The natural behaviour cycle of mother-pup pairs of harbour seals
PREGNANT FEMALES GATHER IN A ‘MATERNITY’ GROUP, ATTRACTED BY MOTHERS AND PUPS ALREADY BORN
PARTURITION: DURATION OF LABOUR: 0.63–20 MIN (Lawson & Renouf, 1985)
NEONATAL BONDING MAY LAST UP TO AN HOUR.
THE MATERNITY GROUP MAY STAY TOGETHER FOR A FEW DAYS BEFORE INTEGRATING WITH OTHER SEALS
NURSING

The mean time post-partum before nursing was 40 min (3–138 min, n=10). (Lawson & Renouf, 1985)

Suckling bout length, and estimated milk intake per bout (weekly average) increase with pup age over 5 week lactation period (Hedd et al., 1995).

Mothers usually nurse their pups immediately after hauling out. Suckling is rarely seen while mother and pup have been resting on shore and are dry (Wilson, 1974; unpublished data).
MEDIAN AGE AT FIRST SWIM – 40 MIN (N=8)
Lawson & Renouf, 1985
NEONATAL PUPS ARE ACTIVE, EXPLORATORY AND PLAYFUL.
The newborn pup spends much time swimming with its mother in the shallow water surrounding the haul-out site. The pup has a strong ‘following’ response, and will follow the mother as she moves away. The pup follows the mother whether on water or on shore, but the behaviour of both mother and pup is highly adapted for keeping together in the water. The mother uses the pup’s following response to lead it by moving slowly just ahead of it, frequently stopping to wait and leaning back to make muzzle contact with it. The mother is responsible for maintaining contact while the pair are swimming and diving. (Wilson, 1974; Renouf & Diemand, 1984).

Photos taken of captive born pup at Natureland, Skegness, August 2012
For the first 1-2 weeks the pup may ride on the mother’s back, with its muzzle against the back of the mother’s neck (Venables & Venables, 1955; Wilson & Kleiman, 1974). This skin area in both mother and pup is rich in sebaceous glands, which are thought to secrete a social attractant pheromone, which probably helps to guide the pup’s following response (Wilson & Keliman, 1974).

Photos: left - captive-bred pup at Natureland, Skegness; right - Wild mother-pup pair in Shetland, photo Bobby Tulloch
Pups also follow their mother onshore and in and out of the water
AFFILIATIVE BEHAVIOUR OF BONDED MOTHER-PUP PAIR ON ‘SHORE’ – Natureland, Skegness, August 2012

Reciprocal nose to back-of-head contact
When a pup is separated from its mother, it gives a distress call.

Pups do not call until several hours after birth (Lawson & Renouf, 1985). Pup calls are individually distinct (a/c frequency of fundamental tone). Mean length of call 31s, interval 2.3s. Calls longer in air than underwater. Calls from pups >2m had more energy – increase in harmonic band. Calls different if mothers stopped to wait (Perry & Renouf, 1988). Pup calls at 0.5 kHz & 90 dB should be heard by M up to 1km and may be individually recognisable up to 140m. At 70 dB recognisable only at 20m.

Seal Strandings Workshop, Suzdal, 2012
Boness et al. (1994) first demonstrated that the harbour seal has a foraging cycle similar to otariids. 9/11 females on Sable Island tracked with TDRs began bouts of diving by 12 days postnatal, making an average of 7 diving trips, averaging 7.1 hrs per trip, between then and weaning, returning to the haul-out site to nurse their pups, for an average of 17.5hrs until the next trip.

They spent on average 31% (4.5hrs) of their ‘home visits’ between foraging trips onshore with their pups and the remainder of the time chaperoning their Pups in the nearby shallow water

Foraging trips made by lactating females was confirmed by Thompson et al (1994) in the Moray Firth.
Boness & Bowen (unpl data, cited in Bowen et al, 1999) found that females at Sable Isl. often left their pup on the beach while they went on foraging trips – survey data from 25 pairs in 1991 found that the pups were alone on the beach in 40% of surveys when the females were not seen. Pups were seen on their own less often in 1996.

