development that began with depending on its mother or a carer for milk feeds.

- in the wild hunting begins as soon as bats fly with *strength*, *stamina* and *agility*—at this stage it is more of a game than a necessity as the bat will not yet be weaned.
- in a flex young bats can begin to explore dead mealworms, practice picking them up, learn to chew them, find them by echolocation, and copy other young bats.
- in a flight cage bats have to learn to 'look' even harder to find food, first in familiar dishes of mealworms, then in randomly placed dishes and finally catching flying insects on the wing,^{***} only getting mealworms as 'top ups' • in captivity young bats can progress to the flight cage before weaning, but in practice the carer managing the flight cage may find it easier to wait until bats are able to access and eat mini mealworms before they are put into the flight cage.



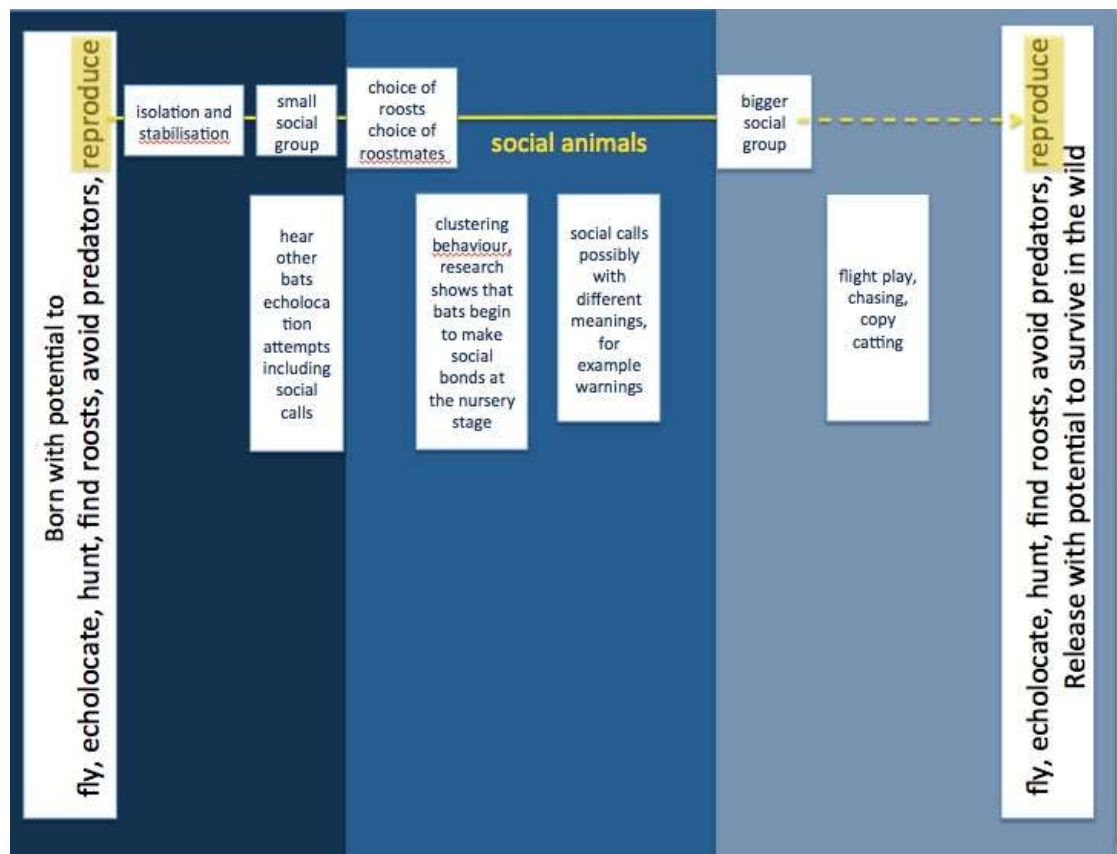
Finding roosts:

- baby bats instinctively take cover from a very early age - this is the first stage of finding roosts.
- grouping babies together in a flex or flight cage with choice of roosts also allows a choice of roost mates.
- juveniles in the flight cage will not explore bat boxes until they have considerable flying and echolocating skills, and will at first discover boxes by landing on them and crawling over them before finding the entrances –they will also discover boxes by hearing other bats inside and searching for a way in.



Avoiding predators:

- baby bats instinctively hide from a very early age.
- babies begin to use social calls as a warning to others.
- young bats will run away or take off when approached, (depending on flight skills).
- they play chasing and avoiding one another in flight, (avoidance is a useful skill when pursued by a predator).
- they practice approaches to roosts in flight and later can access roosts by flying straight in.
- practice flight and echolocation skills till they can avoid obstacles put in their way unexpectedly - for example me waving a hand in front of them as they approach.
- they react to and are wary of shadows above the flight cage and to sounds, for example hooting owls.

