Harbour seal pup stranding: potential causes at different stages in first year of life
Potential causes of neonatal separation of pup from mother

- disturbance during post-partum bonding (1st hour post-natal)
  - Vessel or pedestrian disturbance
  - Disturbance or interference by other seals (not described)
- low birth weight
  - P becomes weak, hypothermic
- mother has insufficient milk during 1st days post-partum
- Twin birth (Rae, 1969)
  - Mother has insufficient milk for two pups
- accidental birth at sea
- inexperienced mother fails to chaperone?
- open ductus arteriosis (Courbis, 1997)
  - poor stamina, weakening, pulmonary congestion
- death of mother during labour
Potential causes of low birth weight and postnatal failure to thrive

A fully documented example is the first recorded birth in 1989 in the highly industrial Tees estuary, NE England.

Mother caring for pup and nursing it regularly
Stranding of 1989 Tees pup – (i)

Pup appears too weak to follow Mother
Mother returns to pup and tries again to get him to follow, but pup is too weak.
The pup later reunited with mother and nursed for 16 min, but stranded onshore the next day (day 5 post-partum) in an emaciated (7 kg) condition, and died the same day. PM revealed nothing abnormal. Analysis of blubber revealed $\Sigma$PCBs 114 mg/kg, $\Sigma$DDTs 9 mg/kg lipid wt.
How many neonatal pups would be expected to strand?


Jemison & Kelly, 2001
Potential causes of post-natal separation

- Storms (Boness et al., 1992)
- Human harassment, persistent disturbance
- Death of mother
STORMS

On Sable Island 68% of 35 pup separations from mother were due to storms with peak wind speed >30 kn (Boness et al, 1992). Pups were located by the observers in the direction of the surface current, an average of 4.9 km from their origin. Smaller (and presumably younger) females were more likely to lose their pups.

After storms, females were seen apparently searching for their pups. Three of 16 females that had lost their pups fostered pups which had lost their mothers. Two Pups died, 7 disappeared and four were successfully reunited with their mothers by the observers (Boness et al, 1992).
Colony including mothers and pups before disturbance

Two pups left behind after disturbance
DEATH OF MOTHER DURING LACTATION: PROBABLY UNUSUAL IN NATURAL CIRCUMSTANCES BUT CORKSCREW INJURIES MAY BECOME SERIOUS ISSUE

In recent years there have been numerous findings of dead seals – mainly adult female harbour seals – stranding on shore with ‘corkscrew’ Injuries. There were 14 confirmed adult female deaths between July 12 and Aug 03 2010 (Thompson et al, 2010). These deaths are believed to be due to ducted propellers on vessels requiring accurate positioning, such as those servicing wind farms. It is thought the propeller sound resembles the call of a male harbour seal, attractive to a female in oestrus in late lactation.

A female thus killed in late lactation could result in her pup losing its mother at a suboptimal time and weight for successful and healthy survival of the early stage of Independence. This could result in increased numbers of underweight pups stranding in August/September with secondary symptoms of deteriorating health.
OTHER CAUSES OF STRANDING
### Table 2. Primary and secondary stranding causes for Pacific harbor seals along the central California coast from 1992-2001

**Primary causes of stranding**

- Malnutrition 487, Respiratory disease 90, Trauma 76, *Otostrongylus circumlitus related* disease 67, Unknown 38, Omphalophlebitis 33
- PhHV-1 infection 32, Septicemia 20, Human interference 19
- Gastrointestinal disease 14, Neurologic disease 13, Congenital disease 12
- Fisheries interaction 10, Protozoal infection 9, Miscellaneous 8
- Ocular disease 6, Peritonitis 4, Debris entanglement/ingestion 2

**Secondary causes of stranding**

- Human interference 164, Trauma 117, PhHV-1 infection 53
- Omphalophlebitis 48, Ocular disease 34, Respiratory disease 20
- Oiled fur 19, *O. circumlitus related disease* 13, Gastric impaction 10
- Miscellaneous 8.
Lungworm is thought to interfere with the respiratory health and diving ability of seals and thus alter their ability to feed. All postweaning harbour seals in the North Sea are thought to become infected with lungworm from fish once they start to feed, but this usually only causes illness in seals in poor condition. Seals >1 year old develop immunity.

Harbour seal lung with large numbers of lungworm (*Otostrongylus circumlitus*) causing obstructive bronchitis.

Figure 2. The percentage of elephant and harbor seals with *Otostrongylus circumlitis* infection and related disease as the primary cause of stranding along the central California coast; numbers over the bars equal the total number of seals stranded that year.
Human interaction as factor in stranding in California (Colgrove et al, 2005).

Most commonly reported from heavily populated areas

Figure 3. The percentage of stranded seals with human interaction as a primary or secondary stranding factor along the central California coast; numbers over the bars equal the total number of seals stranded that year.
Fishing net entanglement is relatively uncommon in harbour seals in California
Blood values measured at time of admission of pups were not predictive of survival during rehabilitation. Mass was associated with survival until release, and all pups that died weighed less than 10 kg at the time of admission. 66% of 64 pups admitted died, and of the pups which died, the mean number of days in rehabilitation was 20 (Greig et al., 2010). Causes of death included septicaemia and umbilical infection (13/22), malnutrition (2/22) and various other causes.

Greig et al (2010) suggest that haematology should be used to diagnose illness rather than be used routinely, but initial treatment should focus on minimising risk of umbilical infection and septicaemia by cleansing umbilical area (and any open wounds) regularly and using broad spectrum antibiotics.
References


Courbis, S. 1997. Observations of a harbour seal pup (Phoca vitulina richardsii) and human interaction with the pup on a public beach in Lincoln city, Oregon.


Although stranded animals represent an inherently skewed sample of the free-living population and the prevalence of diseases in live stranded animals is not the same as in the entire population, assessing temporal trends in causes of strandings and disease can aid in the evaluation of risk factors for disease in wild populations. Quantifying the causes of pinniped strandings also provides information to rehabilitation facilities that can be used to plan appropriate veterinary care. Tracking human interactions in stranding events over time can aid in assessing the impact of human encroachment on the habitat of pinnipeds (Colgrove et al., 2005).