The authors speculate that in 1991 mothers and pups were usually seen in groups of 4–25 pairs, but by 1996 the population had declined and mother-pup group size was only 1–3 pairs. However, Bowen et al (1999) found that even mothers in 1995-96 spent less time on shore and more time at sea than did their pups, i.e. the pups were sometimes left alone onshore.

The authors suggest that larger haul-out group size may provide a reference point for the pup when it enters the water without its mother. Groups also provide greater vigilance and therefore greater safety for Lone Pups. Therefore the authors suggest that mothers pupping singly or in small groups may take their pups with them.

Bekkby & Bjørge (2001) VHF-tracked two mother-pup pairs in Norway, and found that one pup always accompanied its mother on foraging trips while the other was often left at the haul-out site.
Mothers leaving and reuniting with pups was observed at the relatively large breeding colony (minimum of 45 mother-pup pairs) at Mt Desert Isl, Maine (Wilson, 1978)

Mother reclaims pup after period of absence, then leads pup back into water
This rock is part of a breeding colony where mother-pup pairs haul out after the first post-natal week, and mothers are regularly observed to ‘park’ their pups here, and return again to reunite with them. None of 3 pups VHF-tracked before weaning in accompanied their mother on foraging trips (Corpe & Wilson, 1996). In most years there are 7–15 pups and 20–30 adults at this site. Lone Pups follow other seals into the water and to neighbouring ledges as the tide ebbs and flows, Although they sometimes sleep deeply through a tide and may be left alone on a rock until the tide and other seals return.

Leaving and reuniting with pups is also observed at the nearby estuarine site at Ballykinler. There are usually 7–10 pups and >50 adults at this site.
Pup mid-way through nursing period, left at haul-out site.
In a breeding colony in Strangford Lough in N. Ireland, pups were found to sleep at the surface while their mothers dived and then returned to them. This behaviour was not seen until the pups were estimated to be ~2 weeks old (Wilson, 1974). Some mothers may do this as an alternative to leaving the pups on the haul-out rocks.
PUP DEVELOPMENT OF DIVING BEHAVIOUR DURING THE NURSING PERIOD

Bowen et al (1999) further studied the diving behaviour of both mothers and their pups. Ps appeared to descend with their mother at the beginning of a dive, return to the surface to re-load oxygen after 1.5 min and then dived again. The TADL estimates were 2.6 min and 3.1 min for a 10kg and 20kg P respectively.

Dive depth for both M and P diving together increased from birth (~10m) to late lactation (~16m), and was nearly the same at each stage for both M and P. Ps descended and ascended more slowly than their Ms. Maximum dive duration by Ps increased from ~1 to 2-3 min over the nursing period. Surface time between dives did not change, and was similar to M’s surface time.

These data suggest that mothers’ foraging dives were constrained by taking her pup with her – adult females would normally make deeper dives than 10-16m, and clearly adjusted their dives to correspond to their pups capabilities at each developmental stage.
Seal Strandings Workshop, Suzdal, 2012
Later in the nursing period, the mother has been observed to swim rapidly away from her pup, apparently ignoring its distress cries. This is probably the weaning process for mothers who do not leave their pups at the haul-out site while they go to sea to feed.

Mothers who do leave their pups at the haul-out site while they go to sea to feed probably wean their pups simply by returning infrequently.

At this stage, pups start to follow one another, grouping together and sometimes approaching or following other adults in the colony (Wilson, 1978). This is the start of their independent life.
References


Boness D. J., Bowen W. D. and Oftedall O. T., 1994. Evidence of a maternal foraging cycle resembling that of otariid seals in a small phocid, the harbor seal Behavioral ecology and sociobiology, Volume 34, Number 2, 95-104, DOI: 10.1007/BF00164180