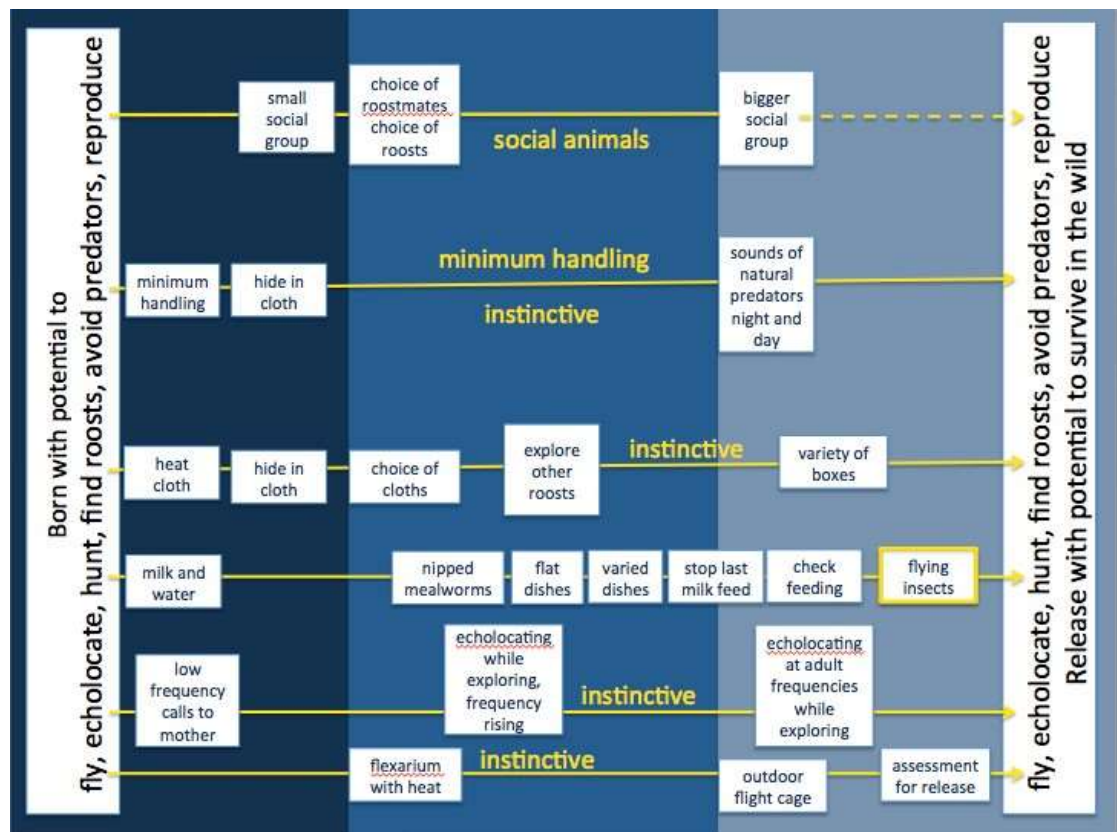


We obviously don't want to see bats reproducing in captivity but developing **social behaviour** will lead to better integration in the wild.

Initially young casualties need **isolation and stabilisation** - they may be harbouring infection and they need to be rehydrated and to adjust to an artificial diet.

In **social groups**

- younger bats learn skills, like communication skills and practical skills like picking up mealworms from other bats.
- moving to larger social groups in a large flex or flight cage allows young bats to extend their social learning and develop their vocalisations on a larger scale.
- ultimately we want young bats to integrate and become part of the breeding population in the wild - encouraging normal social behaviour must help them to integrate.



The mapping shows how different strands of development are progressing at the same time and how good provision allows for development.

In conclusion

- young bats are developing different skills all at the same time.
- providing opportunities for bats to develop these largely instinctive skills speeds up the learning process and makes it possible for young bats to acquire the skills they would get in their natal roost.
- bats grow very quickly and provision should be made to accommodate their learning *in anticipation* of their needs as the timing of these development stages is critical.
- we know that young mammals like badgers and foxes learn their skills by 'playing' – **play** allows time and motivation to acquire skills that need continual practice – baby bats also need time, in a roomy outdoor flight cage with a suitable environment, to **play and practice** the skills they need to survive.

Ideally we need to be **following up** our bats to see how they succeed after release. Post release monitoring is not easy and may take a long time to provide useful evidence... however I have some news.....

Readers of Bat Care News will remember that this young female pip released in September 2014 survived for 12 months before getting caught in something sticky on a building site. She was cleaned up and released again in September 2015. (Left picture)



This very young male pip (right) came into care injured, probably only just flying. In rehab he was socialised with hand reared pups and released with them in late September 2017. He survived for four months before being found grounded beside a newly felled tree in late January 2018. He was uninjured and is due to be released as soon as the weather is favourable.

* push ups are part of pre flight behaviour - bats will stretch and arch their wings so that they lift their chests off the surface they are hanging on. This strengthens bones and muscles for flight and helps to stretch the membrane. They also stretch the membrane (and probably oil it from glands) over their noses and pull it with their mouth. This is probably crucial to developing its flexibility.

** nipped mealworms are those that have been killed by crushing the head with tweezers. This is important so that mealworms cannot attack the young bats before they have the skills to kill them.

*** catching flying insects in flight is the last stage of development of hunting, echolocation and flying skills. Initially young bats will ignore flying insects, will later begin to notice them, but not necessarily pursue them, and finally they will pursue them with the intention of catching them.