

Sable Island consisted of very small prey, such as 6–7 cm sand eels and hake, as well as shrimp (Muelbert and Bowen 1993). Two pups aged about six weeks from County Down (including pup 9 of the present studies) were found to have been eating tiny gadoid fish of about 7 cm in length.

Pups aged four to six months in Northern Ireland were found (from fecal analysis) to be eating mainly gadoid fish and flatfish up to 30 cm long, i.e., of the same size as taken by adult seals from the same haul-out site (Wilson and Corpe 1996).

A study of diving behavior in pups aged two to four months found that dive duration was positively correlated with weight and length, but that although pups are so much smaller than adults (a quarter or less body weight), within one month of weaning they were able to exploit food resources in the same areas as adults (Corpe et al. 1995). These authors found that the median dive time for wild pups of 30 kg body weight diving in waters up to 30 m depth was about 105 s (cited by Wilson and Corpe 1996).

During the postweaning fast, harbor seal pups on Sable Island lost about 5.2 kg (about 21% of their weaning body weight) over the first five weeks of the postweaning period, even though they were beginning to feed. Their total body fat was about 33% at weaning, but only about 12% at 40 days postweaning (Muelbert and Bowen 1993). These authors emphasize that the postweaning delay in feeding is due to feeding techniques having to be learned during this period.

From this catalogue of wild pup physical and behavioral development, the problems facing pups released after three to four months or more in an aquarium are readily apparent. They will have missed the opportunity during the first three weeks after weaning (i.e., up to six weeks of age) of exploring their postweaning area; learning about haul-out and tidal rhythms; learning to catch very small prey, probably in the littoral and sublittoral shallow water; and integrating socially with other pups and older seals in the haul-out.

Over the next few weeks they will have missed the opportunity to disperse locally, establish individualized (or possibly group) foraging areas offshore, and learn to dive to 30–40 m for selecting and catching suitable larger prey. It is important to emphasize that wild pups undergo this critical developmental stage between three weeks and three months of age. The harbor seal pupping season—in Northern Ireland and at least some other regions—is generally well synchronized, with most pups being born over a two- to three-week period (Wilson 1974, 1978; unpublished data), so most of the pups of the year in such a population will go through the stages of postweaning development at more or less the same time.

By the time rehabilitated pups are generally released, at three to four months of age or more, the wild pups are geographically orientated, are socially integrated, have learned to feed via several stages, and—at least in the County Down population—have established offshore foraging areas. The older seals in the British Isles populations have completed their postbreeding season molt by late September and the County Down seals are less in evidence at inshore haul-outs. There will therefore be few “guides” for the rehabilitated pups to follow and imitate. The rehabilitated pups will be not only “uneducated” and disorientated, but their diving potential may be impeded by positive buoyancy due to excess body fat and inadequate muscle development. They may also have to unlearn the behavior patterns associated with seeking and feeding on already dead fish, as learned during the months of rehabilitation.

Observations and discussion of rehabilitation procedures at various facilities in Britain, Ireland, and the Netherlands suggest to this author that rehabilitated pups are usually retained for three to four-plus months before release due to:

- the difficulty of developing an artificial feeding formula that simulates the high-fat content of seal milk and allows pups to grow sufficiently fast to be released close to the natural weaning period;

- misapprehension by many rehabilitation establishments concerning the natural parameters and timetable of pup development; and
- commercial considerations (e.g., it may be “desirable” to retain pups in aquaria for public viewing).

The following case studies (and repetition of such studies in the future) begin to tackle the following questions:

1. What are the postrelease behavior patterns and survival records of pups retained in rehabilitation centers for three or more months? How does their behavior differ from that of wild pups from the same population?
2. Can a high-fat liquid formula, which can be digested by pups and fed exclusively until their release, be developed so that the pup growth rate in rehabilitation may approximate that in the wild?
3. Can a rehabilitated pup, stranded at the nursing stage (usually less than one week of age) and released at about one month of age, survive?
4. Can a rehabilitated pup, stranded sick or starving in the immediate postweaning stage (generally three to six weeks) and released as quickly as possible after medical treatment is complete and given only a minimal nutritional boost, survive?

The seven case studies reported here were intended to address these questions, which will be discussed in the Postscript that follows the case study reports.

Note: References for this Introduction are given following the Postscript, on page 25.

ABBREVIATIONS USED IN THESE STUDIES	
s	seconds
min	minute
hr	hour
d	day
kg	kilogram
m	meter
km	kilometer
n	number
ml	milliliter